

**Guidance for the Cleanup of Clandestine  
Chemical Laboratories  
July 2007**

**New Hampshire Government Leaders  
Methamphetamine Task Force  
Environmental Protection Workgroup**

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# **Guidance for the Cleanup of Clandestine Chemical Laboratories**

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## I. Introduction

The New Hampshire Department of Environmental Services (DES), Department of Safety and Department of Health and Human Services (DHHS) have collaborated to produce this document to provide guidance for property owners, cleanup contractors, government agencies and local authorities related to the cleanup of clandestine chemical labs. This guidance is based on documents produced by other states with special appreciation for the work produced by Connecticut, Minnesota, Arizona, Colorado, Oregon, and Washington.

Although methamphetamine production is not the only type of clandestine chemical labs (CCL) activity, methamphetamine labs are the most common and will be the focus of this document. Contractors working on remediation of other illegal chemical labs may contact DES at (603) 271-3899 for specific advice on remediation of those properties.

Methamphetamine is a highly addictive drug with potent central nervous system stimulant properties. It can be made in small, illegal laboratories, where its production endangers the people in the labs, neighbors, and the environment. For more information about the scope of the methamphetamine problem in New Hampshire, please see the New Hampshire Government Leaders Methamphetamine Task Force's Statewide Strategy, which is available at <http://doj.nh.gov/docs/StatewideMethStrategy.pdf>. The Statewide Strategy and other information about methamphetamine is also available on the DHHS website at <http://www.dhhs.nh.gov/DHHS/ATOD/meth.htm>.

Manufacturing methamphetamine is a simple process and the ingredients can be purchased at retail stores. Methamphetamine production can produce ignitable, corrosive, reactive, and toxic chemicals that pose a threat to human health and the environment. For every pound of methamphetamine produced, approximately five to seven pounds of hazardous waste is created. Hazardous wastes from methamphetamine production may have been deposited in dumpsters, dumped in wooded areas or roadsides, and/or flushed down toilets and drains. Improper disposal of wastes can cause contamination of air, soil, surface water and groundwater.

Several processes and many different combinations of chemicals are used to manufacture methamphetamine (See Appendix A). These processes can produce gas or vapor during the drug manufacturing operation that can result in deposition of contaminants throughout the structure. The distribution of gases and aerosols are often extended by a building's heating, ventilation, and air conditioning system. These vapors and their residues present an exposure hazard for the drug manufacturers, residents, and future occupants of the structure.

Any property on which methamphetamine was produced will require a determination by the DES that the property meets cleanup standards. If the property is sold, transferred, leased or rented prior to the Clearance Determination, the owner of the property, in accordance with RSA 477:4-g, must disclose to the buyer, transferee, lessee or occupant that methamphetamine was produced on the property. The degree of contamination and the amount of cleanup required is dependent upon a number of factors, including the chemicals used, the structure's ventilation, the scale of the production and length of time that the laboratory was in operation, how the materials were handled, and how the wastes were disposed.

There is no law that specifically requires cleanup of CCLs; however, RSA 477:4-g *Notification Prior to Sale, Transfer, Lease, or Rental of Real Property on Which Methamphetamine has Been Produced*, requires a determination that property on which methamphetamine was produced meets cleanup standards established pursuant to rules adopted by DES. Prior to the adoption of rules, the law provides that the determination shall be based on the best scientific methods available. This guidance document is a compilation of the best scientific methods available and, as such, should be used for determining if former drug labs meet cleanup standards, until rules are adopted by DES.

DES cannot require a cleanup of former drug laboratory properties unless there is a violation of the contaminated sites statutes, RSA 146-A *Oil Discharge or Spillage in Surface or Groundwater*, RSA 147-A *Hazardous Waste Management*, RSA 485-C *Groundwater Protection Act* or any violations of rules adopted under those statutes. Methamphetamine is not a regulated compound; therefore, the presence of methamphetamine alone does not constitute a violation of the contaminated sites statutes. Regulated compounds at concentrations below the reportable quantities also do not constitute violations. DES has recently consolidated the various cleanup rules under Env-Or 600, *Contaminated Site Management Rules*. These rules establish cleanup standards for hazardous waste and petroleum compounds and establish procedures and protocols for notification, reporting, investigation, remediation, and management of sites where discharges of contaminants have occurred. There are federal Occupational Safety and Health Act requirements for workers at contaminated sites. It is strongly recommended that former CCL properties be cleaned by contractors that are certified to work in areas contaminated with hazardous chemicals. A list of available contractors can be found at the DES website at [http://www2.des.nh.gov/OneStop/ORCB\\_Web\\_Reports\\_Menu.aspx](http://www2.des.nh.gov/OneStop/ORCB_Web_Reports_Menu.aspx).

Effective remediation involves a cooperative effort among law enforcement officials, state agencies, the local public health officer, the property owner and the remediation contractor. The property owner of a former CCL property is responsible for hiring a licensed professional to perform the cleanup and prepare a Clearance Determination Report to be submitted to DES. DES is responsible for review and approval of the Clearance Determination Report. Properties where DES has made a positive clearance determination will not require any further cleanup activities. At all other properties, if there is a discharge of hazardous waste or petroleum as defined under state law (RSA 146-A, RSA 147-A and 485-C) DES's Waste Management Division (WMD) is responsible for overseeing remediation of the contaminated site. WMD field personnel will determine if there has been a discharge of hazardous waste or petroleum and issue a Letter of Strict Liability for cleanup to the responsible party. Under RSA 147-A, local health officers have the authority to order occupants to vacate a building, structure, or other premises if, after consulting with DES, the officer determines the condition constitutes a clear and imminent danger to the life or health of occupants or other persons.

