Alaska Department of Environmental Conservation

Guidance and Limits for Cleanup of Illegal Drug-Manufacturing Sites

FINAL

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Prepared for:

ALASKA DEPARTMENT OF ENVIRONMENTAL CONSERVATION
Spill Prevention and Response Division
Prevention and Emergency Response Program

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List of Abbreviations and Acronyms

Acronym	Definition
ADEC	Alaska Department of Environmental Conservation
AS	Alaska Statute
C	Celsius
EPA	United States Environmental Protection Agency
F	Fahrenheit
FID	flame ionization detector
ft^2	square feet
HAZMAT	hazardous materials
HAZWOPER	Hazardous Waste Operations and Emergency Response
HB	House Bill
HEPA	high-efficiency particulate air
HI	hydriodic acid
$\mu g/100\ cm^2$	micrograms per 100 square centimeters
MDOH	Minnesota Department of Health
MEK	methyl ethyl ketone
meth lab	illegal methamphetamine laboratory
ng/m^3	nanograms per cubic meter
NIOSH	National Institute of Occupational Safety and Health
OSHA	Occupational Safety and Health Administration
PA	preliminary assessment
PERP	Prevention and Emergency Response Program
P2P	phenyl-2-propanone
PID	photoionization detector
PPE	personal protective equipment
ppm	parts per million

TSP	trisodium phosphate
VOCs	volatile organic compounds
WDOH	Washington State Department of Health
XRF	X-ray fluorescence

1 Introduction

In July 2003, the Alaska Legislature passed House Bill (HB) 59, "An Act relating to the evaluation and cleanup of sites where certain controlled substances may have been manufactured or stored." The impetus for the bill was the increase in illegal methamphetamine drug-manufacturing activities in Alaska. The bill was designed to provide a mechanism for property owners affected by the manufacture of illegal drugs to have their property considered "fit for use" after being decontaminated.

HB 59 was incorporated into Alaska Statute (AS) 46.03.500 to 46.03.599 and directed the Alaska Department of Environmental Conservation (ADEC) to develop and adopt regulations for the evaluation and cleanup of sites where methamphetamine was manufactured or stored (i.e., meth labs). This document, *Guidance for Cleanup of Illegal Drug-Manufacturing Sites*, is incorporated into regulations by reference and includes:

- Cleanup standards;
- Site decontamination guidelines;
- Protocols for collecting samples to verify that the cleanup standards are met;
- Protocols for handling the samples before analysis to ensure that they are not compromised; and
- Methods for analyzing environmental samples collected from affected sites.

During the methamphetamine-manufacturing process, chemical compounds become airborne (volatilized) and settle out, depositing onto walls, ceilings, appliances, floors, carpets, and other typical household items throughout the building's interior. In addition, chemicals used to make the illegal drugs may be spilled during handling. The presence of these chemicals may pose health threats to building occupants and potential liability to property owners.

This document provides guidance for the cleanup and evaluation of building interiors that have been contaminated from activities associated with the manufacture of certain illegal drugs. The guidance provides information

regarding the cleanup of residual contamination found at clandestine methamphetamine laboratory (meth lab) sites after gross chemical removal and before reoccupation. Information contained in this document was adapted from the Washington State Department of Health's (WDOH's) *Guidelines for Contamination Reduction and Sampling at Illegal Drug Manufacturing Sites* (WDOH 1996); the Minnesota Department of Health's (MDOH's) *Clandestine Drug Labs, General Cleanup Guidelines* (MDOH 2003); and other sources.

This guidance document specifies the cleanup standards that ADEC has identified for property owners affected by the illegal manufacture of ***methamphetamine*** to have their property declared "fit for use" after being decontaminated. The document describes the methods to remove residual contamination from building interiors and to verify that cleanup standards have been met via sampling and laboratory analyses.

The guidance document is organized as follows:

- Section 2 provides background information regarding the typical methods used to produce methamphetamine and the associated hazards. It also specifies the cleanup standards that must be met to allow re-occupancy of property. These cleanup standards may be referred to as "fit for use" standards;
- Section 3 describes protocols to be followed to remove residual contamination from building interiors via decontamination of surfaces (through removal, cleaning, and/or encapsulation);
- Section 4 describes the sampling and analytical procedures to confirm that the "fit for use" cleanup standards have been met;
- Section 5 contains a glossary of terms used throughout the document; and
- Section 6 lists references used to prepare the document.

Supporting information is included in several appendices:

- Appendix A provides the form that the property owner must complete and submit to ADEC when requesting removal from the list of clandestine drug laboratory properties;
- Appendix B provides additional forms that ADEC recommends that the property owner use to document decontamination and sampling activities, and to request sample analysis;
- Appendices C and D provide protocols for collecting wipe and vacuum samples, respectively; and

- Appendices E and F provide protocols for collecting air samples for volatile organic compound (VOC) and mercury analyses, respectively.

In addition, property owners or their agents may contact ADEC to obtain a list of laboratories capable of analyzing the samples required by this guidance document.

Although the terms *property* or *residence* are used in this document, this guidance is applicable to the cleanup of any building interior used for residential purposes, including:

- Single family homes/residences,
- Apartments, and
- Hotel/motel rooms.

ADEC emphasizes that the dumping of chemicals outside a residence may affect groundwater, drinking water supplies, surface water, and soil. If it is suspected or if there is evidence that chemicals or wastes were dumped outside the residence, the property owner should notify ADEC for additional guidance.

2 Background Information

This section provides information regarding the methods and chemicals typically used to produce methamphetamine, the general hazards and concerns associated with residual contamination found at an illegal meth lab, the cleanup standards that ADEC has identified, and the process for property owners affected by the operation of an illegal meth lab to have their property declared "fit for use" after decontamination.

2.1 Methamphetamine Manufacturing in Alaska

There are three main methods used to manufacture methamphetamine. These are the red phosphorus, birch, and amalgam or P2P methods. While variations of these methods can be used, the red phosphorus and birch methods are the main cooking methods and are the only two methods that have been found in Alaska.[1] The following sections provide a brief overview of the chemicals or *precursors* used and wastes generated by each method. Several of the listed chemicals are commonly used in household products but are not generally stored in the quantities required to manufacture illegal drugs.

2.1.1 Red Phosphorus Method

The red phosphorus method is also called the *Red P*; *HI*; or *Red, White, and Blue* method. Chemicals commonly associated with this method include hydriodic acid (HI), hydrochloric (muriatic) acid, sulfuric acid, sodium hydroxide (lye), sodium chloride (salt), red phosphorus, iodine, isopropyl alcohol, ethyl alcohol (ethanol), methyl alcohol (methanol), hydrogen peroxide, naphtha (Coleman fuel), charcoal lighter fluid (mineral spirits and petroleum distillate), acetone, benzene, toluene, ethyl ether (starting fluid), Freon, hydrogen chloride gas, and chloroform. Other chemicals that may be used include acetic acid, methyl ethyl ketone (MEK), and hypophosphorus acid. Wastes generated during manufacturing include potentially flammable extraction process sludges, phosphine gas, HI, hydrogen chloride gas, phosphoric acid, and yellow or white phosphorus.

[1] Information received at a meeting with Amanda Leffel, ADEC, and Sgt. Ron Wall, Statewide Drug Enforcement Unit, Tuesday, October 14, 2003. Additional confirmation was received by Scot Tiernan, ADEC, Southeast Alaska Narcotics Enforcement Team.

2.1.2 Birch Method

The birch method, also called the *Ammonia* or *Nazi* method, is reportedly not as common in Alaska as the red phosphorus method. This method relies on a supply of anhydrous ammonia that is most commonly found in commercial freezers and agricultural applications. In Alaska, large commercial freezers are typically associated with seafood-processing operations. Chemicals associated with this method include anhydrous ammonia, lithium metal, sodium metal, isopropyl alcohol, ethyl alcohol (ethanol), methyl alcohol (methanol), hydrogen chloride gas, hydrochloric (muriatic) acid, sulfuric acid, sodium chloride (salt), toluene, naphtha, Freon, ethyl ether, chloroform, and MEK. Wastes generated during manufacturing include potentially flammable extraction process sludges and hydrogen chloride gas.

2.1.3 Amalgam or P2P Method

The third method used to produce methamphetamine is known as the *amalgam* or *P2P method*. This method uses phenyl-2-propanone (P2P) and methylamine as precursors. Mercuric chloride, lead acetate, and many other chemicals are used in the synthesis of methamphetamine via the amalgam method. This cooking method can result in lead and mercury contamination, but it is the least common method because of the limited availability of the precursor since it became regulated, the length of time needed to produce the desired drug, low yield, and low concentration of the finished product.

2.2 Hazards Associated with Clandestine Laboratories

Most of the chemicals used to produce illicit methamphetamine fall within three categories: solvents, metals and salts, and corrosives (i.e., strong acids and bases). Each category has similar toxic and physical properties. Risk of injury from chemical exposure may occur depending on the toxic properties of the chemicals, the physical state (i.e., liquid, gas, or solid), the concentration, and the duration and route of exposure. Most people are aware that skin contact with a strong acid or base can result in injury to the body. However, some people may not be aware that exposure to low or moderate levels of some chemicals over a long period may result in absorption by the body, which can lead to other health effects.

Absorption of chemicals by the body may occur through one or more of the following routes of exposure:

- Inhalation (respiratory),
- Skin or dermal exposure (via direct contact with the skin),
- Ingestion, and
- Injection (via skin puncture with a needle or other sharp object).

The chemicals classified as solvents or corrosives may exist as gases or liquids and thereby produce the greatest potential for inhalation exposure. Chemical substances in the form of fine powders, or particulates, also pose an inhalation

hazard if environmental factors such as air movement keep them suspended in the air.

The final methamphetamine product has considerable potential for adverse effects on the drug user. Toxic properties of the drug include agitation, psychosis, seizures, respiratory arrest, and death. In addition, drugs produced in clandestine laboratories contain numerous contaminants and byproducts that do not have predictable effects on the drug user. However, impurities found in some drugs produced in clandestine laboratories have resulted in severe and permanent neurological disability following intravenous injection. Injury to the liver, kidneys, brain, nerves, and respiratory systems is commonly seen in drug users (WDOH 1996).

After removal of the illicit laboratory equipment and chemicals, residual amounts of some chemical substances may persist on building surfaces and furnishings as a result of spills during methamphetamine production and deposition of volatilized contaminants. Until the residual contamination is completely removed, exposure to it poses a health risk to building occupants where the laboratory was located. Exposure for an extended period of time (months to years to lifetime) is known as *chronic exposure*. Not much is known regarding the chronic health effects from methamphetamine laboratories. However, there is scientific evidence that the chemicals used to manufacture methamphetamine can cause a variety of health effects, including cancer, brain/nervous system injury, injury to the liver and kidneys, birth defects, and reproductive disorders (MDOH 2003). Table 2-1 lists the physical and health hazards posed by some of the chemicals found at illicit meth labs.

The potential for exposure to meth lab residues on surfaces and porous articles (e.g., furnishings) depends on (MDOH 2003):

- **Accessibility of residues and frequency of direct contact:** The likely use of a contaminated area is an important factor in estimating frequency of contact. For example, residues in a kitchen or bathroom of a house will likely be contacted more frequently than residues in a garage;

- **Ability of volatile residues to become airborne:** For example, residues in ventilation systems may be dispersed throughout a residence; and

- **Characteristics of the inhabitants or users of the contaminated site:** For example, toddlers who crawl on contaminated carpet or floors will have high frequency of contact with toxic residues over a considerable area of skin. These residues may directly irritate the skin and/or be absorbed into the body through the skin. In addition, hand-to-mouth behavior exhibited by young children will allow chemicals to be ingested into the body. Hand-to-eye behavior can introduce toxic materials to the

Table 2-1
Chemical Hazards Associated with Illegal Methamphetamine Laboratories

Chemical	Common Legitimate Use	Poison	Flammable	Toxic Vapors	Explosive	Corrosive	Skin Absorption	Common Health Hazards
Acetone	Finger nail polish remover, solvents	X	X	X			X	Reproductive disorders
Anhydrous Ammonia	Disinfectant	X		X		X	X	Blistering, lung damage
Benzene	Varnishes, lacquers	X	X	X	X	X	X	Carcinogen, leukemia
Ether	Anesthetic, starter fluid	X	X		X			Respiratory failure
Freon	Refrigerant, propellants	X		X		X		Frostbite, lung damage
Hydriodic Acid	Driveway cleaner	X		X		X	X	Burns, thyroid damage
Hydrochloric Acid	Mining industry	X		X		X	X	Respiratory damage, liver damage
Iodine Crystals	Antiseptic	X	X		X	X		Birth defects, kidney failure
Lithium Metal	Lithium batteries	X				X	X	Burns, pulmonary edema
Methanol	Brake cleaner fluid	X	X	X			X	Blindness, eye damage
Muriatic Acid	Swimming pool cleaner	X		X		X		Burns, lung damage
Phosphine gas	Pesticides	X		X			X	Respiratory failure
Pseudophedrine	Cold medicines	X						Heart damage
Red Phosphorus	Matches, fireworks	X	X	X	X			Unstable flammable substance
Sodium Hydroxide	Drain cleaners, lye	X		X		X	X	Burns, skin ulcers
Sulfuric Acid	Battery acid	X		X		X	X	Burns, thyroid damage
Toluene	Paint, thinners, solvents	X	X	X	X		X	Fetal damage, pneumonia
Liquid Laboratory Waste	Not applicable	X	X	X	X	X	X	Unknown long-term effects

Source: http://dec.co.riverside.ca.us/fyi/hazards.htm

- eyes. Although all people exhibit these behaviors, infants and toddlers are at greatest risk.

However, if appropriate decontamination procedures are followed, buildings can be reoccupied, because there is no scientific evidence to suggest continuing human health risk after thorough decontamination.

2.3 Development of Cleanup Standards

To meet ADEC obligations within AS 46.03.500 to 46.03.599, the ADEC Prevention and Emergency Response Program (PERP) established an internal work group to identify methamphetamine-manufacturing methods used in Alaska; to evaluate existing heath-based standards for chemical compounds found at meth labs; and to research other state regulations for reoccupation or "fit for use" criteria, decontamination guidelines, sampling protocols, and analytical methods for clandestine methamphetamine-manufacturing sites.

The PERP work group efforts to identify health-based standards for substances found at an illegal meth lab are documented in a paper titled, *'Fit-for-Use' Standards for Sites Associated with Clandestine Drug Labs, Proposal and Basis for Alternative Standards* dated April 29, 2004 (ADEC 2004). The following paragraphs summarize some of the work group's findings.

The work group research determined that no health-based standards exist for methamphetamine and that few applicable standards exist for many of the other chemical substances found at clandestine meth lab sites. The work group also found that a very small percentage of states have adopted detailed regulations for illegal drug laboratory cleanup. However, the work group did identify three states (Arizona, Oregon, and Washington) that have established quantitative decontamination standards for illegal drug laboratories. These states have established cleanup levels for selected contaminants that may be found at a meth lab site. Each state bases its determination that decontamination[2] is sufficient on meeting a standard for methamphetamine as an indicator (i.e., if methamphetamine is not detected, then other chemicals used to manufacture methamphetamine are probably absent as well). A paper by the Washington Office of Environmental Health Assessments (2000), *Review of Contaminant Levels: Guidelines for Clandestine Drug Lab Cleanup*, recommends the current decontamination standard for methamphetamine at 0.1 microgram (µg) per 100 square centimeters (cm^2). The paper acknowledges this standard as not being a health-based standard but one that is based on achievable and measurable results. The assumption is that decontamination processes necessary to reduce the levels of methamphetamine to 0.1 µg/100 cm^2 on surfaces should be sufficient to reduce the concentrations of other methamphetamine-manufacturing chemicals to acceptable levels. However, to ensure that unknown sources of solvents (i.e.,

[2] *Decontamination* is defined in the State of Washington's *Review of Contaminant Levels: Guidelines for Clandestine Drug Lab Cleanup* as "the process of reducing levels of known contaminants to the lowest practical level using current available methods and processes."