Generally, the property owner or the individual who generated the hazardous waste or discharged petroleum products to the environment is responsible for any costs associated with the remediation of the contaminated site. However, former CCL sites may be eligible for the Environmental Protection Agency's Brownfields funding under Comprehensive Environmental Response, Compensation, and Liability Act §104(k) section 3.3.1, *Contamination by Controlled Substance Sites*. Sites eligible for Brownfields funding may include private residences, formerly used for the manufacture and/or distribution of methamphetamines or other illegal drugs where there is a presence or potential presence of controlled substances or pollutants, contaminants, or hazardous substances. The EPA publication is available at [www.epa.gov/swerosps/bf/pg/fy06\\_arc\\_final.pdf](http://www.epa.gov/swerosps/bf/pg/fy06_arc_final.pdf).

The roles and responsibilities for property owners, remediation contractors, law enforcement, fire departments, hazmat teams, public health and other agencies are described in the State of New Hampshire Government Leaders Methamphetamine Task Force's Statewide Strategy, which is available at <http://doj.nh.gov/docs/StatewideMethStrategy.pdf>.

## II. Cleanup Strategy

There are two phases of CCL cleanup: removal of gross contamination and remediation of residual contamination. Removal occurs when the laboratory is identified and seized by law enforcement, and bulk chemicals, equipment and wastes are removed.

### 1. Removal Phase

When a CCL is discovered or suspected, it **must be immediately reported to the federal Drug Enforcement Administration (DEA)**. If there is an investigation into the CCL by DEA, the DEA will summon and pay a contract cleanup/waste disposal company for the initial phase of site cleanup. All drug related chemicals, hazardous wastes, and contaminated equipment will be characterized and stabilized for removal by the waste disposal company.

The DEA will notify the local police and fire departments. Local police and fire departments, in consultation with the DEA agent in charge of the operation, will notify and request other resources as necessary. DEA will also notify New Hampshire State Police Dispatch, and request that the NH Hazardous Materials Coordinator and DES be notified. The DES on-call person will notify the DHHS Health Officer Liaison, who will notify the local health officer. Any animals found on the scene may be contaminated and should be referred to local animal control personnel for evaluation and possible decontamination.

Contamination is likely if an active lab, chemical storage area, or signs of previous chemical manufacturing are found in a structure. Contamination should be suspected if evidence of a CCL is found in a vehicle, building or home, if there is evidence of on-site dumping, spillage or staining, and/or there is reason to believe that manufacturing or storage of hazardous material may have occurred in the past.

If contamination is suspected, the DEA will post the property with a hazardous material warning sign prominently displayed on all entryways before leaving the laboratory site. DEA will notify the property owner in writing by certified mail that hazardous precursor materials were discovered and removed from the property. This letter will be copied to DES, the local police and fire departments and the local health officer.

### 2. Remediation Phase

The hazards associated with a former CCL property must be documented in a Clearance Determination Report prepared by a licensed professional such as a remediation consultant or certified industrial hygienist. The Clearance Determination Report will describe the activity at the site, summarize the physical hazards associated with the residual contamination, identify potential exposure routes and those who are likely to be exposed, describe any remediation activities to remove the contamination and provide a comparison of any residual contamination to cleanup standards. The Clearance Determination Report must be submitted to DES for review and approval. Information that must be included in the Clearance Determination Report is outlined in Sections A through D, below.

## **A. Clearance Determination Report**

### **1. Preliminary Site Investigation**

Areas of high-level contamination shall be identified through consultation with the DEA or other on-scene responders. These are areas where chemicals were used, stored, handled or disposed. Areas with obvious spills or staining are also likely to be highly contaminated. Areas where contamination may have been at a moderate level (e.g., adjoining rooms) or at a minimal level (areas distant from any CCL operation and where there is no evidence of handling, storage or disposal of chemicals or waste) shall also be identified.

Other site information to be documented shall include (but is not limited to):

- 1) A property description, physical address, legal description (if possible), physical layout of the property, structural features.
- 2) A list of the hazardous materials removed from the property by the hazardous waste contractor and where those materials were located.
- 3) Photographic documentation of the site.
- 4) Documentation of:
  - Apparent hazardous chemical use or storage areas
  - Apparent waste disposal areas
  - Presumed drug manufacturing areas identified by visible contamination or by law enforcement officials
  - Chemical stains, fire damage, other observable contamination/damage
  - Information about surfaces, furnishings, appliances, and other features
  - Inspection of ventilation system
  - Inspection of plumbing, septic system, sewer system
  - Identification of adjacent areas/units in multiple dwellings that may require cleaning
  - Identification and documentation of areas of contamination
  - Outdoor inspection for evidence of burn or trash pits, discolored soil, or dead vegetation, indicating possible contamination of water and/or soil
  - Sampling of any on-site drinking water supply, if necessary
  - Identification of neighboring structures, wells, surface water, and other potential receptors within 500 feet of the site.