VOCs) do not remain at the residence, a 1-part-per-million (ppm) total VOC standard was also recommended.

Cleanup standards for methamphetamine and VOCs are deemed applicable to all methamphetamine-manufacturing sites, no matter which of the three cooking methods was used. The States of Washington, Oregon, and Arizona have also established cleanup standards for lead and mercury for those sites where the amalgam or P2P manufacturing method was used.

In instances where the amalgam or P2P method was employed, the Washington standards specify that concentrations of lead and mercury should be reduced to less than or equal to 20 μg per square foot (ft^2) of lead on surfaces, and less than or equal to 50 nanograms per cubic meter (ng/m^3) of mercury in air.

In its guidelines for contamination reduction (WDOH 1996), the State of Washington states, "There are no absolute guarantees that chronic health effects will be completely eliminated." Nevertheless, the standards are based on "reducing concentrations of known contaminants to the lowest practicable level using current methods and processes." By these means, the cleanup standards minimize chronic health effects associated with residual contamination from former drug laboratory activities, while maintaining the level of effort and costs for decontamination, sampling, and analyses within reason for the property owner.

Many of these methods and practices are being developed in response to the increasing volume of illegal drug laboratory activity in the United States and elsewhere. The accumulation of chemical and health-related data pertaining to former drug laboratories might lead to more precise human health risk-based standards in the future.

2.4 Required Cleanup Standards

Based on the fact that no health-based standards exist for methamphetamine and many of the substances used in methamphetamine production, ADEC recommends adopting the State of Washington's "fit for use" cleanup standards for clandestine meth lab sites. Table 2-2 specifies the required cleanup standards to be obtained in Alaska.

The standards for methamphetamine and VOCs are applicable to any property where methamphetamine has been manufactured using either the red phosphorus, birch, or amalgam method. The lead and mercury standards are applicable only to those properties where the amalgam method was used. The cleanup or "fit for use" standards specified in Table 2-2 apply only to illegal methamphetamine-manufacturing sites (i.e., meth labs). ADEC has not developed standards for other types of drug laboratories, such as those for LSD and ecstasy. Property owners working on cleanup non-meth drug-manufacturing sites should contact ADEC for advice regarding sampling and cleaning of those sites.

Table 2-2
Required Cleanup Standards
Illegal Methamphetamine-Manufacturing Sites[A]

Substance	Cleanup Standard
Methamphetamine	0.1 µg/100 cm^2
VOCs	1 ppm of total hydrocarbons and VOCs in air
Lead[B]	2 µg/100 cm^2
Mercury	50 ng/m^3 in air

Notes:

A. The cleanup standards apply only to illegal methamphetamine-manufacturing sites. ADEC has not developed standards for other types of drug laboratories, such as those for LSD and ecstasy.

B. This is equivalent to the 20-µg/ft^2 standard specified by the State of Washington. A conversion was made to simplify the sampling protocols and to standardize the size of the sampling areas and templates.

ADEC's rationale for establishing standards for determining whether former illegal drug-manufacturing properties are "fit for use" assumes that if decontamination activities are sufficient to remove methamphetamine and VOCs (also lead and mercury if the amalgam/P2P method were used) to acceptable levels, other chemicals will have been sufficiently removed as well.

Property owners should be aware that lead and mercury were commonly added to paints in past years, and in some areas, lead and mercury are present from natural (mineralogical) sources. *Background* concentrations of mercury and/or lead may result in false positives in excess of "fit for use" standards. If a background source is known or suspected, background concentrations must be determined and the applicable cleanup standard would equal background plus the cleanup standard. Property owners should consult ADEC for advice regarding the collection of background samples for lead and mercury.

2.5 Cleanup Process

Figure 2-1 outlines the process for remediating a clandestine laboratory site located in a building used for residential purposes. Initially, a drug bust is made and a hazardous materials (HAZMAT) team under contract to law enforcement officials is responsible for the removal of the illegal drug laboratory and associated chemicals. This process is called *gross chemical removal*, although it is often mistakenly referred to as *cleanup*. Shortly thereafter, law enforcement posts a ***Notice of Illegal Drug Manufacturing Site***, and the notice is served to the property owner. At this point, the property owner is responsible for the cleanup (decontamination), sampling, and laboratory analyses.

001813AL0601/Fig 2-1.cdr_AES

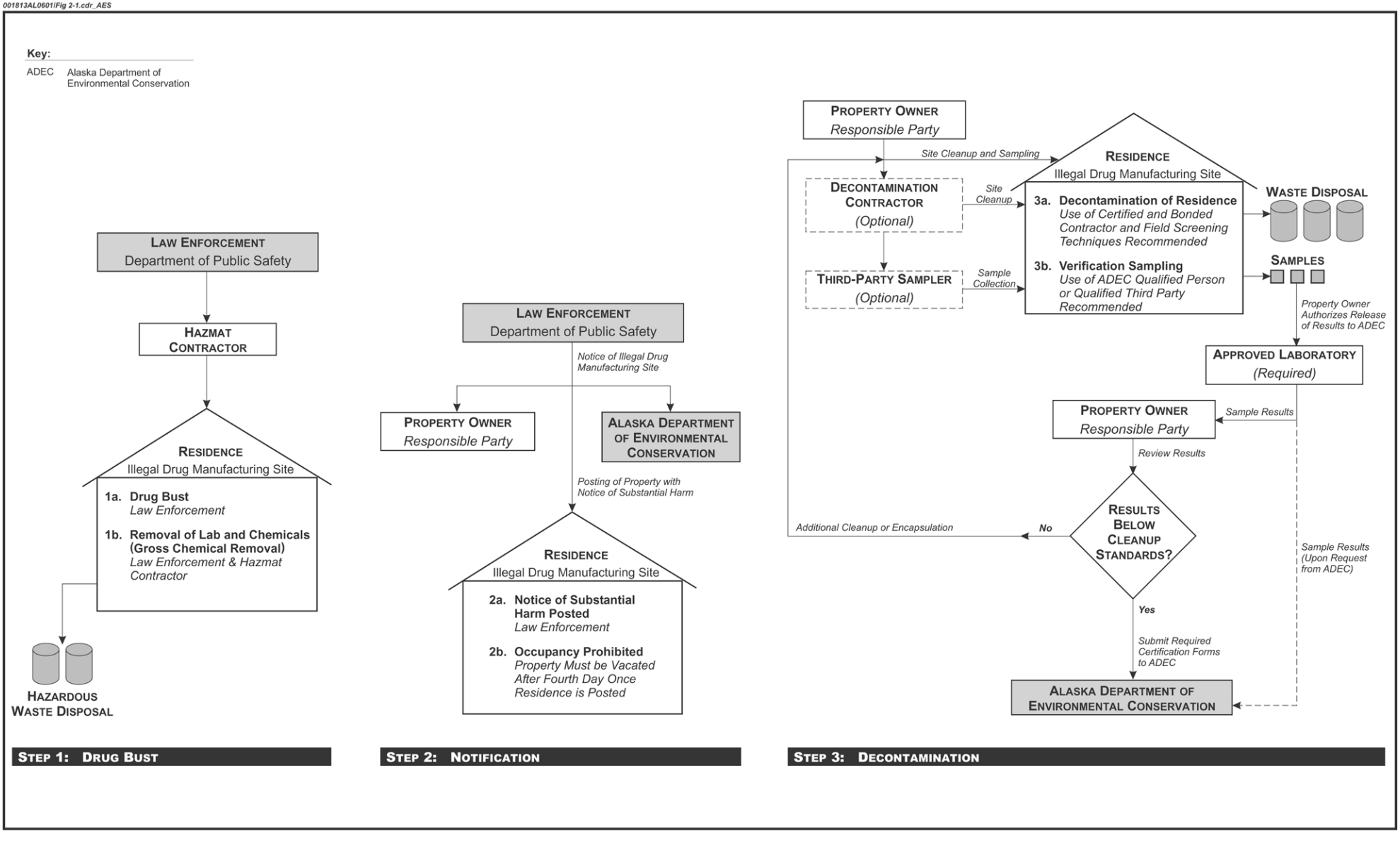

Figure 2-1 Cleanup Process Flowchart for Illegal Drug Manufacturing Sites

When a property owner is officially notified by a law enforcement agency that an illegal drug laboratory was determined to be located on his or her property, ADEC is also notified. ADEC is required to place that property on a list until it has been certified by the property owner that decontamination or cleanup of the site was performed and that sampling showed that contamination was below the limits established by the State of Alaska's "fit for use" standards. This list is provided to anyone who requests a copy, including prospective renters or real estate agencies, banks, and other individuals.

The owner of the property must ensure that the property where the drug laboratory operations were identified is vacated and secured against use. Within fours days after a property is posted as a site of an illegal meth lab, provisions must be made to ensure that any remaining occupants have vacated the premises and the property secured against access except as necessary for sampling, testing, or decontamination. The property cannot be reoccupied until decontamination activities have been performed and samples have been collected and analyzed to confirm that the cleanup standards in Table 2-2 have been met. For multi-unit properties, such as hotels, motels, and apartment buildings, occupants must vacate only the hotel/motel room or apartment unit where illegal lab operations or paraphernalia were located, unless the remaining units in that building share a common, forced-air ventilation system.

Owners of multi-unit properties that share such a ventilation system shall at a minimum, sample the ductwork and ventilation registers in all units that share the ventilation system for methamphetamine. If the sample results indicate that methamphetamine concentrations are above the required cleanup level in Table 2-2, the property owner must decontaminate the ventilation system and conduct additional sampling and testing to determine if other surfaces in those units require decontamination.

To remove the property from ADEC's list and allow reoccupation, the property owner or owner's agent must:

1. Decontaminate the property in accordance with the protocols established in Section 3 of this guidance document to remove residual chemical contamination.
2. Collect samples in accordance with Section 4 of this guidance document.
3. Submit the samples to one of the qualified laboratories identified by ADEC for analysis. The analysis must be performed in accordance with the testing protocols in Section 4 of this guidance document.
4. Receive analytical results for the samples from the laboratory and confirm that the results meet or are below the "fit for use" standards

identified in Table 2-2. If the sample results do not confirm that decontamination efforts were sufficient to meet the standards, additional decontamination will be required and samples must be retaken for those areas that failed to meet the cleanup standards.

5. Submit documentation to ADEC certifying that Steps 1 through 4 have been performed and that sample analytical results confirm that the required cleanup standards have been met. Appendix B contains the Decontamination Documentation form that ADEC recommends a property owner complete and retain for their records.

The property owner must authorize the laboratory to provide ADEC with the results of sample analyses, if requested by ADEC. The laboratory request form in Appendix B includes the required authorization statement. ADEC will remove the property from the list of drug-manufacturing sites upon receipt of the certification statements by the property owner that the property was decontaminated and that laboratory analytical results demonstrate that the cleanup standards have been met.

Sections 3 and 4 provide detailed instructions for decontaminating a residence and collecting and analyzing confirmation samples to prove that the required cleanup standards are met. Examples are provided where possible. The examples reference a two-bedroom, one-bathroom home. Figure 3-1 illustrates the layout of the sample residence.

While not a requirement, use of screening techniques or instrumentation (i.e., on-site methamphetamine wipe analyses and screening of the residence with a VOC detector) is recommended to assist in decontamination efforts, including delineation of contaminated areas or media, and preliminary or tentative confirmation of decontamination efforts. Field-screening techniques are further discussed in Section 3.8.

3 Decontamination Protocols

If the property owner desires to decontaminate the property for which a notice has been issued under AS 46.03.500, the property owner or the property owner's contractor shall follow these guidelines established by ADEC.

Because every meth lab site is different, there is no single template for cleanup that applies to every site. This document attempts to provide some flexibility for the property owner based on the degree of contamination at his or her site.

Pre-cleanup sampling is not required. Property owners may decide to collect pre-cleanup samples if they wish to prove that decontamination is not necessary for rooms located away from drug lab activities or when it is believed that pre-sampling will reduce overall decontamination costs. If pre-cleanup samples are collected, the sampling and laboratory testing procedures described in Section 4 must be utilized.

Much of the decontamination guidance involves removal of potentially contaminated items such as carpets, countertops, sinks, toilets, and bathtubs. In some instances, removal of an item may not be necessary if it can be sufficiently decontaminated and verified with analytical results. **The property owner should be aware that it may be more cost effective to remove and discard certain furnishings and appliances (e.g., carpet, upholstery, draperies, and stoves/ranges), rather than to try to decontaminate them.**

Alaska regulations allow for the decontamination or cleanup of the property and the subsequent sampling to be conducted by the property owner. While this may be an option, ADEC strongly recommends that the property owner consider utilizing qualified personnel; e.g., HAZMAT or remediation contractors for decontamination, and environmental or health professionals for confirmation sampling. Small former illegal drug laboratory operations may not require professional assistance for decontamination activities; however, in most instances, the application of field-screening technology and sampling protocols requires professional experience and qualification.

3.1 Safety During Decontamination Activities

Decontamination activities pose the risk of potential exposure to hazardous substances and chemicals. Property owners may not employ workers without requisite Hazardous Waste Operations and Emergency Response (HAZWOPER) training and certification specified by regulations contained in 29 Code of Federal Regulations 1910.120, which are accessible via the internet at http://www.osha-slc.gov/pls/oshaweb. These regulations outline the necessary protective measures that are taken during hazardous substance cleanup operations and include the use of air-monitoring equipment and appropriate personal protective equipment (PPE) to prevent injury from physical and chemical hazards at a site.

If the property owner elects to have a contractor perform the decontamination activities, ADEC recommends that the contractor meet the requirements provided in Section 3.2. After conducting initial air monitoring, the contractor may determine whether the use of an air-purifying or other type of respirator is necessary for workers. In most cases, Level C PPE (with air-purifying respirator) or Level D PPE (without respirator) will suffice during meth lab cleanup activities.

For either level of protection, workers also will wear:

- Chemically protective clothing (hooded Tyvek® or Saranex® coveralls),
- Eye protection (face shields, goggles, or safety glasses),
- Hand protection (latex or nitrile gloves),
- Rubber work boots or disposable latex overboots, and
- Duct tape (to seal seams at wrists and ankles).

ADEC recommends that property owners electing to decontaminate their own property without the aid of a contractor also work in Level C PPE as described above. The protective equipment listed above can typically be obtained at hardware stores and/or safety equipment supply stores. The air-purifying respirator cartridge should protect against particulates and organic vapors.

3.2 When Hiring a Contractor, What is Required?

ADEC strongly recommends that property owners utilize a contractor trained and equipped to perform hazardous chemical remediation for the decontamination of former illegal meth lab sites. The benefits of hiring a qualified contractor include the assurance that the appropriate safety precautions will be implemented and providing an added level of defense in the demonstration that the property has been adequately decontaminated.

A qualified environmental contractor or consultant is also recommended to perform sampling within the residence to confirm that cleanup levels have

been met. Information and proper documentation gathered by an unbiased, qualified third party may provide an added layer of defensibility to sampling results. The decision to hire contractors for decontamination or sampling is left up to the property owner's discretion.

3.2.1 Recommendations for HAZMAT or Remedial Contractors

If a HAZMAT or remedial contractor is hired to perform the decontamination, ADEC recommends that the property owner confirm that the contractor meets the following requirements:

(1) The contractor should be licensed and bonded (for the assurance of the property owner).

(2) The contractor must provide a supervisor and site workers who are certified for working with HAZMAT. At a minimum, the supervisor and site workers must have completed Occupational Safety and Health Administration (OSHA) 40-hour HAZWOPER training.

(3) The contractor must provide suitable PPE for all personnel involved in cleanup operations, including appropriate respiratory protection for a Level C response if site conditions warrant it. Use of respirators requires a physician's statement, fit testing, and respiratory protection training.