## **2. Hazard Assessment**

The hazard assessment portion of the Clearance Determination Report describes the potential for residual chemical contamination, lists what chemicals may be present, where the contamination has been documented and where it may be expected to be found.

The hazard presented by the residual chemical contamination will depend upon the amount and type of chemicals present. The amount of residual contamination will depend upon the size of the lab, the length of time it operated, methods of chemical storage and disposal, occurrence of chemical spills, and building construction. A statement summarizing all knowledge of these factors shall be included in the hazard assessment.

## **3. Exposure Assessment**

The exposure assessment portion of the Clearance Determination Report describes the uses of the property and the individuals that may be exposed to residual contamination identified during the site investigation. The potential for exposure to residual contamination depends upon where the contamination is, who might come in contact with it and how often contact might occur. How a contaminated area was used is an important factor in estimating frequency of contact. For example, residue in a kitchen or bathroom of a house will likely be contacted more frequently than residue in a non-residential outbuilding.

The future inhabitants or users of the contaminated site should also be identified in the exposure assessment. For example, young children who may crawl on carpets or floors, might have high frequency contact with residual contamination, the potential for young children to occupy the space should be identified in the exposure assessment.

## **4. Determination of Remediation Requirements**

The remediation requirements section of the Clearance Determination Report summarizes the findings of the site investigation, hazard assessment and exposure assessment to determine the necessity for remediation.

Remediation is likely to be necessary in any residential structure where lab, equipment or chemical residues were found. Garages or other buildings attached to an occupancy structure are also considered to be “occupancy structures.” Remediation of non-occupancy structures is not always required if neither laboratory nor chemicals are found. Remediation or assessment is recommended for any vehicle or structure that has the potential to be occupied. DES may require sampling of any non-occupancy structures on a property where there is evidence of possible contamination, or where anecdotal information suggests drug manufacturing may have occurred.

If remediation is necessary, either the building owner or the cleanup contractor is required to develop a site safety plan and a remedial action plan that summarizes the inspection of the premises and includes the elements described in the Workplan Guidance section below. The workplan must be reviewed and approved by DES prior to remediation efforts. After the remediation is complete, indoor air and surface sampling for compounds identified in the preliminary site investigation may be required in order to document that the cleanup meets the standards established by DES.

### III. Remediation Workplan Guidance

If the Clearance Determination Report indicates that remediation is necessary, DES will coordinate with the property owner and the local health officer to ensure that the property is safe for reoccupation. The building owner or cleanup contractor must develop a remediation workplan and submit it to for review and approval by DES.

#### 1. Target Cleanup Levels

The focus of this guidance document is the management of chemical residues within structures. For this purpose, if a CCL was used for methamphetamine production, methamphetamine will be used as a surrogate for all other potential contaminants. This is based on the premise that removal of the residual methamphetamine will also provide adequate management of other contaminants. The levels of methamphetamine residue are used as an indication of surface contamination. Cleanup levels for methamphetamine across most states and range from 0.05 to 0.1 micrograms per square centimeter ( $\mu\text{g}/100\text{ cm}^2$ ).

Because of the uncertainties involved in estimating the risk posed by chemical residues from methamphetamine laboratories, the cleanup target that will be used in New Hampshire is the detection limit: 0.1  $\mu\text{g}$  methamphetamine/ $100\text{ cm}^2$  of surface area sampled. This cleanup target requires removal of any contamination that is detected to ensure safety of future building occupants. Table 1 presents cleanup targets for methamphetamine and related contaminants that may be found at methamphetamine labs.

**Table 1. Target Cleanup Levels for Remediation of Former Methamphetamine Labs**

<b>Chemical</b>	<b>Cleanup Standard or Action Level</b>
Corrosives	Surface pH 6-8
Volatile Organic Compounds (VOCs)/Solvents	Total VOCs in air 1 part per million*
Methamphetamine	0.1 $\mu\text{g}/100\text{ cm}^2$
Ephedrine/Pseudoephedrine	0.1 $\mu\text{g}/100\text{ cm}^2$
Red Phosphorus	Removal of stained material
Iodine	Removal of stained material 22 $\mu\text{g}$ iodine/ $100\text{ cm}^2$
Mercury	1 $\mu\text{g}/\text{m}^3$
Lead	40 $\mu\text{g}/\text{ft}^2$ wipe sample

Abbreviations:

VOCs - volatile organic compounds

$\mu\text{g}$  - microgram

$\text{cm}^2$  - square centimeter

$\text{ft}^2$  - square foot

\*Note: Please see section 3-B for a discussion of indoor air testing and interpretation of results.

The extent of contamination and the type of material that has been contaminated will determine the cleaning methods necessary and the likelihood that cleaning activities will be successful. A single cleaning event may not achieve a guideline level of  $< 0.1 \mu\text{g}/100 \text{ cm}^2$  when pre-cleaning concentrations are above  $10 \mu\text{g}/100\text{cm}^2$ . Removal rates of seventy to ninety percent are typically achieved with each wash-and-rinse cleaning event. Decontamination solutions containing a weak oxidizer like dilute bleach or hydrogen peroxide have been shown to be effective. It may often be more cost effective to discard porous furnishings (e.g., upholstery, carpet, draperies) rather than trying to clean them, and to paint or wallpaper walls after a single wash.