If a property owner hires an individual (independent of a qualified company or contractor) to assist with the decontamination of his or her property, he or she assumes the responsibilities as an employer. As such, any workers employed by or assisting the property owner must be HAZWOPER trained. These responsibilities are mandated and defined by OSHA. ADEC recommends that the property owner contact an OSHA representative to ensure that these legal obligations are met.

3.2.2 Recommendations for Sampling Contractors

If a contractor is hired to perform sample collection, ADEC recommends that the property owner confirm the following:

(1) The contractor should be licensed and insured (for the assurance of the property owner).

(2) The contractor should provide samplers that meet the requirements of an ADEC qualified sampler.

(3) The contractor must provide suitable PPE for all personnel involved in sampling operations.

(4) The contractor should be familiar with the sampling protocols specified in this guidance document.

3.3 Pre-Decontamination Procedures

ADEC strongly recommends that property owners or contractors conducting former illegal meth lab cleanup perform a preliminary assessment (PA) of the site before the decontamination activities. The PA should include:

(1) Collection and review of all available documents associated with the former illegal meth lab site, including all law enforcement reports, HAZMAT team reports, and any other report associated with the meth lab (e.g., Drug Enforcement Administration Form 612 if available; Form 612 provides an inventory of chemicals and drugs seized at the site, and information pertaining to the method used).

(2) Determination of the cooking method used and potential contaminants that may be encountered at the site. A qualified determination (by the law enforcement agency, a HAZMAT team, remedial contractor, or other qualified professional) is required to rule out the possibility that the amalgam/P2P method was used.

(3) Determination whether the site is safe for entry. Any reports of potential structural problems, fire, or explosion should be brought to the attention of a qualified engineer before entrance to the site.

(4) Completion of a walk-through examination of the site. ADEC recommends that pictures and drawings of the site be collected and maintained for the property owner's record. If quantities of unknown substances that may have been overlooked by law enforcement officials are found during the walk-through examination, the Alaska Department of Public Safety should be notified. Removal and identification of unknown chemicals or substances should be conducted by a HAZMAT team before any additional cleanup activity.

Once the PA is completed, ADEC recommends that the property owner or their contractor develop a cleanup plan for the site. Items that should be addressed in the cleanup plan include:

(1) Location and legal description of the meth lab.
(2) A summary of materials removed from the site during the drug bust.
(3) Contractor information (if hired to perform cleanup).
(4) A list of items to be removed from the premises.
(5) A description of cleanup methods to be used.
(6) A waste disposal plan.
(7) A list of all required permits, such as disposal and burn permits.

(8) Security provisions for the site.

(9) A site safety plan that meets the requirements of OSHA 1910.120 (if a contractor is being utilized).

3.4 Decontamination Protocols

Initial stabilization of the property through removal of chemicals, manufactured drugs, paraphernalia, or any other items needed by law enforcement authorities should occur before the cleanup. This process is called *gross chemical removal*, although it is often mistakenly referred to as *cleanup*. Once gross chemical removal is completed, the property owner is responsible for removing and disposing of, or cleaning, remaining items at the property with residual contamination. In this guidance, residually contaminated areas (or areas with residual contamination) are subdivided into two categories: (1) heavily contaminated areas, and (2) areas with low-level contamination.

In general, there are five steps to the decontamination process:

- **Step 1:** Heat and ventilate the building to remove residual volatile organic compounds (VOCs). Section 3.4.1 describes ventilation procedures;

- **Step 2:** Remove interior furnishings and household contents (e.g., dishes, clothing, and food). Section 3.4.2 provides recommendations regarding the handling of furnishings and household items;

- **Step 3:** Decontaminate heavily contaminated areas. These areas are locations where chemicals were stored, and areas where the 'cook' occurred, or where chemicals were mixed or disposed of (e.g., sinks and bathtubs). Section 3.4.3 describes the decontamination protocols to be used for areas assumed to be heavily contaminated;

- **Step 4:** Decontaminate areas with low-level contamination. These areas are rooms located away from the cooking or mixing areas that are assumed to be contaminated through the volatilization and subsequent deposition of chemicals. Section 3.4.4 provides decontamination protocols for areas that are assumed to have low-level contamination; and

- **Step 5:** Encapsulate materials that cannot be adequately decontaminated via cleaning and/or removal. Section 3.4.5 describes encapsulation procedures. Consideration must be given to potential impacts to VOC sampling results when encapsulating surfaces using oil-based paints or sealants, or replacing carpets or other types of flooring because of the VOCs associated with these materials. Review Section 4.3 for guidance.

Items removed from the property must be disposed of in accordance with applicable rules and regulations. As described above, heavily contaminated areas are assumed to be those areas where chemicals were stored and/or used, cooking areas, and areas where chemicals may have been mixed or disposed of (such as toilets, sinks, bathtubs, and showers). Surfaces in these areas also may exhibit chemical staining or etching (from acids), depending on the method and chemicals used to manufacture the methamphetamine. The identification of heavily contaminated areas should be based on the following:

- Visual observations (staining or etching);
- Reports and/or photographs obtained from law enforcement officials that indicate the location of drug laboratory equipment and chemicals when the drug bust was made; and
- Field-screening techniques (optional). Section 3.8 provides additional details regarding field-screening techniques that may be helpful in guiding decontamination activities.

For example, if drug laboratory equipment and chemicals were documented in the kitchen and bathroom of the example residence shown in Figure 3-1, and visual assessment did not note any chemical staining in any other room, then those two rooms (kitchen and bathroom) would be assumed to be heavily contaminated. The remaining rooms in the house (bedrooms, living room, utility room, and garage) would be assumed to have low-level contamination. ADEC recommends that the hallway between the kitchen and bathroom also be considered a heavily contaminated area because this was likely a high-traffic area between the two rooms.

3.4.1 Ventilation Procedures

Before commencement of cleanup activities and to allow for weather constraints, the premises should be heated to 75° Fahrenheit (F) or higher (24° Celsius [C] or higher) and ventilated for at least 48 hours.

Ventilation can be performed by opening windows throughout the residence to allow for cross-ventilation. Mechanical fans also can be used, if necessary, to improve ventilation. Care must be taken to ensure that vented contaminants are exhausted to the outdoors and not to air intakes of adjacent structures. The use of supplemental, portable heating units may be necessary if the building heating system has been inactivated or is incapable of achieving the desired temperature because of cold weather conditions. Portable heating units and ventilation equipment can be obtained from equipment rental companies.

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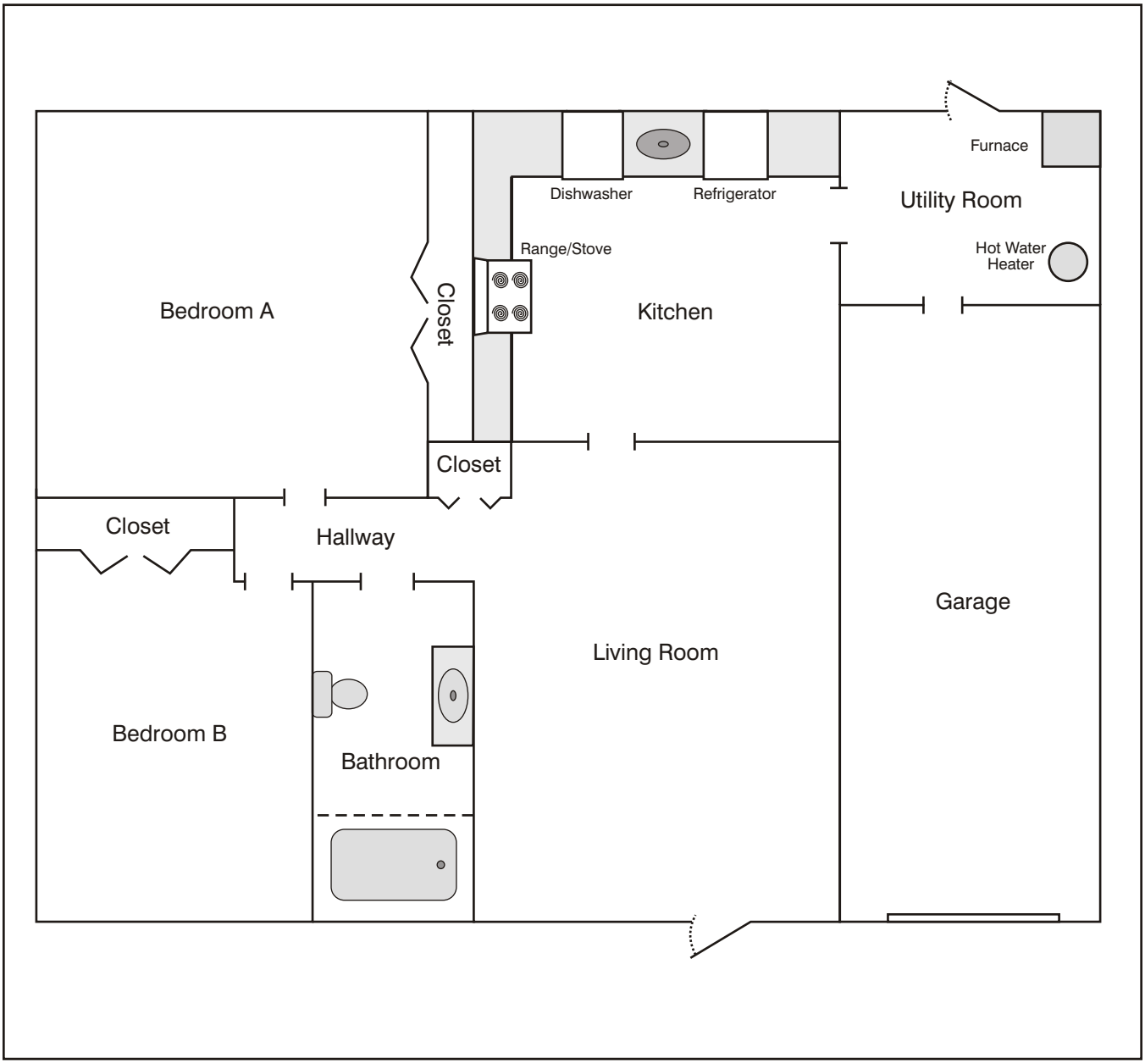

Figure 3-1 Example Residence

After the initial airing, ventilation of the building should be continued for site safety purposes throughout the decontamination process unless it hinders decontamination activities, such as screening for VOCs using a photoionization detector (PID).

3.4.2 Removal of Furnishings and Household Contents

The disposition of the contents of a structure where an illegal meth lab operated will depend on many factors, including an assessment of the degree of contamination, legal status of the resident or owner, and value of the items to the owner (e.g., precious heirlooms or sentimental items). The property owner should be aware that it might be more cost effective to discard certain items rather than decontaminate them. The following list provides some guidance regarding the disposition of site furnishings and household contents. These recommendations were adapted from MDOH's *Clandestine Drug Labs, General Cleanup Guidelines* (MDOH 2003):

- **Food:** All food should be discarded, including pet food;

- **Small and large appliances:** Stoves/ranges used to cook methamphetamine should be discarded because it is too difficult to ensure that contamination is removed from all crevices. Large appliances, such as refrigerators, dishwashers, washers, and dryers, with no evidence of visual contamination can be decontaminated by washing exterior and interior surfaces with a hot water detergent solution and rinsing with clean water. The wash and rinse procedures should be performed at least three times using clean fluids. Small appliances that are used for food preparation, such as toasters, microwave ovens, and coffee makers, should be discarded;

- **Clothing, linens, and other fabric items:** Fabrics with obvious chemical staining or contamination should be discarded. Washable fabrics, including bed linens, area rugs, and soft toys, should be machine washed at least three times with a solution of hot water and detergent. Fabrics that cannot be washed with detergent and water shall be dry cleaned using a liquid solvent dry-cleaning solution in a dry-cleaning machine for at least 15 minutes;

- **Dishes, flatware, and other hard (non-porous) household goods:** Any item that shows evidence of being used for the cooking process (e.g., staining and/or etching) should be discarded. Washable items, including ceramics, hard plastics, metals, and glass, should be washed and rinsed with hot water and detergent at least three times;

- **Household items made of wood and wood-like composites:** The disposition of these generally porous items depends on the degree of contamination, surface finish (e.g., varnish, polyurethane), value, and ability of the item to be washed with a solution of hot water and

detergent. If considered cleanable, these items should be washed at least three times, rinsed, and possibly coated with an oil-based finish;

- **Upholstered furniture:** Disposal of these items is recommended. Cleaning of upholstered items that are not discarded because of obvious contamination should consist of vacuuming using a machine equipped with a high-efficiency particulate air (HEPA) filtration system, followed by hot water detergent or steam cleaning; and

- **Household books and paper items:** Paper goods are extremely porous. Any paper items near the area of a known laboratory should be discarded. Paper goods stored in filing cabinets, closed bookcases, or cupboards in rooms where wipe samples show low levels of contamination may be salvageable. Given the uncertain history of most laboratory sites, disposition of such porous materials should err on the conservative side.

If any materials are removed from the property for cleaning (e.g., curtains, rugs), they shall be HEPA vacuumed before being removed from the site and the cleaning facility shall be notified in writing by the property owner or their contractor that the materials being cleaned are from a former illegal drug laboratory. The vacuum cleaner will be of commercial grade and equipped with a HEPA dust collection system. Bag-less vacuum cleaners will not be used for any cleanup work at a former illegal meth lab site. Suitable HEPA vacuums can be rented from equipment supply companies. Household vacuums equipped with HEPA filters, such as those purchased at retail stores, are not recommended.

3.4.3 Decontamination Procedures for Heavily Contaminated Areas

ADEC recommends that doors or other openings to areas assumed to have low-level contamination be cordoned off with plastic sheeting where possible to reduce the spread of contamination during decontamination of heavily contaminated areas.

Once the rooms have been emptied of the household items, the following procedures should be used to decontaminate the building interior. These procedures generally require the use of cleaning solutions consisting of hot water and Simple Green® or trisodium phosphate (TSP) detergents, unless otherwise specified. Both cleaners are readily available at retail stores, including hardware and home improvement stores.

All areas of the premises assumed or known to be heavily contaminated shall be vacuumed, including the ceilings and ductwork. Reference Section 3.4 for additional guidance on identifying heavily contaminated areas. Before vacuuming, all closets and cabinets will be opened, and cabinet drawers will be removed. The vacuum cleaner will be of commercial grade and equipped

with a HEPA dust collection system. Refer to Section 3.4.2 for HEPA vacuum specifications.

The following paragraphs provide decontamination guidelines for specific items such as kitchen countertops and bathroom fixtures. However, because each meth lab cleanup will be different, guidelines for general categories of building materials are also provided. In essence, all surfaces within a former illegal meth lab should be removed and replaced, or cleaned during decontamination activities.

(1) **Bathroom fixtures:** Remove and replace visibly contaminated (stained or etched) sinks, bathtubs, toilets, and shower stalls. Remove and replace all accessible plumbing traps. If a plumbing trap cannot be removed because of inaccessibility, then it shall be flushed with hot water and detergent solution for at least 5 minutes. All non-porous surfaces, such as bathtubs, toilets, mirrors, windows, tile flooring, and sinks that are not removed shall be cleaned. If cleaned, these surfaces shall be washed with a solution of hot water and Simple Green® or TSP and rinsed with hot water. This shall be done at least two additional times with clean wash and rinse water.

(2) **Kitchen/bathroom countertops:** Remove and replace all porous countertops and food preparation surfaces. Porous materials include wood and granite. Manmade solid surface countertops, such as Corian®, may be sanded to remove any contaminated material, washed with a solution of hot water and Simple Green® or TSP, and rinsed with hot water. This shall be done at least two additional times with clean wash and rinse water.