In areas of moderate and high level contamination, the best course of action is to discard everything including all furniture, household furnishings, carpeting, and all porous building materials (e.g., ceiling tiles). These items should be destroyed or otherwise rendered useless to prevent any further reuse as a result of scavenging at the ultimate disposal site. Asbestos is commonly found in heating system insulation, vinyl floor tiles and sheet flooring, and a variety of other building construction products. These materials are required to be tested for the presence of asbestos before removal. All asbestos must be removed prior to any building demolition project. In most cases, asbestos abatement activities must be performed by a licensed abatement contractor. Lists of accredited asbestos inspectors, licensed abatement contractors, and approved disposal facilities are maintained by DES. For more information about asbestos hazards, please visit the DES website at [www.des.nh.gov/ARD/asbestos.htm](http://www.des.nh.gov/ARD/asbestos.htm).

Hard, non-porous building elements such as walls, floors, pipes, etc. can be thoroughly cleaned and recoated, e.g., paint on walls, new finish on floors. If all hard surfaces have been thoroughly washed and resurfaced and if all porous materials have been removed, final clearance testing is not necessary, although it is still recommended. Clearance testing can help document successful decontamination and suitability of the unit for new occupants.

It would be ideal to mitigate areas of low-level contamination as well, since it is difficult to guarantee that methamphetamine or related chemicals were not at some point taken into portions of the building remote from the operation for the purposes of storage, concealment or personal use. Additionally, air handling systems and foot traffic may have transported contamination into distant areas. If it is possible to identify areas that are unlikely to be contaminated, a round of cleaning of walls, floors, carpeting, and other furnishings should still be conducted. Wipe sample testing of walls and floors can help document whether a remote area has received contamination and needs cleaning or more aggressive measures. The procedure for collecting a wipe sample is included in Appendix B. This procedure is in accordance with the OSHA Technical Manual ([www.osha.gov/dts/osta/otm/otm\\_toc.html](http://www.osha.gov/dts/osta/otm/otm_toc.html)).

## **2. Interior Remediation Procedures**

### **A. Ventilation**

During a criminal investigation or gross chemical cleanup, the laboratory site is generally vented for the safety of onsite personnel. However, it may be sealed for security reasons when law enforcement and hazardous materials teams leave the scene. Any structure used as a former CCL should be aired out for three to five days. It may be beneficial to close up the building, raise the indoor air temperature to 90° F, and then air it out. Ventilation should continue throughout the cleanup except during the assessment of residual odors. Care must be taken that vented contaminants are exhausted to the outdoors and away from the air intakes of any adjacent structures. Ventilation will not remove non-volatile residues. The use of respirators may be required if adequate ventilation cannot be obtained.

### **B. Surface Decontamination**

#### **1. Areas of Moderate or High Level Contamination**

##### **a. Porous Materials**

Absorbent materials can accumulate vapors that are created and dispersed during the drug manufacturing process or can collect dust and powder from chemicals used in drug manufacture. Disposal of all carpeting, furnishings and porous building materials is recommended. However, depending on the type of chemicals used and the extent of the contamination, these materials may be determined to be hazardous waste. If so, it is necessary for the owner to have these items tested for contaminant levels and then have the material handled accordingly by Occupational Safety and Health Administration Hazardous Waste Operations and Emergency Response Standard (29 CFR 1910.120) trained individuals and licensed hazardous waste transporters. Sampling procedures for porous surfaces are described in Appendix C. Be aware that certain porous building materials such as ceiling tiles may contain asbestos. These materials must be tested and then removed by a licensed asbestos abatement professional. Also asbestos material must be disposed at a facility licensed to accept asbestos in accordance with DES Solid Waste Rules.

##### **Household items made of wood and wood-like composites**

The disposition of these generally porous items is dependent on the finish and ability of the item to be detergent washed, as well as on the consideration of value and assessed potential contamination. Such items, if considered cleanable, should be twice-washed, rinsed, and if possible, coated with an oil-based finish.

##### **Household books and paper items**

Paper goods are extremely porous. Any paper items near the area of a known CCL should be destroyed and discarded. Paper goods stored in file cabinets, closed bookcases, or cupboards in rooms where wipe samples show non-detectable levels of contamination should be salvageable. However, given the uncertain history of most labs, the decision for the disposition of such porous materials should err on the conservative side.

## **b. Non-porous Materials**

Non-porous materials including household items made out of glass, hard plastics, metals, and ceramics can generally be cleaned (twice-washed) with hot water and soap. Anything used in the drug manufacturing process may need to be disposed of as hazardous waste. Wash water and other waste generated during the cleanup process should be disposed properly to prevent the possibility of recontamination.

### **Detergent washing and encapsulation of contaminated hard surfaces**

Hard interior surfaces such as walls, tile and wood flooring, sheetrock ceilings and paneling, and hard furniture or appliances (wood or porcelain) can retain contamination from the drug manufacturing process. These surfaces should generally be twice scrubbed using a standard detergent solution and then rinsed with water. If a surface has visible contamination or staining, cleaning methods may not work and complete removal and replacement of that surface may be required.