(3) **Walls:** Walls in the immediate vicinity of the cooking area may be stained or may have absorbed some of the chemicals used in the manufacture of methamphetamine. Wall materials, such as sheet rock, with visible staining or discoloration shall be removed and replaced. It is recommended that all baseboards and window and ceiling trim in heavily contaminated areas be removed and replaced. Walls with no evidence of staining shall be cleaned in accordance with the guidelines below for porous and non-porous surfaces, depending on the building material type.

(4) **Carpeting:** Remove all carpeting from rooms designated as heavily contaminated. Carpet must be misted with water before removal to prevent dust particles from becoming airborne. This is a protection measure for cleanup personnel. Once the carpeting and pad are removed, the non-porous sub-floor should be vacuumed with a HEPA vacuum.

(5) **Fans and Vents:** All floor and window fans shall be removed and disposed of. Exhaust vents such as those used above ranges/stoves should be removed and replaced.

(6) **Ceilings:** Ceiling tiles, drop ceiling panels, and other types of ceilings (e.g., painted sheetrock, spray on textured ceilings) in the immediate vicinity of the cooking area shall be removed and replaced. *Note: Some ceiling tiles and panels may contain asbestos, especially in older buildings. If the presence of asbestos is suspected, additional testing and safety precautions may be warranted to prevent exposure during the removal and cleaning process.* Ceilings with no evidence of staining should be cleaned in accordance with the guidelines below for porous and non-porous surfaces, depending on the building material type:

a. Non-porous (i.e., smooth painted ceilings) shall be washed with a solution of hot water and Simple Green® or TSP, and rinsed with hot water. This shall be done at least two additional times with clean wash and rinse water.

b. Porous ceilings in areas of the premises not associated with the cooking process shall be vacuumed with a commercial HEPA-equipped vacuum cleaner and encapsulated with an oil-based paint (see Section 3.4.5).

(7) **Windows/Glass:** All windows and glass surfaces shall be cleaned with a commercial glass-cleaning compound (e.g., Windex®) at least three times, using clean solution each time.

(8) **Storage cabinets and closets:** The interior and exterior of all storage cabinets and closets shall be washed with a solution of Simple Green® or TSP and hot water. This procedure will be done at least two additional times with clean wash and rinse water.

(9) **Electrical fixtures:** Electrical outlet covers, wall switch plate covers, and light fixtures should be removed, washed in a solution of hot water and Simple Green® or TSP, and rinsed with hot water. This will be done at least two additional times with clean wash and rinse water. *Note: Power should be cut when decontaminating or washing electrical fixtures and switches.*

(10) **Remaining non-porous items, such as ceramic tile flooring, doors, vinyl or metal mini-blinds, and door and window hardware:** Remove and replace all visibly stained items. Items with no evidence of staining or etching shall be cleaned by HEPA vacuuming, then washed with a solution of hot water and Simple Green® or TSP, and rinsed with hot water. The items shall be washed at least two additional times with clean wash and rinse water.

(11) **Remaining porous materials such as painted drywall, flooring (e.g., linoleum), ceiling tiles, and spray-on wall or ceiling surfaces:** Remove and replace all visibly stained items. *Note: Some ceiling and flooring tiles and sheet flooring products may contain asbestos, especially in older buildings. If the presence of asbestos is suspected, additional testing and safety precautions may be warranted to prevent exposure during the removal and cleaning process.* Items with no evidence of staining shall be cleaned by HEPA vacuuming and one of the following methods:

a. Steam cleaning: Hot water and detergent shall be injected into the porous materials under pressure to agitate and loosen any contamination. The water and detergent solution shall then be extracted from the porous material by a wet vacuum.

b. Chemical dry cleaning: Porous materials that cannot be washed with detergent and water shall be dry cleaned using a liquid solvent dry-cleaning solution in a dry-cleaning machine for at least 15 minutes. On-site dry cleaning is not recommended because of the VOCs associated with dry-cleaning solvents. Items cleaned offsite should not be returned to the site until after VOC sampling has been performed, and the results indicate that the required cleanup standard has been met.

c. Detergent and water solution: Porous materials shall be washed in a washing machine with detergent and hot water for at least 15 minutes. The porous materials shall be rinsed with water.

If any materials are removed from the property for cleaning, they shall be thoroughly HEPA vacuumed prior to removal, and placed in plastic bags or visqueen for transport to the cleaning facility. The cleaning facility shall be notified in writing (by the property owner or their contractor) that the materials being cleaned are from a former illegal drug laboratory.

3.4.4 Decontamination Procedures for Areas with Low-Level Contamination

The following paragraphs provide decontamination guidelines for specific items, such as walls, ceilings, and switch plates, that may be found in rooms considered to have low-level contamination. Because each meth lab cleanup will be different, guidelines for general categories of building materials are also provided. All surfaces within rooms considered to have low-level contamination should be cleaned during decontamination activities unless sampling and laboratory testing indicates that the concentration of contaminants is below the required cleanup levels.

All areas of the premises assumed or known to have low-level contamination shall be vacuumed, including the ceilings and ductwork. Reference Section 3.4 for additional guidance on delineating areas with low-level contamination. Before vacuuming, all closets will be opened, cabinet doors will be opened, and drawers will be removed. The vacuum cleaner will be of commercial grade and equipped with a HEPA dust collection system. Refer to Section 3.4.2 for HEPA vacuum specifications.

(1) **Walls:** All walls shall be washed with a solution of hot water and either Simple Green® or TSP, and rinsed with hot water. This will be done at least two additional times with clean wash and rinse water on each wall surface, unless the wall area is sampled and the sample results indicate that the cleanup standard has been met.

(2) **Electrical fixtures:** Electrical outlet covers, wall switch plate covers, and light fixtures should be removed, washed in a solution of hot water and Simple Green® or TSP, and rinsed with hot water. This will be done at least two additional times with clean wash and rinse water. *Note: Power should be cut when decontaminating or washing electrical fixtures and switches.*

(3) **Windows:** All windows and glass surfaces shall be cleaned with a commercial glass-cleaning compound (e.g., Windex®) at least three times, using clean solution each time.

(4) **Ceilings:** All ceilings shall be cleaned in accordance with the guidelines below for porous and non-porous surfaces, depending on the building material type:

a. Non-porous (i.e., smooth painted ceilings) shall be washed with a solution of hot water and Simple Green® or TSP, and rinsed with hot water. This shall be done at least two additional times with clean wash and rinse water.

b. Porous ceilings in areas of the premises not associated with the cooking process shall be vacuumed with a commercial HEPA-equipped vacuum cleaner and encapsulated with an oil-based paint (see Section 3.4.5).

(5) **Ventilation Systems:** The cleaning of ventilation ductwork, registers, air-handling units, heaters, air conditioners, filters, and associated equipment requires specialized equipment that may be obtained from a heating/ventilation/air conditioning contractor or supplier. The equipment and cleaning procedures are discussed below:

(A) Air registers shall be removed and washed with a solution of hot water and Simple Green® or TSP, and rinsed with hot

water. This shall be done at least two additional times with clean wash and rinse water.

(B) Temporary filter media shall be attached to air register openings.

(C) A fan-powered HEPA filter collection machine shall be connected to the ductwork to develop negative air pressure in the ductwork.

(D) Air lances, mechanical agitators, or rotary brushes shall be inserted into the ducts through the air register openings to loosen all dirt, dust, and other materials.

(E) The air handler unit, including the return air housing, coils, fan(s), system(s), and drip pan, shall be washed with a detergent and water solution and then thoroughly rinsed. This cleaning procedure shall be repeated at least two times using new detergent solution and rinse water.

(F) All porous linings or filters in the ventilation system shall be removed and properly disposed of.

(G) The ventilation system shall be sealed off at all openings with at least 4-mil plastic sheeting to prevent recontamination until sampling indicates that building surfaces within the property meet the cleanup standards.

(6) **Storage cabinets and closets:** The interior and exterior of all storage cabinets and closets shall be washed with a solution of Simple Green® or TSP and hot water. This procedure will be done at least two additional times with clean wash and rinse water.

(7) **Septic systems:** If a septic system is present, it shall be pumped out and the effluent discharged to the local publicly owned treatment works.

(8) **Plumbing traps:** All accessible plumbing traps shall be removed and replaced. If a plumbing trap cannot be removed because of inaccessibility, then it shall be flushed with hot water and detergent solution for at least 5 minutes.

(9) **Remaining non-porous items, such as countertops, ceramic tile flooring, doors, vinyl or metal mini-blinds, door and window hardware, and other fixtures.** Items such as these shall be washed with a solution of hot water and Simple Green® or TSP, and rinsed with hot water. This shall be done at least two additional times with clean wash and rinse water.

(10) **Remaining porous materials such as painted drywall, flooring (e.g., linoleum, laminate flooring, etc.), ceiling tiles, and spray-on wall or ceiling surfaces.** Items shall be cleaned by HEPA vacuuming and one of the methods described in paragraph (11) of Section 3.4.3.

3.4.5 Encapsulation Procedures

Encapsulation is the process of providing a physical barrier (e.g., painting or sealing the surface) between contaminated materials and any person who may potentially be exposed to the contaminated surface. Encapsulation is not required, with one exception, provided that surfaces can be cleaned and sampling indicates that the cleanup standards are met. If decontamination procedures are not successful in removing contamination to acceptable levels, the property owner can elect to re-clean the surfaces or encapsulate the contamination by performing the following:

a. Walls should be painted with two coats of **oil-based** paint or Kilz®. *Note: Oil-based paints contain significant quantities of VOCs. Painting and/or sealing should occur after confirmation sampling for VOCs.*

b. Any wood that has not been removed should be encapsulated with an oil-based paint or sealant. *Note: There is no database that identifies commercial products, including shellacs and other sealants that effectively encapsulate methamphetamine residues. Because methamphetamine is soluble in water, oil-based encapsulation sealers or paints are recommended. Additional information regarding the effectiveness of a given paint or sealant may be available from the manufacturer.*

c. Wood floors or sub-flooring should be painted with two coats of oil-based paint, or with two coats of shellac.

d. Spray on acoustical ceiling surfaces (i.e., popcorn ceilings) that are not removed **must** be encapsulated by spray painting with two coats of oil-based paint or Kilz® since this surface is not amenable to cleaning.

The effectiveness of encapsulation must be confirmed via sampling of the surface to prove that the required cleanup standard for methamphetamine is met.

3.5 Waste Management

Decontamination activities will generate both solid waste (e.g., trash) and liquid waste or wastewater (e.g., used decontamination fluids).

All wastes must be disposed of in accordance with applicable state and federal laws and regulations. In general, wastewater may be discharged to a sanitary sewer or septic system unless it contains concentrated decanted or spilled

chemicals. Any waste materials determined to meet the regulatory definition of *hazardous waste* must be disposed of in accordance with applicable state and federal laws and regulations for those types of wastes. In some instances, small quantities of hazardous waste may be disposed of via the local household hazardous waste program with little cost to the property owner.

The determination for final disposition of waste may require testing, and should be made by a person knowledgeable in hazardous waste characteristics, regulations, and disposal requirements. Properties owners should consult ADEC if they have questions about waste disposal requirements.

3.6 Documentation of Decontamination Activities

ADEC recommends that the property owner maintain documentation of decontamination activities. Suggested documentation includes the following:

- Decontamination Documentation (Appendix B)
- Photographs (before, during, and after cleanup),
- Receipts from disposal companies,
- Receipts for rented equipment or cleaning supplies, and
- Notes or reports from contractors (if contractors were utilized).

3.7 Post-Cleanup Sampling

Once decontamination activities have been completed, samples must be collected from the building interior and submitted to an ADEC-approved laboratory for analysis. Detailed sample collection procedures are provided in Section 4 of this guidance document.

ADEC recognizes that laboratory analyses are expensive and take time. Consequently, it may be cost effective for the property owner or contractor to utilize field-screening techniques during the decontamination process to guide decontamination activities. For example, field screening methods can be used to identify heavily contaminated areas, and to assess whether cleaning activities are adequately removing contamination. An overview of potential field-screening methods is provided in Section 3.8.

3.8 Field-Screening Methods

The field-screening instrumentation and tests included in Sections 3.8.1 through 3.8.4, may be helpful to identify the progress of decontamination efforts and the extent to which these efforts must proceed (e.g., adjoining rooms). Field screening is not intended to provide final confirmation laboratory results, but to provide real-time information to confirm the presence or apparent absence of contaminants.

Use of Simon test reagents (such as MISTRAL®) provides real-time detection of methamphetamine to 1 $\mu g/100\ cm^2$. Because this field test detection limit is 10 times the cleanup standard, the absence of a positive result from this

field test does not mean the area meets the "fit for use" standard of 0.1 μg/100 cm^2. In most instances, wipe samples collected near the meth lab operation will yield strongly positive results (blue color) with the application of the Simon reagent. Using this and other field-screening techniques, the effectiveness of decontamination efforts and the distance from the meth lab (e.g., adjoining rooms) where further decontamination efforts may not be necessary can be determined.

Use of a PID and/or a flame ionization detector (FID) should easily identify the locations and/or sources of VOC contamination, and can provide strong evidence when VOC abatement is adequate. However, there are household sources of VOCs, such as new carpet, paints, and other materials and substances that can be detected by a PID or FID. In the event positive readings are encountered, the source of the VOCs should be investigated using the instrument as a guide. For example if chemicals were spilled on the flooring during drug manufacturing operations, the PID or FID readings will increase as the instrument approaches the source (area where chemicals were spilled).

Most people can use the above two field-screening methods successfully. Although field screening is not required, the use of these techniques should help to:

1. Delineate the extent of contamination.
2. Provide an indication of satisfactory decontamination before confirmation sampling and analyses.
3. Prevent the need for additional decontamination and subsequent re-sampling and re-analyses.

If the property owner elects to utilize a field screening method, decontamination efforts should be continued until the method no longer indicates the presence of the substance. Final confirmation sampling and testing must be performed in accordance with Section 4 of this guidance.

Field-screening instrumentation also exists for lead and mercury. While these instruments are not readily available in Alaska and require some degree of expertise to operate, in the event of significant lead or mercury contamination, the use of these instruments by a qualified person may be cost effective and in some instances necessary.

Field-screening techniques for each contaminant of concern are summarized below.

3.8.1 Methamphetamine Field Screening

Measurement System:	MISTRAL® Spray Reagent
Measurement Method:	Reagent is sprayed onto wipe or vacuum sample. If color appears, methamphetamine concentration exceeds cleanup standard.
Detection Limit:	1 µg/100 cm^2 (i.e., 10 times the cleanup standard)
Cleanup Standard:	0.1 µg/100 cm^2
Approximate Cost:	$50 per 100 tests $20 per 10 tests

3.8.2 Volatile Organic Compound Field Screening

Measurement System:	PID and/or FID
Measurement Method:	Instrument is used to scan the air in rooms and inside drains. High gas readings indicate the presence of VOCs or solvents requiring decontamination.
Detection Limit:	1 ppm
Cleanup Standard:	1 ppm
Approximate Cost:	$85 per day

3.8.3 Lead Field Screening

Measurement System:	X-Ray Fluorescence (XRF)
Measurement Method:	XRF can be used to test wipe or vacuum samples directly, or test surfaces directly (such as a wall). Prepared samples may be analyzed to achieve quantitative data.
Detection Limit:	50 µg/cm^2 (i.e., 25 times the cleanup standard)
Cleanup Standard:	2 µg/100 cm^2
Approximate Cost:	$200 to $600 per day

3.8.4 Mercury Field Screening

Measurement System:	Mercury Vapor Analyzer
Measurement Method:	Instrument reads concentration of mercury in air.
Detection Limit:	3,000 ng/m^3 (Jerome model)
Cleanup Standard:	50 ng/m^3
Approximate Cost:	$700+ per day

Through the use of field-screening techniques, heavily contaminated areas may be readily identified.

4 Sampling and Testing Procedures

If the owner of the property for which notice was received under AS 46.03.500(b) desires to determine whether the property is "fit for use," the owner shall cause the site to be sampled and tested for the substances specified in this guidance, using the procedures and laboratory services specified in this section. Using the laboratory services request form (see Appendix B), the property owner shall inform the laboratory that the sampling and testing are related to property that has been determined to be an illegal drug-manufacturing site, and shall authorize the analytical laboratory to provide copies of laboratory reports to ADEC. This information and authorization are a required condition for ADEC to de-list the property.

Although the field-screening techniques discussed in Section 3.8 may be used to identify locations requiring decontamination and to provide evidence that decontamination activities are adequate before final confirmation sampling and analyses, the results are not acceptable to prove that the building interior meets the required cleanup standards. Samples must be collected and submitted to a qualified, ADEC-listed laboratory for analyses.

ADEC allows for one exception to this requirement: The use of PID readings may be substituted for the Summa® canister results if an ADEC qualified sampler takes the readings and provides signed documentation that the "fit for use" VOC standard has been met. For this exception, the protocols outlined within Section 4.3.2 must be followed and the readings in each room must be documented and certified by the ADEC qualified sampler.

Table 4-1 summarizes the analytical methods to be utilized to confirm that the cleanup standards have been met. Estimated costs are also included.

Table 4-1
Analytical Methods, Sample Type, and Estimated Sample Cost[1]

Contaminant	Sample Type	Analytical Methods	Estimated Cost per Sample[2]
Methamphetamine (Meth)	Wipe or vacuum sample	Laboratory-Specific Methods	$50 to $150
Volatile Organic Compounds (VOCs)	Air sample – Summa® canister	Summa® Canister TO-15	$225 to $300
Lead (Pb)	Wipe or vacuum sample	EPA 3050/6010 EPA 3050/6020	$20 to $40
Mercury (Hg)	Air sample – sorbent tube	NIOSH 6009	$35 to $50

Key:
EPA United States Environmental Protection Agency.
NIOSH National Institute of Occupational Safety and Health.

Notes:
1. VOCs can also be evaluated using a PID or FID survey by an ADEC qualified sampler. Refer to Section 4.3 for additional information.
2. Actual sample costs will be based on the laboratory and number of samples submitted.

4.1 Sample Collection Overview

The statute allows for the property owner or agent to conduct sampling activities. ADEC strongly recommends that the property owner contract a qualified environmental or health professional to conduct sampling and testing. The services of a qualified third party professional will help ensure that sampling and testing activities are objective. See Section 3.2.2 for recommendations regarding the hiring of a sampling contractor.

The analytical results obtained via sampling and laboratory analyses will be used to determine the presence and concentration of methamphetamine, VOCs, and lead and mercury (if necessary) remaining on building surfaces or in air after decontamination activities. The analytical results must show that residual contaminant levels (if any) are below the cleanup standards specified in Table 2-2.

4.1.1 Types of Samples

Types of sample collection include, but are not limited to:

- Wipe samples from non-porous surfaces, including walls, fixtures, floors, furniture, and appliances, for methamphetamine and, if necessary, lead;
- Vacuum samples from carpets, upholstered furniture, and other surfaces not amenable to wipe sampling; and

- Air samples from within the residence for VOCs and, if necessary, mercury.

If it is suspected or if there is evidence that chemicals or wastes were dumped outside a residence, the property owner should notify ADEC for additional guidance. Dumping of chemicals outside a residence may affect groundwater, drinking water supplies, surface water, and soil.

4.1.2 Basic Sampling Protocols

All sample collection shall be performed using standards and protocols to ensure:

(1) Accuracy, which is the ability to produce similar results with repeated sampling.

(2) Proper wipe-, vacuum-, or air-sampling techniques to collect a representative sample of the area being sampled.

(3) Proper care and prudent action to avoid cross-contamination during sampling (e.g., changing gloves between sample locations).

(4) Proper storage and preservation of samples until they are transported to the laboratory for analysis. Samples should be placed in a cooler with gel ice to keep them cool. ADEC recommends that the samples and gel ice be double bagged (separately) in Ziploc® bags to prevent the labels from being damaged by moisture. Sufficient gel ice should be included in the cooler to keep the samples cool in transit to the laboratory.

In addition, ADEC recommends that the property owner keep the samples in a secure (i.e., locked) location until they are shipped or delivered to the laboratory. Samples should be held only for a few days after collection to ensure that holding time requirements specified in Table 4-5 are not exceeded. For example, the holding time for methamphetamine wipe samples is 14 days. ADEC recommends that the samples be shipped to the laboratory within 2 to3 days after being collected to ensure that the laboratory receives them several days before the 14-day holding time occurs.

All samples collected, transported, stored, and analyzed should be accompanied by the laboratory services request form. This form, located in Appendix B with the property owner documentation, may serve as a chain of custody if the property owner or contracted professional desires to maintain it for the purposes of legal defensibility or other perceived liability.

4.1.3 Sampling Equipment

Table 4-2 identifies the recommended equipment and supplies for conducting verification sampling.

Table 4-2 Recommended Sampling Equipment and Supplies	
Equipment/Supplies Obtained from a Certified Laboratory or Sampling Supplier	**Equipment/Supplies Obtained from Retail Stores**
♦ Sample jars (wipe samples) ♦ Conical tubes (vacuum samples) ♦ Sample wipes ♦ Wetting agent(methanol for methamphetamine wipes; nitric acid for lead wipes) ♦ Labels for sampling jars ♦ Summa® canisters (VOC samples) ♦ Sorbent tubes (mercury samples) ♦ Sampling templates (10 cm x 10 cm) ♦ Cooler(s) ♦ Gel ice	♦ Field notebook ♦ Sampling gloves (nitrile) ♦ Masking tape ♦ Permanent ink marking pens ♦ Ziploc® bags ♦ Camera & film ♦ Paper towels ♦ Trash bags ♦ Personal protective equipment ♦ Bubble wrap ♦ Packaging tape
Source: Adapted from *Guidelines for Contamination Reduction and Sampling at Illegal Drug Manufacturing Sites* (WDOH 1996).	

4.2 Methamphetamine Sampling and Testing

Methamphetamine sampling and testing will be conducted using the wipe- and/or vacuum-sampling protocols adapted from United States Environmental Protection Agency (EPA) Publication EPA 747-R-95-001, *Residential Sampling for Lead Protocols for Dust and Soil Sampling* (EPA 1995), as they apply to this guidance. Simplified wipe- and vacuum-sampling protocols are provided as Appendices C and D, respectively, to this guidance.

To summarize, wipe samples are achieved using reagent-grade, methanol-wetted, 100-cm^2 cotton gauze or filter paper wipes from various 100-cm^2 surfaces, wiping the surfaces with the wetted wipe in the manner prescribed by the protocols. Figure 4-1 illustrates the actual size of a 100-cm^2 sample area and the technique to be used to wipe the area.

The following paragraphs describe the number and location of final confirmation samples that will require laboratory analyses. ADEC recommends field screening employing a similar approach of wipe sampling and use of a Simon test reagent in order to determine methamphetamine concentrations during and upon completion of decontamination activities.

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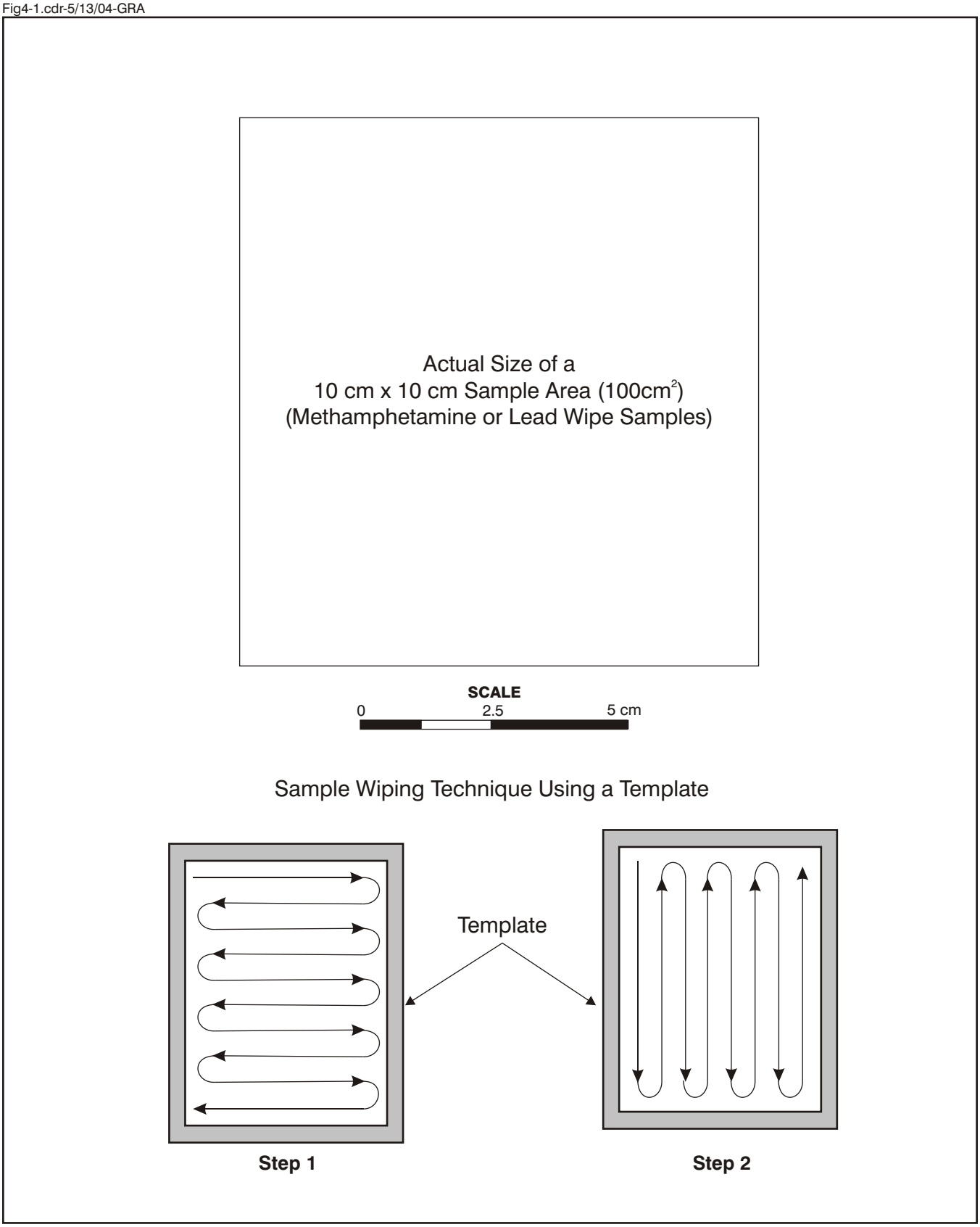

Figure 4-1 Wipe Sample Area and Sampling Technique

In each room within the property, known or suspected to be contaminated with methamphetamine, four 10-centimeter by 10-centimeter areas (a total of 400 cm^2) shall be wipe sampled from the following locations: the non-porous floor, the ceiling, and two walls. This may include all rooms at the property. These four wipes may be combined or composited into one sample for each room. Figure 4-2 provides an example of wipe sample locations for methamphetamine and/or lead analyses on ceilings, walls, and floors.

If there is a kitchen on the property, four additional 10-centimeter by 10-centimeter areas (a total of 400 cm^2) shall be wipe sampled from a combination of the countertop, sink, stove top, and floor in front of the stove top. These four wipes may be combined or composited into one kitchen appliance sample. Figure 4-3 provides an example of kitchen wipe sample locations for methamphetamine and/or lead analyses.

If there is a bathroom on the property, four additional 10-centimeter by 10-centimeter areas (a total of 400 cm^2) shall be wipe sampled from a combination of the countertop, sink, toilet, and shower/bathtub. These four wipes may be combined or composited into one bathroom fixture sample. Figure 4-4 provides an example of bathroom fixture wipe sample locations for methamphetamine and/or lead analyses.

Vacuum samples may be more appropriate for some of the sampling described above if porous materials are present on ceilings and floors (i.e., acoustical ceilings and carpeting). Carpets and other coarse surfaces that have been decontaminated shall be sampled using a vacuum-sampling system, as described in Appendix D. Vacuum samples may be collected utilizing an air-sampling pump, which draws the sample through a collection nozzle and filter sock from coarse 100-cm^2 surfaces such as carpets or coarse-textured walls or ceilings. Figure 4-5 provides an illustration of vacuum-sampling equipment and technique.

In addition to the samples discussed above, four 10-centimeter by 10-centimeter areas (a total of 400 cm^2) shall be wipe sampled at different locations in the ventilation system. These four wipes may be combined or composited into one sample.

If there are any cleaned appliances on the property (e.g., refrigerator), one 10-centimeter by 10-centimeter area (100 cm^2) shall be wipe sampled from the exposed portion of each appliance. If multiple appliances are present, up to four wipe may be combined or composited into one appliance sample (for a total of 400 cm^2 per sample)

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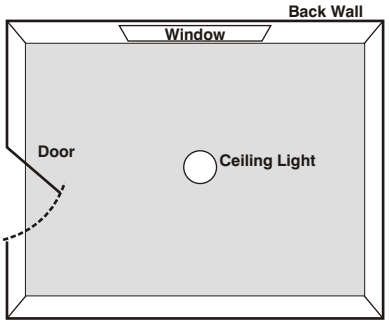
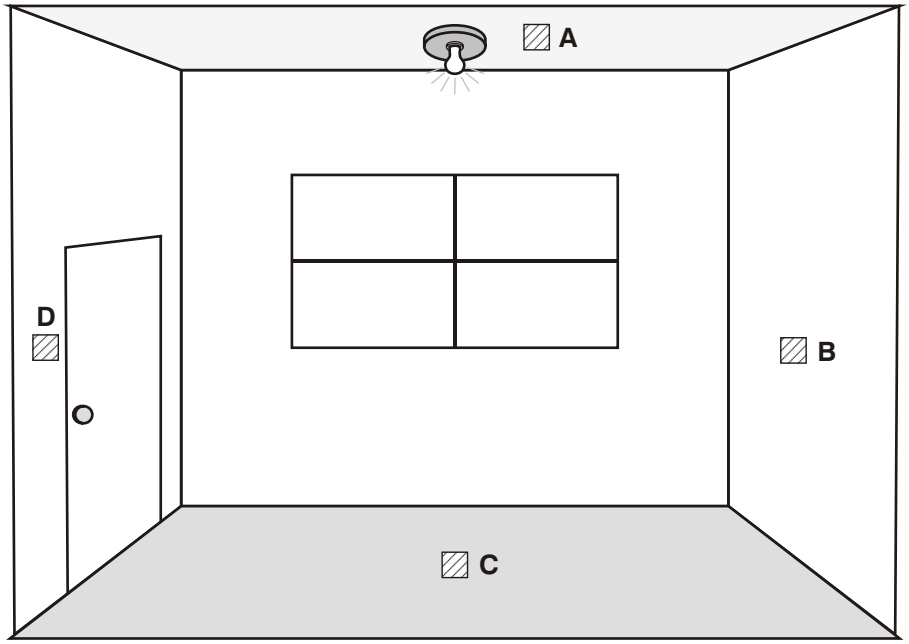


Overhead View

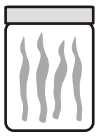


KEY:

10 cm x 10 cm area to be wipe sampled

NOTES:

1. This graphic depicts example areas that are acceptable locations for wipe samples to be taken from a room to confirm that the walls, ceiling, and floor surfaces meet cleanup levels.
2. A minimum of four areas shall be sampled. See Section 4.2 for additional instructions.
3. The total sample area must be reported to the laboratory when the samples are submitted. For example, if four wipes are combined into one sample jar, the total sample area is 400cm^2.
4. If a vacuum sample was collected from location C (because the carpeting was left in place), then that sample would not be combined with wipes collected from locations A, B, and D.