Detergent or solvent scrubbing of walls and floors is a necessary first step to removing contamination. When completed, these hard surfaces should be recoated with a new layer of paint or floor treatment such as wax or other floor finish. This creates a barrier between the surface and any residual contamination when paint or another physical barrier is applied. Complete coverage may require more than one coat. These areas should be monitored and the barrier maintained to assure that the contamination is contained. If staining, odors or discoloration appear after the coating dries, removal and replacement of that surface section may be necessary.

### **Major Household Appliances**

Major household appliances, such as refrigerators and stoves that have insulation or other inaccessible parts that are suspected or likely to be contaminated should be removed and discarded. Appliances can be evaluated on a case-by-case basis, with attention to: 1) site type, e.g., residence or licensed facility, and proximity to laboratory activity; 2) use during drug manufacture, e.g., chemicals stored in refrigerators, or cooked on stoves; 3) use in the home, e.g., washer/dryer vs. refrigerator; 4) ability to be cleaned (hard surface vs. porous material); and 5) cost/benefit of disposal vs. cleaning.

### **Chemical Spill Residues**

If any liquid or powder residues remain after DEA removal, contact the DEA to determine if it is their responsibility. If it is not, powders and liquids throughout the structure shall be tested to determine their corrosivity, toxicity, and flammability. Locations of suspected contamination shall be tested with pH paper using de-ionized water. Acids should be neutralized with sodium bicarbonate (baking soda); and bases with weak acid wash solutions, e.g., vinegar, citric or acetic acid. Solids can be scooped up and packaged for proper waste disposal. Liquids can be adsorbed with clay or another non-reactive material and packaged for proper waste disposal. As stated previously, only OSHA 29 CFR 1910.120 trained individuals are authorized to perform this task. After neutralization, pH paper shall be used to check the surface.

### **c. Heating and Ventilation Systems**

Heating, ventilation and air conditioning systems tend to collect vapors and dust and redistribute them throughout the structure. The vents, ductwork, filters, walls and ceilings near ventilation ducts can become contaminated. If assessment information indicates that the ventilation system may be contaminated, consideration should be given to hiring an OSHA 29 CFR 1910.120 trained cleanup contractor. The contractor should replace all filters in the system, remove and clean vents, clean the surfaces near system inlets and outlets, and clean ductwork.

In hotels, motels, connected apartments or other multiple-family dwellings, a ventilation system may serve more than one unit or structure. These connections must be considered when writing the workplan. One strategy is to take samples from adjacent or connected areas/rooms/units, working outward from the laboratory site until samples show low levels or no contamination.

### **d. Plumbing, Septic and Sewer Systems**

Most liquid chemical byproducts from CCLs are dumped into laundry and bathtubs, sinks, drains, and toilets. Chemicals and contaminated wastes can collect in drains, traps and septic tanks. Disposal to a septic system can be indicated by staining or etching on sinks, toilets or bathtubs, the residual chemicals in plumbing traps or chemical odors emanating from plumbing. Evidence of disposal to the on-site septic system may include visible and olfactory evidence of chemicals in the septic tank and stressed vegetation in the area of the leach field. If the property is serviced by a municipal sewer system, household plumbing should be cleaned and the wastewater treatment facility should be notified.

If the contents of a septic tank are determined to be contaminated with chemical byproducts, a licensed hazardous waste transporter must pump, haul, and dispose of the contents at an approved disposal facility because licensed septic system handlers are not authorized to do such work. Testing of the contents of the septic tank (septage) may be needed to determine if the wastewater is contaminated. If septic system contamination is suspected, the leaching system must also be evaluated to determine if additional contaminated wastewater can be recovered. Many leaching systems, especially hollow structures such as leaching galleries or pits, can store more than 1,000 gallons of liquid.

## **2. Areas of Low-Level Contamination**

In portions of the structure that are physically separate from drug manufacturing areas, where no visible staining or contamination is present, and which were unlikely to have received contamination via foot traffic or air flow, consideration should still be given to complete cleaning of hard surfaces and removal of porous materials. However, if removal of porous materials is not practical, these materials should be thoroughly cleaned. Fabric-covered furniture, carpeting and other porous furnishings can be cleaned with detergent. Cleaning of porous materials will usually consist of vacuuming using a machine equipped with a high-efficiency particulate air (HEPA) filtration system followed by at least one hot water detergent scrubbing and extraction. If non-washable materials such as lined curtains, are not heavily contaminated, dry-cleaning is permissible. Porous drop ceilings in areas of low-level contamination should be HEPA-vacuumed. Because popcorn ceilings may contain asbestos they should be left undisturbed and a sample collected to determine the level of contamination.

An area far from the drug manufacturing area that has been cleaned or determined to be free of contamination can serve as a storage area for any portable items cleaned during remediation. The doors or openings to these areas should be cordoned off with heavy plastic sheeting (4-6 mil) to avoid recontamination during further cleaning of the site.