Jar containing wipes from four areas shown above

Figure 4-2 Example Ceiling, Floor, and Wall Sampling Locations for Composite Wipe Samples for Methamphetamine and/or Lead

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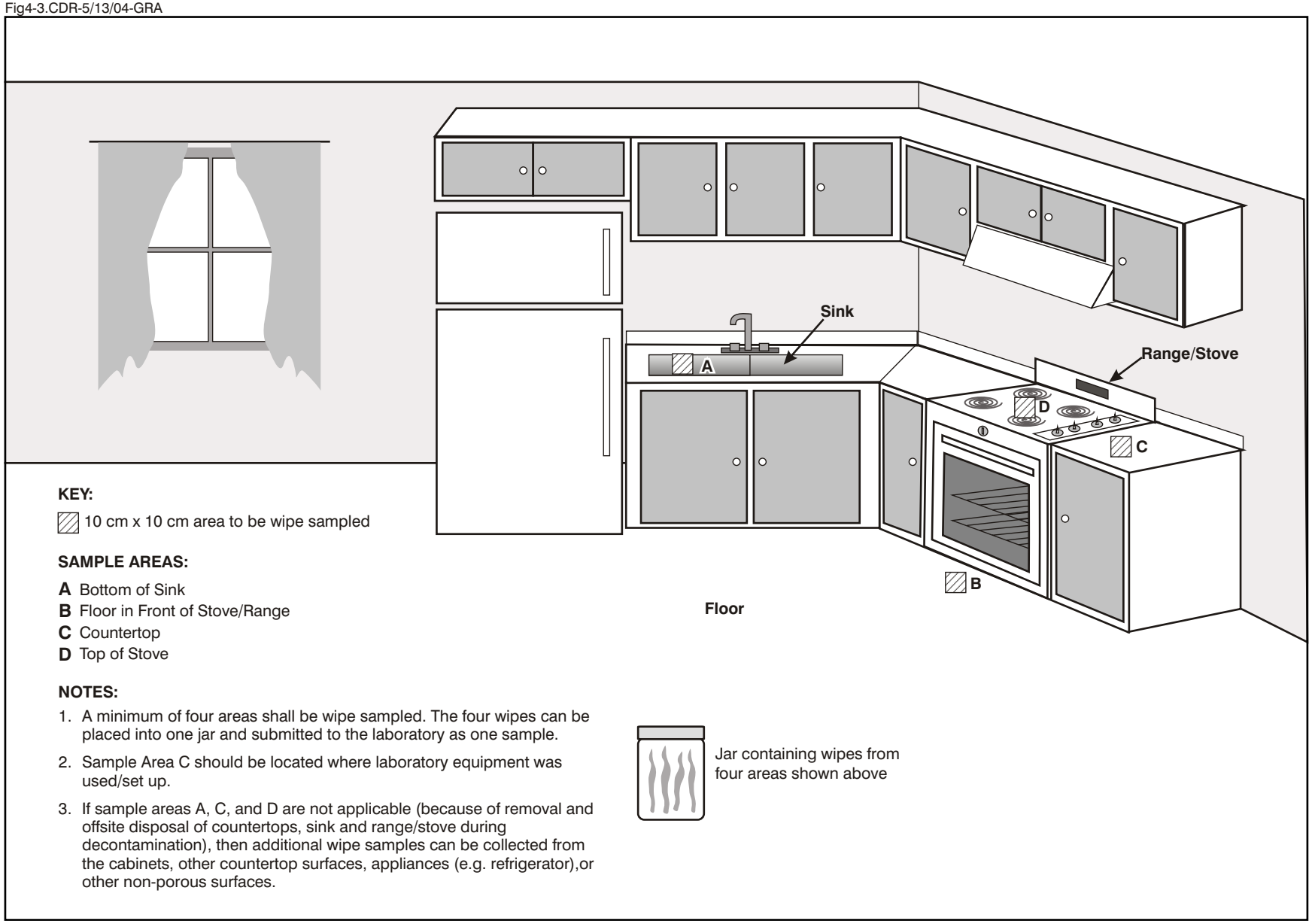

SOURCE: Ecology and Environment, Inc. 2004

Figure 4-3 Example Kitchen Sampling Locations For Composite Wipe Samples for Methamphetamine and/or Lead

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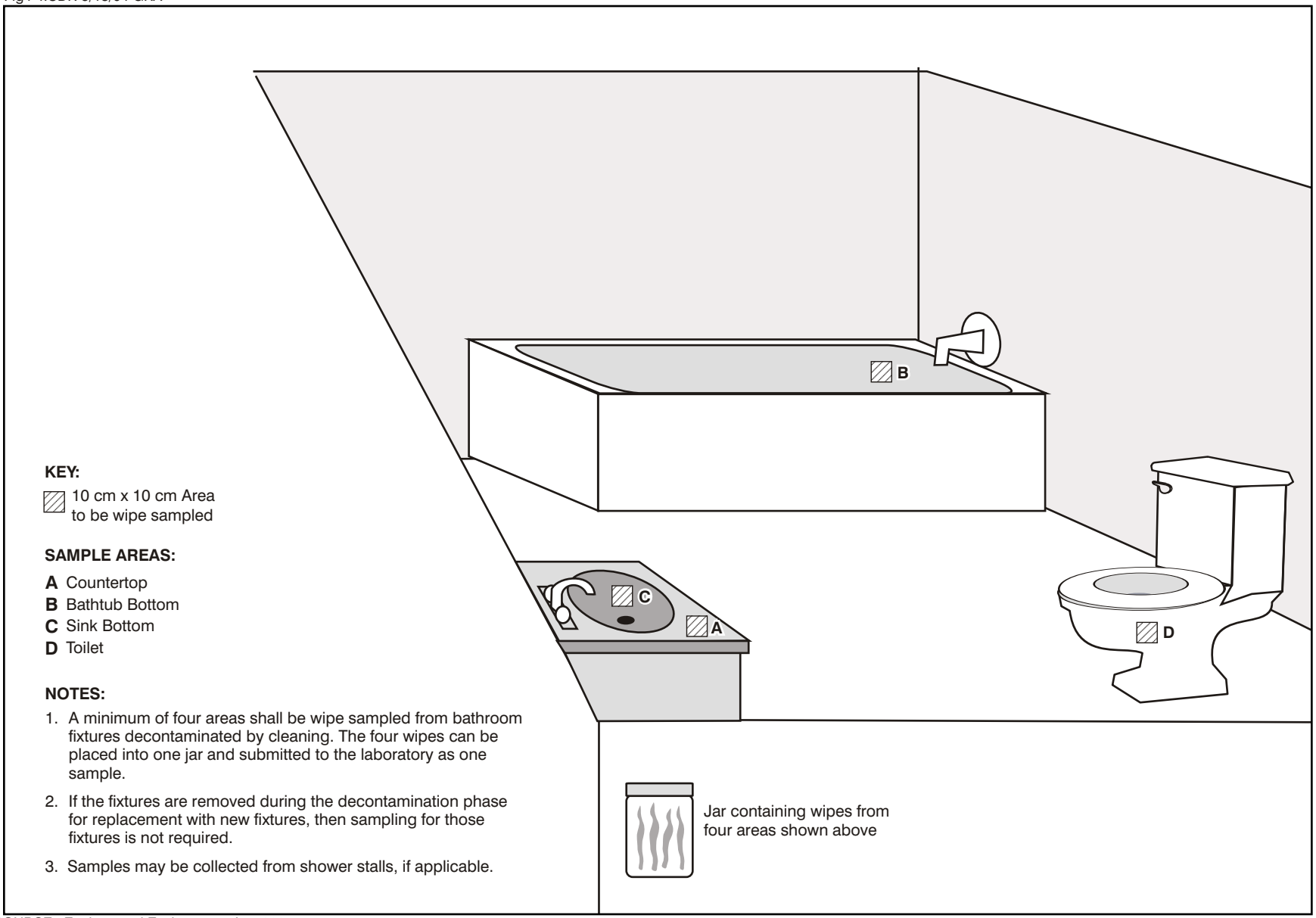

SOURCE: Ecology and Environment, Inc. 2004

Figure 4-4 Example Bathroom Sampling Locations for Composite Wipe Samples for Methamphetamine and/or Lead

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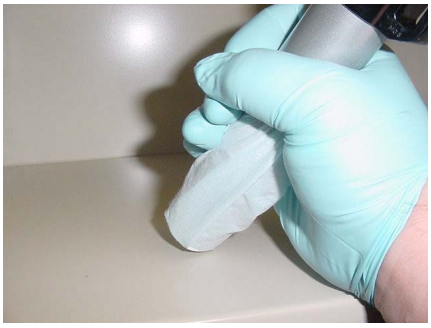
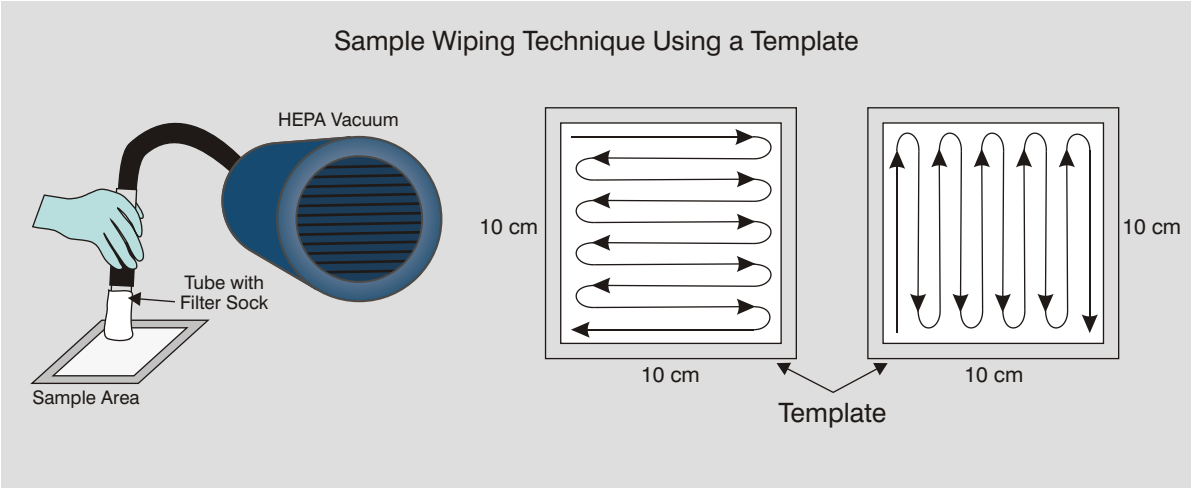
1. Example HEPA Vacuum Sampler

2. Filter Sock



3. Collecting Sample

4. Final Sample



Photos Source: Biological Sampling Procedures Booklet (2003)

Figure 4-5 HEPA Vacuum Sampling Illustration

After sampling, the single or multiple wipes, or single or multiple vacuum filter socks, shall be placed in a new clean sample jar (wipes) or conical sample tube (vacuum filter socks) and sealed with a Teflon-lined lid. Vacuum samples cannot be combined with wipe samples for laboratory analysis.

The sample containers shall be properly labeled with at least the site name or project identification number, date, time, actual sample location, and total size of the sample area. The sample containers shall be placed in individual, sealed Ziploc® bags; placed in a cooler with gel ice; and maintained at 4±2°C (or 40±4°F) until delivered to an ADEC-approved analytical laboratory.

4.3 Volatile Organic Compound Sampling and Testing

Conformance to the VOC cleanup standard (1 ppm total VOCs) may be achieved by one of the following methods: 1) use of a flow regulated SUMMA® canister for sampling with subsequent laboratory analyses; or 2) VOC survey via a calibrated PID or FID conducted by an ADEC qualified environmental sampler.

While use of a PID or FID by property owners is acceptable for screening purposes (Section 3.8), the protocols for VOC cleanup confirmation using a PID or FID require knowledge and experience of the instrumentation. For this reason an ADEC listed qualified sampler is required if this option is used to confirm that the VOC cleanup standard is met. Do to the expense involved with TO-15 sampling and analyses, contracting of a qualified sampler may in fact be the more cost effective method. In addition, the TO-15 sampling and analyses method is a more sensitive method and it may be difficult to achieve the 1 ppm cleanup standard with this method because of the presence of VOCs not related to an illegal meth lab operation (e.g., VOCs from carpeting, paints, foam insulation, etc.).

New carpets, paints, and some cleaners may yield positive results on PID and FID instruments as well. For this reason VOC sampling (by either method) must occur after decontamination (i.e., cleaning) activities are completed and prior to the use of any paints or encapsulants, or the addition of new carpeting, flooring or adhesives to the property. After decontamination and before commencement of VOC sampling activities, venting of the residence for 24 to 48 hours is recommended in order to “air out” any remaining detergent or other decontamination agents. The premises should be heated to at least 75°F during this ventilation procedure. However, ventilation must not be performed during VOC sampling using the methods described in Sections 4.3.1 and 4.3.2. Prior to VOC sampling, the property should remain closed (doors, windows), without ventilation, for at least 8 hours and returned to a temperature of 70°F in order that the property may come to equilibrium for testing.

4.3.1 TO-15 SUMMA® Canister VOC Sampling

Final VOC confirmation sampling shall be conducted in the center of the room that contained the former drug laboratory activities. Although not required, ADEC recommends that additional samples be collected from all rooms considered to be heavily contaminated.

Simplified sampling protocols adapted from EPA Method TO-15 are included in Appendix E. A Summa® vacuum gas cylinder is placed in the room, a flow device is attached with a small wrench, and the valve is opened, allowing a time-weighted average sample of the air to be obtained over a period of 8 to 12 hours. The sampler notes the time of sampling, and after closing the valve and removing the flow controller, ships the canister to the laboratory for analyses. Figure 4-6 provides an illustration of VOC sampling using a Summa® canister.

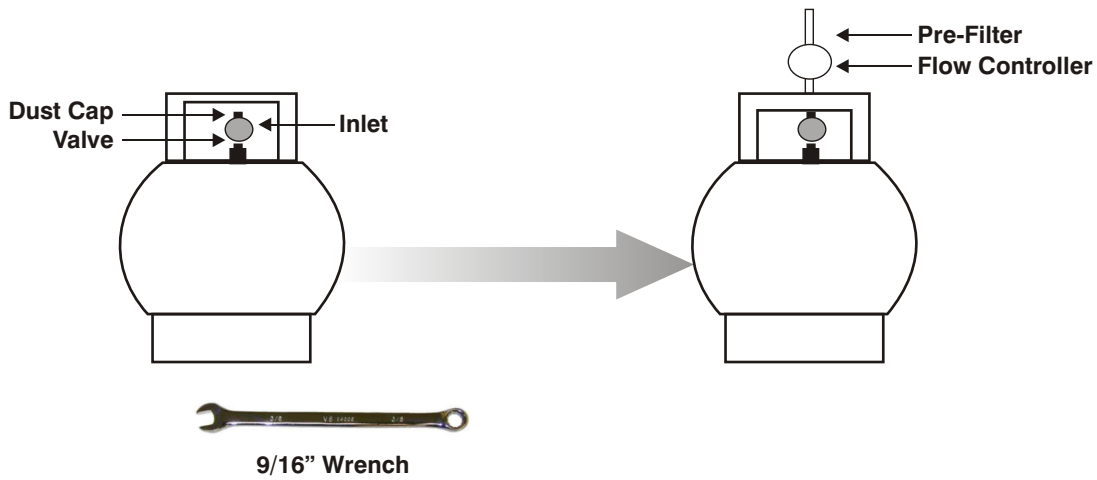
4.3.2 PID/FID VOC Survey

Confirmation VOC survey utilizing a properly calibrated PID or FID by an ADEC qualified sampler may be employed in lieu of Method TO-15. A properly operating PID or FID will yield near-zero ppm readings in clean air, and will yield substantial evidence (20, 50, or 100+ ppm) in the presence of solvents. For this method, the PID or FID must be calibrated using a low concentration calibration gas (0- to 10-ppm range).