### **3. Post-cleanup Assessment: Interior Environmental Testing**

If sampling of a former CCL is necessary, it must be conducted under the supervision of a licensed professional such as a remediation consultant or certified industrial hygienist, with oversight from DES. Decisions regarding the workplan will be made based on the preliminary assessment information, such as the chemicals used, duration of operation and the apparent extent of contamination. After complete cleanup, small amounts of residual chemicals may remain. Post-cleanup sampling is recommended and shall involve at a minimum, wipe sampling for methamphetamine residues on hard surfaces.

Written documentation showing that the cleanup has been completed and the cleanup meets DES standards shall be submitted to DES and the local health officer. This report shall summarize the inspection, work performed and data collected, and be prepared by a licensed professional. The report will be reviewed by DES to determine if cleanup standards are met. The report will also be reviewed by the local health officer, who should make a final inspection of the premises to ensure that the property is suitable for re-occupancy.

#### **A. Surface Sampling**

After complete cleanup, small amounts of residual chemicals may remain. If there is concern about remaining contamination after cleaning, or if the property still has an odor, visible staining, or causes physical irritation to those exposed, additional surface sampling may be warranted. If there is a concern about future exposures at the property, post remediation wipe sampling for the presence of methamphetamine is recommended. The procedure for collecting a wipe sample is included in Appendix B.

#### **B. Indoor Ambient Air Quality Sampling**

In cases of heavy contamination, indoor air sampling for volatile organic compounds (VOCs) may be recommended before and after cleaning. Sampling shall be conducted with a photo-ionization detector, flame ionization detector or similar instrument to determine that the former CCL has been cleaned to reasonable background levels, i.e., concentration similar to ambient outdoor air. A sweep through the entire building shall be made with an accurate record kept of all readings in every room. Additionally, each drain to the septic system should be flushed to remove any chemicals that may have accumulated in the drain trap. Field screening will provide information regarding the concentration of total VOCs in the structure, which is important for monitoring exposures for worker protection. Field screening may also provide information regarding the severity of contamination and the areas on which to focus cleanup efforts.

If there is sufficient concern about residual vapor concentrations after cleanup, indoor air may be tested to determine the concentrations of specific chemicals. In most cases, indoor air testing may not be necessary as long as an adequate cleanup has been performed. The presence of residual methamphetamine laboratory related chemicals may be hard to distinguish from background levels of commonly used household chemicals. Because of the potential problem of background interference, and the relatively high cost associated with collecting and analyzing indoor air samples, the use of indoor air testing may not be the most practical way to evaluate the effectiveness of a cleanup. If indoor air sampling is conducted, it shall be performed by an environmental professional familiar with indoor air sampling techniques. Prior to collecting an indoor air sample for VOCs, the indoor air temperature shall be maintained at 70° F or above for a minimum of 24 hours.

## **4. Exterior Evaluation and Remediation**

An inspection of the exterior of the CCL site to determine if there is evidence of surface and/or subsurface releases of hazardous materials shall be conducted. Chemicals may have been dumped on the ground surface, burned or buried. Areas of disturbed or stained soil or stressed vegetation may indicate locations where wastes have been improperly disposed. Chemical containers are often stockpiled on the property because discarding them in the common trash may arouse suspicion. In addition, liquid and solid wastes from a CCL may have been disposed of in burn pits or barrels.

Please contact the DES Spill Response and Complaint Investigation Section for advice on how to cleanup contamination outside of the structure. If the initial inspection reveals the possibility that waste materials were released to the environment, soil and groundwater contamination threats exist and an Initial Site Characterization shall be conducted. The Initial Site Characterization and further investigation and remediation shall be completed in accordance with Env-Or 600. The purpose of the Initial Site Characterization is to (1) determine the location and estimated quantity of the discharge and any response actions taken; (2) determine the nature and extent of contamination encountered; and (3) identify nearby receptors. Each of these goals is elaborated below with specific reference to investigations of CCL sites.

### **A. Source, Location and Quantity of Discharge and Summary of Response Actions**

Locations of releases can be determined by collecting samples of soil and groundwater in the potential release locations identified during the initial inspection. Samples shall be collected from areas likely to represent worst-case conditions. Estimating the quantity of the discharge may be difficult, however an attempt to quantify the amount released can be based on concentrations present in the affected media applied over the impacted area. A determination of response actions taken shall include a description of the bulk chemicals, equipment and wastes removed by law enforcement during the initial removal of gross contamination. Based on this information, a decision may be made that further Initial Response Actions are necessary to reduce risks to human health and the environment.

### **B. Nature and Extent of Contamination**

It is important to adequately characterize the nature and extent of the impacted media to understand risk to potential receptors. Proper characterization of the nature and extent of impacts also allows a better estimate of the extent of remediation that will be required. In cases where impacts are minor and limited to soil, the nature and extent of contamination may be adequately characterized by soil removal conducted during an Initial Response Action. If it is determined that the possibility of groundwater contamination exists, groundwater quality shall be assessed.

### **C. Identification of Nearby Receptors**

The Initial Site Characterization requires a preliminary assessment of receptors and potential receptors located within 500 feet of the site. These shall include drinking water supply wells and surface water bodies.

### **D. Initial Site Characterization Report**

The specific items to be included in the Initial Site Characterization Report can be found in Env-Or 605.09. This report shall be submitted to the DES Waste Management Division for review. Upon review of the Initial Site Characterization, the DES will determine if further investigation or remediation is required.

## **IV. References**

- Arizona, R4-30-103 through 305 Board of Technical Registration, August 7, 2004.
- Code of Federal Regulations 29 CFR-1910.120 Hazardous Waste Operations and Emergency Response.
- Colorado Department of Public Health and the Environment, 6CCR 1014-3 Regulations Pertaining to the Cleanup of Methamphetamine Laboratories, January 9, 2005.
- Colorado Department of Public Health and the Environment, Cleanup of Clandestine Methamphetamine Labs Guidance Document, July 2003.
- New Hampshire Code of Administrative Rules, Chapter 141-E Asbestos Management and Control, September 12, 2005.
- New Hampshire Code of Administrative Rules, Chapter Env-Or 600 Contaminated Site Management, February 1, 2007.
- New Hampshire Code of Administrative Rules, Chapter Env-Sw 901 Asbestos, October 28, 2005.
- New Hampshire Code of Administrative Rules, Chapter He-P 5000, Asbestos Management Rules, March 23, 2001.
- New Hampshire Statutes, RSA 146-A Oil Discharge or Spillage in Surface or Groundwater, July 1, 1996.
- New Hampshire Statutes, RSA 147-A Hazardous Waste Management, July 20, 1999.
- New Hampshire Statutes, RSA 477.4-g Notification Prior to Sale, Transfer, Lease, or Rental of Real Property on Which Methamphetamine has been Produced, January 1, 2007.
- New Hampshire Statutes, RSA 485-C Groundwater Protection Act, August 21, 2006.
- New Hampshire, Government Leaders Methamphetamine Task Force, Statewide Strategy, March 2006.
- Occupational Safety and Health Administration Technical Manual.  
[http://www.osha.gov/dts/osta/otm/otm\\_toc.html](http://www.osha.gov/dts/osta/otm/otm_toc.html)
- Oregon Drug Lab Cleanup Program, Chemicals Used in Methamphetamine Manufacture, June 24, 2005.
- Washington Department of Health, Guidelines for Environmental Sampling at Illegal Drug Manufacturing Sites, November 30, 2005.

## **V. Appendices**

## Appendix A –Methamphetamine Production Method Representative Chemicals

### 1) Red phosphorus Method

Substances commonly associated with this method include:

Hydrochloric acid	Methanol
Hydriotic acid	Hydrogen Peroxide
Sulfuric acid	Naphtha (Coleman fuel)
Sodium hydroxide (lye)	Acetone
Sodium chloride (salt)	Benzene
Red phosphorus	Toluene
Iodine	Ethyl Ether (Starter fluid)
Isopropyl alcohol	Freon
Ethyl alcohol	
Hydrogen chloride gas	
Chloroform	
Charcoal lighter fluid (mineral spirits, petroleum distillate)	

Also included may be:

- Acetic acid
- Methyl-ethyl-ketone (MEK)
- Hypophosphorus acid

Waste generated may include:

- Potentially flammable extraction process sludges
- Phosphine gas
- Hydriotic acid
- Hydrogen chloride gas
- Phosphoric acid
- White or yellow phosphorus

### 2) Birch Method (Also called the “Ammonia” or “Nazi” method.)

This method relies on a plentiful supply of anhydrous ammonia, which is most commonly used in commercial freezers and agricultural applications.

Substances associated with this method include:

Anhydrous ammonia	Lithium metal
Chloroform	Methyl-ethyl-ketone (MEK)
Ethanol	Methanol
Ethyl ether	Naphtha
Freon	Sulfuric acid
Hydrogen chloride gas	Sodium chloride
Hydrochloric acid	Toluene
Isopropyl alcohol	Sodium metal

Wastes generated include:

- Potentially flammable extraction process sludge
- Hydrogen chloride gas

### 3) Amalgam or P2P Methods

This method uses phenyl-2-propanone (P2P) and methylamine as precursors.

Other substances used are mercuric chloride, lead acetate, and many other substances. However, this method is much less common and has not been seen in many states.

## **Appendix B - Collection of Non-Porous Surface Samples (Wipe Samples)**

Sampling is performed to establish the presence of methamphetamine. To determine the extent of contamination on non-porous surfaces (tile, linoleum and Formica), a technique known as “wipe” sampling is used.

Samples should be taken using methanol-dampened wipes. Wipes can be filters, gauze pads or swabs. The sampler should have clean hands and must wear gloves during each sampling event to avoid contaminating samples. Post-remediation sampling should be performed after washing and painting or sealing of walls and surfaces.

The following procedure is recommended for collecting wipe samples:

1. If multiple samples are to be taken at the worksite, prepare a rough sketch of the area to be wipe sampled.
2. A new set of clean, impervious gloves should be used for each sample to avoid contamination of the filter by previous samples (and the possibility of false positives) and to prevent contact with the substance.
3. Withdraw the filter from the vial with your fingers or clean tweezers. If a damp wipe sample is desired, moisten the filter with distilled water (lead samples) or other solvent (methanol for methamphetamine samples) as recommended.
4. Depending on the purpose of the sample, it may be useful to determine the concentration of contamination (e.g., in micrograms of agent per area). For these samples, it is necessary to record the area of the surface wiped (e.g., 1 square foot). This would normally not be necessary for samples taken to simply show the presence of the contaminant.
5. Firm pressure should be applied when wiping.
6. Start at the outside edge and progress toward the center of the surface area by wiping in concentric squares of decreasing size.
7. Without allowing the filter to come into contact with any other surface, fold the filter with the exposed side in. If possible, use the same filter to repeat the sampling of the same area, then fold it over again. Place the filter in a sample vial, cap the vial and number it, and note the number at the sample location on the sketch. Include notes with the sketch giving any further description of the sample.
8. At least one blank filter prepared in the same fashion, but without wiping, should be submitted for each sampled area.