Calibration of the PID and/or FID must be verified before and after the survey. A certified 10 ppm isobutylene calibration gas shall be used for calibration. Acceptable criteria shall be $\pm$15% of the certified calibration gas standard. Note: Conventional use of these instruments often employs a 100-ppm calibration gas standard. The 10-ppm gas standard does not cost more than a 100-ppm calibration gas standard. The use of this low concentration standard is required because of the cleanup standard is 1 ppm total VOCs (as isobutylene). Low calibration standards should not exceed 10 times the associated cleanup standards.

Note: Many commercial PIDs or FIDs will achieve $\pm$15% low standard QC criteria, however some may not. The low range sensitivity of these instruments is based upon the specifications of the instrument; i.e. sample gas flow, sample path length, size and intensity of the PID or FID source, and solid-state sensitivity of the instrument's photomultiplier.

Testing should occur in each room of the affected property. Initially, directed survey of areas of possible storage, use, spillage, or disposal associated with the former drug lab should be conducted using the PID or FID in each location for at least 1 minute (VOC vapors may not be detected by the PID or FID otherwise) and the highest reading obtained should be recorded. Any positive reading above natural background may indicate the presence of solvent-contaminated materials requiring further removal and/or decontamination.



1. Remove dust cap from the valve of the Summa® canister. Note: If the cap is loose, this does not mean that the canister leaked during transit.
2. Attach the flow controller to the cylinder inlet, turning the threaded nut until it is hand tight.
3. Use a 9/16 inch wrench to tighten the nut. Turning 1/4 to 1/2 turn beyond hand tight is sufficient.
4. Complete sample label. If using your own label, please do not cover up or remove canister information tag.
5. To initiate sampling event, turn valve counterclockwise, one and 1/2 or two turns.
6. Note start time. The valve must be closed at the endpoint (i.e., 8 to 12 hours) by turning clockwise until snug.
7. If the valve is not closed at the end point the canister will eventually go to ambient pressure. If this happens, the sample cannot be used.
8. After closing the valve, **remove the flow controller from the canister**, replace the dust cap and return both to the laboratory in the containers in which they were received.
9. Note that the flow controllers are not to be adjusted in the field.
10. Do not remove the canister information tag for any reason, this is a record of the canister's certification.

Source: Severn Trent Laboratories

Figure 4-6 VOC Sampling Using a Summa® Canister

In the event positive readings are encountered, the source of VOCs should be investigated using the instrument as a guide. Some low (i.e. slightly greater than 1 ppm) background VOCs may exist at the property. These may be due to resins in building materials, oil based paints, or external factors such as spilled fuel adjacent to a storage tank, poor septic drainage, tree pollen or other background source not associated with the former drug lab.

In the event "background" VOCs are encountered, the qualified sampler will substantiate background concentration with detailed documentation. With ADEC approval, a site-specific VOC standard equaling 1 ppm plus background may be achieved. While at the site, the qualified sampler may contact ADEC if VOCs slightly above the 1 ppm cleanup standard are obtained and no source areas are identified.

After completing the directed survey, a room-by-room survey should occur to confirm that the areas away from documented lab activities are below the cleanup standard. The initial survey should occur in the center of the room for a period of 3 minutes. The PID or FID is held 3 feet above the floor (the height of a small child's breathing zone). The highest reading observed during this time is recorded.

Next a survey along the walls of the room shall occur, with readings achieved every five feet for a period of one minute. Again the highest reading achieved during this period is recorded.

All inaccessible drains or plumbing traps not replaced during decontamination shall be tested for VOCs by holding the testing equipment probe in the plumbing pipe above the trap for at least 1 minute, and the highest reading should be recorded.

Upon completion of the VOC survey, the qualified environmental sampler shall prepare a brief report, inclusive of all findings and calibration data. The sampler shall certify their findings. The certified VOC survey report shall be included with other deliverables to the ADEC.

4.4 Lead Sampling and Testing

If there is clear evidence that lead and/or chemicals containing lead were used in the manufacture of methamphetamine, lead sampling and testing shall be conducted in a manner similar to methamphetamine wipe sampling; however, the cotton gauze wipe should be wetted with reagent-grade nitric acid rather than with methanol. Sample areas for lead should not be co-located with sample areas for methamphetamine (i.e., the same area should not be wiped with both methamphetamine and lead wipes). The sample areas for lead should be adjacent to the sample areas for methamphetamine.

Field screening using a portable XRF is recommended. XRFs may be utilized to identify and delineate the extent of lead contamination, and to determine lead

background levels. The XRF should be operated in accordance with manufacturer's specifications.

4.5 Mercury Sampling and Testing

If there is clear evidence that mercury was used in the manufacture of methamphetamine at the clandestine drug lab, mercury sampling and testing shall be conducted using National Institute of Occupational Safety and Health (NIOSH) Method 6009. This method involves the use of a sample pump drawing an air sample through a sorbent tube that is subsequently analyzed by a laboratory. Figure 4-7 provides an illustration of mercury sampling using a sample pump and sorbent tube.

Final mercury confirmation sampling and analyses (if required) shall be performed in the center of the room that contained the former illegal methamphetamine laboratory. Although not required, ADEC recommends that additional samples be collected from all rooms considered to be heavily contaminated. Sampling and analyses shall be performed in accordance with the protocols prescribed by NIOSH Method 6009. Simplified protocols are provided in Appendix F.

4.6 Number of Samples to be Collected and Analyzed

Because each meth lab site is different, the number of samples to be collected will vary based on the number of rooms within the building, whether fixtures and appliances were decontaminated for reuse, and other factors.

Table 4-3 provides a summary of the samples that should be collected if a meth lab were documented in the example residence shown in Figure 3-1. The table assumes that either the birch or red phosphorus method of drug manufacturing was used (i.e., lead and mercury testing not required), and that up to four major appliances were decontaminated for reuse. This example also assumes that the laboratory equipment and chemicals were located in the kitchen and that some chemical mixing operations also occurred in the bathroom (based on information gathered by law enforcement during the drug bust).

Each sample sent to the laboratory should be assigned a unique identification number (i.e., sample ID) and the locations of the subsamples should be documented in a field notebook. Example sample ID numbers are included in Table 4-3.

If the amalgam/P2P method were documented at the example residence shown in Figure 3-1, then additional samples would be collected for lead and mercury analysis. Table 4-4 summarizes the number of samples that would be collected for lead and mercury.

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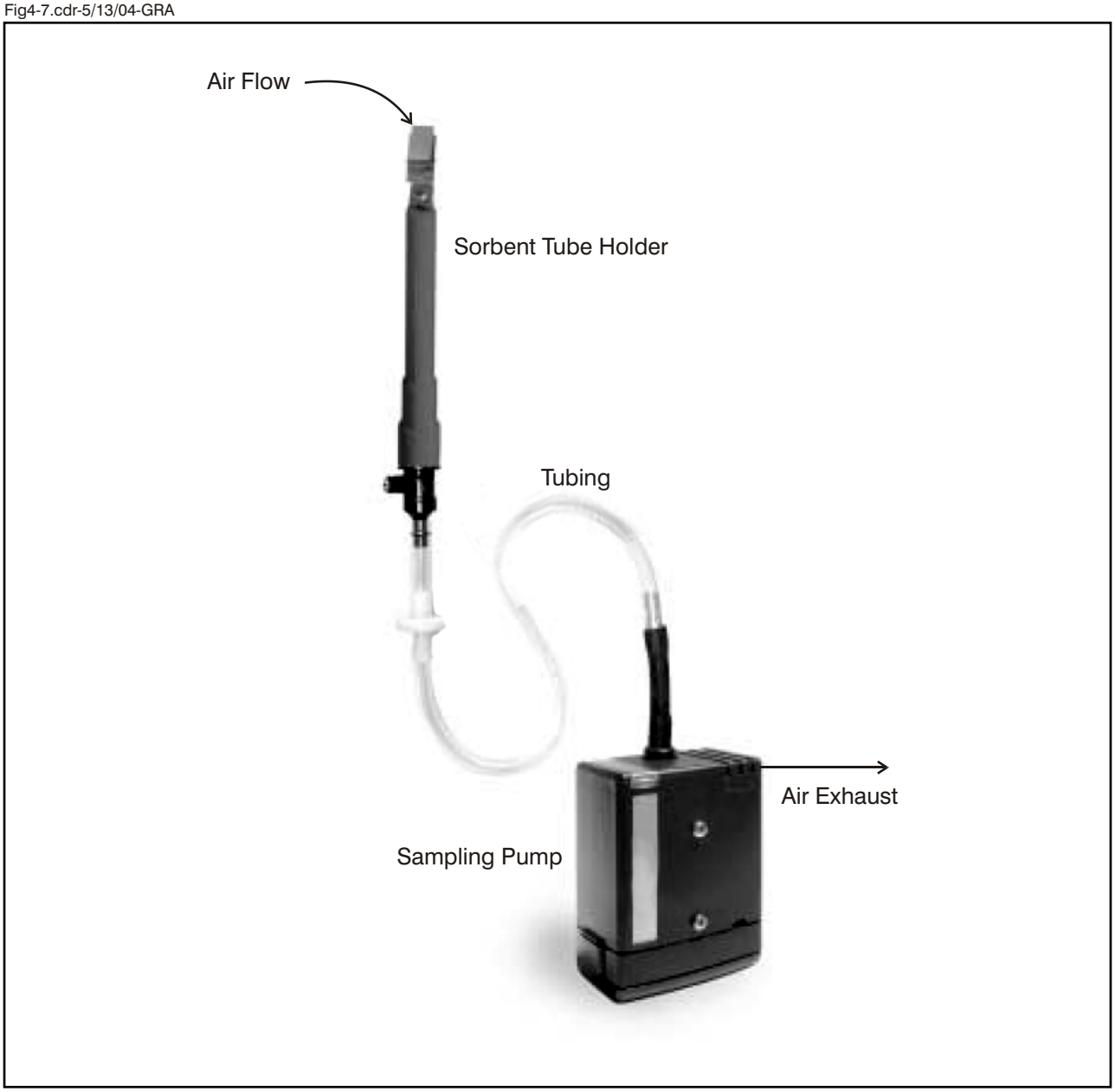

Figure 4-7 Example Sampling Pump for Mercury Sampling Using a Sorbent Tube

Table 4-3
Number, Type, and Location of Sample Areas for Example 2-Bedroom Residence Methamphetamine and VOC Samples

No.	Room	Sample ID	Sample Type	Sample Areas	Total Sample Size
Methamphetamine Samples					
1	Living Room	LVR01	Composite wipe	Ceiling, floor, and two walls	400 cm^2
2	Bedroom A	BRA01	Composite wipe	Ceiling and two walls[1]	300 cm^2
3	Bedroom B	BRB01	Composite wipe	Ceiling and two walls[1]	300 cm^2
4	Bedrooms A and B	BRAB01	Composite vacuum sock	Carpet in each bedroom[1]	200 cm^2
5	Utility Room	UTR01	Composite wipe	Ceiling, floor, and two walls	400 cm^2
6	Kitchen	KTN01	Composite wipe	Ceiling, floor, and two walls	400 cm^2
7	Kitchen	KTN02	Composite wipe	Kitchen counter, floor in front of range/stove, cabinet shelf, and bottom of sink[2]	400 cm^2
8	Bathroom	BATH01	Composite wipe	Ceiling, floor, and two walls	400 cm^2
9	Bathroom Fixtures	BATH02	Composite wipe	Bathtub, sink bottom, countertop, and toilet	400 cm^2
10	Hallway	HALL01	Composite wipe	Ceiling, floor, and two walls	400 cm^2
11	Garage	GAR01	Composite wipe	Ceiling, floor, and two walls	400 cm^2
12	Ventilation System	HVAC01	Composite wipe	Air register, ductwork (2 locations), air intake	400 cm^2
13	Appliances	APPL01	Composite wipe	Refrigerator, dishwasher, washer, dryer	400 cm^2
VOC Samples					
1	Kitchen	KTN03	Summa® canister	Kitchen (where lab equipment was documented)	8-12 hours
2	Bathroom	BATH03	Summa® canister	Bathroom (second heavily contaminated area)—optional	8-12 hours

Key:
cm^2 = Square centimeters.
VOCs = Volatile organic compounds.

Notes:
1. For this example, the carpeting in the two bedrooms was left in place and cleaned. Vacuum samples were collected from the carpeting to confirm that the cleanup level was met.
2. For this example, the range/stove was removed and disposed offsite, so a cabinet shelf was wipe sampled instead of the range/stove.

Table 4-4
Number, Type, and Location of Sample Areas for Example 2-Bedroom Residence Lead and Mercury Samples

No.	Room	Sample ID	Sample Type	Sample Areas	Total Sample Size
Lead Samples					
1	Living Room	LVR02	Composite wipe	Ceiling, floor, and two walls	400 cm^2
2	Bedroom A	BRA02	Composite wipe	Ceiling and two walls[1]	300 cm^2
3	Bedroom B	BRB02	Composite wipe	Ceiling and two walls[1]	300 cm^2
4	Bedrooms A and B	BRAB02	Composite vacuum sock	Carpet in each bedroom[1]	200 cm^2
5	Utility Room	UTR02	Composite wipe	Ceiling, floor, and two walls	400 cm^2
6	Kitchen	KTN04	Composite wipe	Ceiling, floor, and two walls	400 cm^2
7	Kitchen	KTN05	Composite wipe	Kitchen counter, floor in front of range/stove, cabinet shelf, and bottom of sink[2]	400 cm^2
8	Bathroom	BATH04	Composite wipe	Ceiling, floor, and two walls	400 cm^2
9	Bathroom Fixtures	BATH05	Composite wipe	Bathtub, sink bottom, countertop, and toilet	400 cm^2
10	Hallway	HALL02	Composite wipe	Ceiling, floor, and two walls	400 cm^2
11	Garage	GAR02	Composite wipe	Ceiling, floor, and two walls	400 cm^2
12	Ventilation System	HVAC02	Composite wipe	Air register, ductwork (2 locations), air intake	400 cm^2
13	Appliances	APPL02	Composite wipe	Refrigerator, dishwasher, washer, dryer	400 cm^2
14	Background	RR01	Wipe	Consult ADEC	100 cm^2
Mercury Samples					
1	Kitchen	KTN06	Sorbent tube	Kitchen (where lab equipment was documented)	Appendix E
2	Bathroom	BATH06	Sorbent tube	Bathroom (second heavily contaminated area)—optional	Appendix E

Key:
ADEC = Alaska Department of Environmental Conservation.
cm^2 = square centimeters.

Notes:
1. For this example, the carpeting in the two bedrooms was left in place and cleaned. Vacuum samples were collected from the carpeting to confirm that the cleanup level was met.
2. For this example, the range/stove was removed and disposed offsite, so a cabinet shelf was wipe sampled instead of the range/stove.

4.7 Sample Containers and Holding Requirements

Table 4-5 summarizes the analytical methods, detection limits, container descriptions, preservatives, and holding times for each analytical method. For example, methamphetamine wipe samples have a 14-day holding time. This means that the laboratory must test the sample within 14-days of the sample collection date.

With the exception of the Summa® canister, all samples should be cooled to 4 ± 2^0C (40 ± 4^oF), and that temperature should be maintained until the laboratory takes possession of the samples. Failure to properly preserve samples may result in data that is not considered valid by ADEC. When shipping samples to an out-of-state laboratory, use of an overnight shipping service (e.g., FedEx) is recommended to ensure that the required temperature range will be maintained.

4.8 Documentation of Sampling Activities

ADEC strongly recommends that the property owner or owner's agent collect and maintain documentation of sampling activities. Appendix B contains a sampling report that can be used to document sampling locations. Photographs of sampling areas and sample jars are also recommended.