## Appendix C - Collection of Samples from Porous Surfaces (Vacuum Sampling)

Sampling to establish the presence of methamphetamine on porous surfaces is only satisfactory for a qualitative (absence or presence) identification of the chemical.

Typical sample materials are carpet, drapes, upholstered furniture, brick or cinderblock, raw wood, or any surface with accumulated dust particles.

Equipment needed:

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

The following procedure is recommended for collecting vacuum samples:

1. If multiple samples are to be taken, prepare a rough sketch of the areas to be sampled. Visibly soiled, dusty, or heavily used areas are good choices for sampling.
2. Each sampling area should be measured and delineated, typically 4" x 4," or 6" x 6".
3. Calibrate the vacuum pump. The pumps should be calibrated to approximately 20 L/min (with exact calibration flow rate recorded) before the sampling project begins. Confirmation of the calibration can be periodically checked between samples and must be confirmed at the end of the sampling project. The calibration should be performed while the tubing and type of filter cassette to be used during sampling are attached to the pump. If desired, an in-line field rotameter can be used throughout the sampling process to monitor the flow rate.
4. Sample the area for one minute, taking a minimum of two passes over the area, at right angles to each other.
5. Immediately after an individual sample has been collected, the pump should be turned off so that no extraneous material will be collected. Disconnect the filter cassette, seal and label the sample.

## Appendix D – Contact Information and Additional Resources

Local law enforcement - Call 911

Department of Safety  
Division of State Police  
33 Hazen Drive  
Concord, NH 03305  
Hazardous Materials Emergencies: 1-800-346-4009  
[www.nh.gov/safety/divisions/nhsp/](http://www.nh.gov/safety/divisions/nhsp/)

Anonymous Tips: 1-800-NAB-DOPE  
Fax: (603) 271-6497  
[isb@safety.nh.gov](mailto:isb@safety.nh.gov)

United States Drug Enforcement Administration  
New England Division  
Manchester (603) 628-7411  
Portsmouth (603) 334-6006  
[www.DEA.gov](http://www.DEA.gov)

New Hampshire Department of Environmental Services  
29 Hazen Drive  
Concord, NH 03302  
[www.des.nh.gov/](http://www.des.nh.gov/)

Note: To report spills and other environmental emergencies during business hours (8:00 am - 4:00 pm, Monday - Friday) contact the Hazardous Materials/Waste Spills unit at (603) 271-3899. At all other times contact DES via the NH State Police at (800) 346-4009.

Other relevant DES programs:  
Hazardous Waste Remediation  
(603) 271-3744

Environmental Health Program  
(603) 271-4664  
[www.des.nh.gov/ARD/EHP/](http://www.des.nh.gov/ARD/EHP/)

New Hampshire Fire Marshal's Office  
33 Hazen Drive  
Concord, NH 03305  
(603) 271-3294  
email: [fmo@safety.state.nh.us](mailto:fmo@safety.state.nh.us)

Department of Justice  
Environmental Protection  
33 Capitol Street  
Concord, NH 03301-6397  
(603) 271-3679  
<http://doj.nh.gov/>

### **Additional Resources:**

A list of Licensed Remediation Consultants maintained by DES is available at:  
[//www.des.nh.gov/orcb/doclist/pdf/consult.pdf](http://www.des.nh.gov/orcb/doclist/pdf/consult.pdf)

New Hampshire Government Leaders Methamphetamine Task Force *Statewide Strategy* March, 2006. <http://doj.nh.gov/docs/StatewideMethStrategy.pdf>.

New Hampshire Department of Health and Human Services website  
Alcohol, Tobacco and Other Drug Services  
Methamphetamine and New Hampshire  
[www.dhhs.nh.gov/DHHS/ATOD/meth.htm](http://www.dhhs.nh.gov/DHHS/ATOD/meth.htm)

Drug Enforcement Administration and Environmental Protection Agency: Guidelines for Law Enforcement for the Cleanup of Clandestine Drug Laboratories - 2005 Edition  
[www.dea.gov/resources/redbook.html](http://www.dea.gov/resources/redbook.html)

Clandestine Drug Lab General Cleanup Guidance  
Minnesota Department of Health, Minnesota Pollution Control Agency. April 3, 2007.  
[www.health.state.mn.us/divs/eh/meth/lab/guidance0407.pdf](http://www.health.state.mn.us/divs/eh/meth/lab/guidance0407.pdf)

Michigan Department of Community Health maintains a Methamphetamine Resource Site with many useful links.  
[www.michigan.gov/mdch/0,1607,7-132-2941\\_4871-68417--,00.html](http://www.michigan.gov/mdch/0,1607,7-132-2941_4871-68417--,00.html)