4.9 Sample Testing

Collected samples must be submitted to an ADEC-approved laboratory for testing (i.e., analysis). A list of qualified laboratories can be obtained from ADEC. *Note: Most environmental laboratories do not routinely conduct analysis for methamphetamine. Currently, no commercial Alaska laboratories conduct methamphetamine analysis routinely. Likewise, analysis of VOC air samples is a specialty performed routinely by a small number of laboratories.*

The property owner must indicate the total sample area size when requesting analysis of composite wipe samples for methamphetamine or lead. The analytical laboratory can report sample results into the units specified by the cleanup standards (µg/100 cm^2 for methamphetamine and lead wipe or vacuum samples, ng/m^3 for mercury samples, and ppm for VOC samples) upon request.

ADEC recommends that the property owner use the sample analysis request form included in Appendix B when requesting analysis of confirmation samples. This form contains a statement authorizing the laboratory to provide ADEC with a certified copy of the sample results upon request. It also specifies that sample results will be reported in units that match the cleanup standards (e.g., µg/100 cm^2 for methamphetamine).

Table 4-5
Reference Guide to Sample Collection, Preservation, and Laboratory Analysis

Parameter	Analytical Method	Sample Type	MDL[1]	PQL[1]	Container	Preservation/Maximum Holding Time
Methamphetamine	Laboratory-Specific	Wipe	0.01 µg/100 cm^2	0.1 µg/100 cm^2	4-ounce, brown-amber jar with Teflon-lined lid or conical tube[2]	Methanol-wetted wipes, cool to 4 ± 2^0C (40 ± 4^oF), 14 days
Methamphetamine	Laboratory-Specific	Vacuum	0.01 µg/100 cm^2	0.1 µg/100 cm^2	Sock filter placed in 4-ounce, brown-amber jar with Teflon-lined lid or conical tube[2]	H_2SO_4-treated glass fiber filter, cool to 4 ± 2^0C (40 ± 4^oF), 14 days
VOCs	TO-15	Air	1.0 ppbv	10 ppbv	Summa® Canister	7 days
Lead	3050/6010	Wipe	0.02 µg/100 cm^2	0.2 µg/100 cm^2	4-ounce, brown-amber jar with Teflon-lined lid or conical tube[2]	10% HNO_3-wetted wipes, cool to 4 ± 2^0C (40 ± 4^oF), 30 days
Lead	3050/6010	Vacuum	0.02 µg/100 cm^2	0.2 µg/100 cm^2	0.8-µm or sock filter placed in 4-ounce, brown-amber jar with Teflon-lined lid or conical tube[2]	Cool to 4 ± 2^0C (40 ± 4^oF), 30 days
Mercury	6009	Air	0.6 ng/m^3	6 ng/m^3	SKC 226-17-1A Sorbent Tube or equivalent	Cool to 4 ± 2^0C (40 ± 4^oF), 14 days

1 Method detection limit (MDL) and practical quantitation limit (PQL) based on data quality objective (DQO) criteria, *when achievable*, where MDL = 10 × DQO and PQL = 10 × MDL. Actual MDL based on laboratory studies in accordance with 40 Code of Federal Regulations 136.

2 Conical tube = 50 or 100 ml sterile plastic centrifuge tube

cm^2	square centimeter	C	Celsius
m^3	cubic meter	F	Fahrenheit
ng	nanogram	HNO_3	nitric acid
ppbv	part per billion, volume	H_2SO_4	sulfuric acid
µg	microgram	VOCs	volatile organic compounds

5 Glossary

Following is a glossary of terms used in the guidance document.

acute
Short-term.

ADEC qualified sampler
18 AAC 78.995 defines a "qualified person" or "qualified third party" as a person who actively practices environmental science or engineering, geology, physical science, hydrology, or a related field and has the following minimum education and experience:

(A) a bachelor's degree or equivalent from a nationally or internationally accredited post-secondary institution in environmental science or engineering, geology, hydrology, physical science, or a related field; for purposes of this subparagraph, "equivalent" means that the person earned at least 128 semester hours, 168 trimester hours, or 192 quarter hours at an accredited post-secondary institution, and with at least 18 percent of those hours in a science major and at least 13 percent of those hours in upper division-level courses; and

(B) at least one year of professional experience in environmental science or engineering, geology, physical science, or a related field, completed after the degree described in (A) of this paragraph was obtained.

air lances
Long, thin, high-pressure air piping, hose, and nozzle used to snake through ventilation systems to physically dislodge particulate contamination from ductwork.

air registers
Grated inlet or outlets to heating, ventilation, and air conditioning inlets and outlets.

background concentration
The amount of a substance that may be present throughout an area due to environmental conditions.

chronic
Long-term.

clandestine drug laboratory
Illegal drug laboratory.

corrosives
Acids such as muriatic or hydrochloric (or other) acids, and bases such as Red Devil® lye or caustic soda.

decontamination
The process of removing contamination.

deposition
The process by which contamination in the vapor or particulate form (such as methamphetamine and lead) deposits on walls and surfaces.

disposition
The location where wastes are finally deposited (e.g., as in a landfill, down the drain, or HAZMAT removals).

encapsulation
The process of sealing contamination on walls and other surfaces in place using paint or other oil-based media.

field screening
The use of field (as opposed to laboratory) instrumentation and chemical detection systems to identify the presence of contamination in the field (or house or residence), and to monitor the progress of decontamination efforts.

"fit for use"
Decontaminated residences that meet the cleanup criteria of this guidance are considered "fit for use" and may be re-inhabited after being de-listed as an illegal drug-manufacturing site.

flame ionization detector or FID
A field-screening device used to detect VOCs in air.

gross chemical removal
Removal of illegal laboratory equipment, paraphernalia, chemicals, etc. by law enforcement HAZMAT contractor.
HAZMAT

Hazardous materials.

HAZWOPER
Hazardous Waste Operations and Emergency Response training and certification specified by 29 CFR 1910.120.

heavily contaminated areas
Areas where high concentrations of contaminants are likely, such as the rooms where chemicals were used or cooked, or areas where chemicals were spilled.

HEPA
High-efficiency-particulate air. *HEPA systems* refers to filtration devices, including vacuum cleaners, designed to remove particulates from the air.

illicit
Illegal.

low-level contaminated areas
Areas where low concentrations of contamination are likely, such as rooms located away from areas where chemicals were used, cooked, or spilled.

mechanical agitators
Long, thin, mechanical devices used to snake through ventilation systems to physically dislodge particulate contamination from ductwork.

metals and salts
Refers to chemical substances containing toxic metals, including lead and mercury.

methamphetamine
A controlled substance, sometimes illegally manufactured for illicit use by clandestine laboratories.

non-porous
A hard, smooth surface that does not have “pores” that would allow for the accumulation of contamination.

OSHA
Occupational Safety and Health Administration.

PPE
Personal protective equipment such as chemical protective suits (Tyvek®, Saranex®), gloves, boots, and respirators.

photoionization detector or PID
A field-screening device used to detect VOCs in air.

porous
A surface that has "pores," not necessarily visible to the naked eye, that are susceptible to the accumulation of contamination and/or liquids.

precursor
A chemical used to create methamphetamine.

qualified
A term that identifies a person as knowledgeable and experienced in a given field of technical expertise. For non-professional occupations (decontamination contractor), the qualified contractor will possess industry-related certifications (HAZWOPER or HAZMAT), equipment manufacturer training, and at least four years of experience in the general trade. Qualified contractors should have verifiable references.

remediate
To clean up. A term used to describe the act of decontaminating a contaminated site.

residual contamination
Contamination at a site due to spilling of chemicals and/or deposition of chemicals through the air upon walls, floors, ceiling, ventilation, appliances, and other surfaces. Residual contamination can have high concentrations where chemicals were spilled, or low concentrations due to deposition of chemicals via air movement.

rotary brushes
Long, thin piping, hose, and mechanical rotary brushes used to snake through ventilation systems to physically dislodge particulate contamination from ductwork.

sorbent tube
For mercury analysis, the sorbent tube is a glass tube containing activated carbon, which traps mercury from the air sample drawn by the sample pump. The sorbent tube is then analyzed for mercury content.

Summa® canisters
Vacuum cylinders used to obtain VOC samples.

TO-15
Toxic Organics-15. The method for using a Summa® canister to collect a VOC sample and subsequent laboratory analysis.

wetting agent

Methanol for methamphetamine wipe samples, and 10% nitric acid for lead wipe samples. The gauze wipes are wetted with these chemicals before the wipe sample is collected.

wipe sample
Use of a wetted gauze wipe to sample walls, countertops, appliances, and other suitable surfaces.

volatilized
Process by which liquid or solid chemicals are made airborne.

VOCs
Volatile organic compounds. These compounds include solvents used in the manufacture of methamphetamine.

XRF
X-ray fluorescence. Field-screening instrumentation used to detect lead. Lead atoms “fluoresce” when exposed to X-rays. By these means, the instrument can determine the concentration of lead in a wipe or vacuum sample, or in paint containing lead.

6 References

Alaska Department of Environmental Conservation, April 29, 2004, *'Fit-for-Use' Standards for Sites Associated with Clandestine Drug Labs, Proposal and Basis for Alternative Standards*.

Minnesota Department of Health, September 2003, *Clandestine Drug Labs, General Cleanup Guidelines.*

Occupational Safety and Health Administration, 29 CFR 1910.120 Hazardous Waste Operations and Emergency Response regulations.

United States Environmental Protection Agency (EPA), April 22, 2003, *Biological Sampling Procedures Booklet*.

_____, January 1999, *Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air, Second Edition, Compendium Method TO-15, Determination of Volatile Organic Compounds (VOCs) in Air Collected in Specially-Prepared Canisters and Analyzed by Gas Chromatography/Mass Spectrometry (GC/MS),* EPA/625/R-96/010b.

_____, March 1995, *Residential Sampling for Lead Protocols for Dust and Soil Sampling,* Publication EPA 747-R-95-001.

Washington Office of Environmental Health Assessments, September 2000, *Review of Contaminant Levels: Guidelines for Clandestine Drug Lab Cleanup.*

Washington State Department of Health, June 1996, *Guidelines for Contamination Reduction and Sampling at Illegal Drug Manufacturing Sites*.

A

Property Owner's Cleanup Certification

Required to be completed, signed, and submitted to ADEC when requesting removal from the list of clandestine drug laboratory properties.

Former Illegal Drug-Manufacturing Site
Property Owner's "Fit for Use" Certification Statement

Legal Description of Property: _____

Property Owner: _____

Mailing Address: _____

Phone Number(s): _____

Please initial next to the statements that apply and provide contractor information if applicable.

1. Decontamination:

_____ I conducted decontamination myself

OR
_____ I contracted decontamination to (name, address, and phone number of contractor):

_____

_____

2. Sampling:

_____ I conducted confirmation sampling myself;

OR
_____ I contracted sampling to (name, address, and phone number of qualified third party):

_____

_____

Attach ADEC qualified sampler's certified VOC survey report (if applicable).

3. Sample Testing: Confirmation samples were submitted to the following ADEC-approved lab (name, address):

_____

I have authorized the laboratory to provide a certified copy of the analytical results directly to ADEC upon request. I certify that the above information is true and complete, to the best of my knowledge and belief:

Signature: _____Date:_____

Warning: Supplying a false statement, answer, or document that you do not believe to be true may subject you to criminal prosecution for unsworn falsification under Alaska Statute 11.56.210. If found guilty, you may be punished for violation of a class A misdemeanor.

B Recommended Cleanup Documentation

Former Illegal Drug-Manufacturing Site
Decontamination Documentation

Property Owner: _____

Legal Description of Property: _____

1. Decontamination of Heavily Contaminated Areas
From the room(s) or location of the meth lab operations, remove all porous and visibly stained materials; may include, but is not limited to: carpets, sheetrock, countertops, appliances, and drain traps. Maintain a photographic record. List materials and items removed:

_____

_____

_____

_____

_____

Identify final disposition of materials and items removed:_____

_____

2. Decontamination of Surfaces and Appliances
All remaining surfaces and appliances in the room, or the location of the meth lab, require thorough cleaning with a hot water solution of trisodium phosphate or commercial cleanser, such as Simple Green®, or the use of a wet-vac or steam cleaner. Maintain a photographic record. List surfaces and items, and methods of decontamination:

_____

_____

_____

_____

_____

Identify final disposition of fluids generated by decontamination activities:_____

_____

Former Illegal Drug-Manufacturing Site
Sampling Report

3. Field Screening of Decontaminated Surfaces and Appliances

While not required, field screening is strongly recommended. Field screening can cost effectively identify contamination in excess of "fit for use" standards, providing cost savings via real-time knowledge of contaminant location(s), allowing for timely decontamination activities, and indicating evidence where decontamination may not be necessary. Additional cost savings may be realized because repeated decontamination, sampling, and laboratory analyses may not be required.

Screening for volatile organic compounds using a low-range photoionization detector, flame ionization detector, or portable gas chromatograph is recommended in proximity to the former meth lab, adjoining rooms, kitchen, bathroom(s), sinks, and other drain locations.

Screening of wipe samples for methamphetamine using the MISTRAL® drug detection system, or equivalent or similar technology, is recommended for all surfaces in the meth lab area and adjoining rooms, ventilation systems, kitchen, bathroom(s), sinks, and other locations of concern.

Maintain a photographic record. Identify final field-screening locations, methods, and results (attach additional sheets if necessary):

_____

_____

_____

_____

_____

_____

_____

I certify that the above information is true and complete, to the best of my knowledge and belief:

Signed:_____ Date:_____

Printed Name:_____ Phone:_____

Firm:_____ (if contractor performed the work)

Former Illegal Drug-Manufacturing Site
Sampling Report

This is an optional report document intended to aid the property owner in final cleanup confirmation sampling and analyses.

Post-decontamination sampling and analyses are required in order to verify that cleanup standards have been achieved. In the interest of avoiding excessive cost to the property owner, sampling and analysis are limited to:

1. Methamphetamine sampling and analyses.
2. Volatile organic compound (VOC) sampling and analysis.

And in the event that the P2P (amalgam) method was employed (as determined by the law enforcement agency), additional sampling and analysis are required for:

3. Lead and mercury.

A photographic record of all sampling activities should be maintained.

Methamphetamine sampling will be accomplished via wipe and/or vacuum samples, as described in Section 4.2 and Appendices C and D of the *Guidance for Cleanup of Illegal Drug Manufacturing Sites.*

VOC sampling will be accomplished using either a Summa® canister or ADEC qualified sampler and calibrated PID or FID, as specified in Section 4.3 and Appendix E of the *Guidance for Cleanup of Illegal Drug Manufacturing Sites*.

Lead sampling (if required) will be accomplished via wipe and/or vacuum samples, as described in Section 4.4 and Appendices C and D of the *Guidance for Cleanup of Illegal Drug Manufacturing Sites.*

Mercury sampling (if required) will be accomplished via indoor air sampling, as described in Section 4.5 and Appendix F of the *Guidance for Cleanup of Illegal Drug Manufacturing Sites*.

While the property owner is permitted to conduct sampling, performance of sampling activities by a qualified third party professional is strongly recommended.

On the following pages are sample summary tables and a laboratory analysis request form.

Former Illegal Drug-Manufacturing Site
Sampling Report

SITE LOCATION:
_____

Methamphetamine Wipe-Sampling Summary		
Room/Appliance[1]	**Composite Locations[2]**	**Sample ID[3]**

Notes:
1. Kitchen, bathroom, bedrooms, toilet, tub, refrigerator, range/stove, etc.
2. Four or fewer subsamples from a single room, or multiple fixtures or appliances may be composited into one single sample for analysis.
3. The sample ID must be distinct from any other sample ID.
4. The sample label must include the date and time of sampling, sample ID, and total sampling area. The same information must be included on the chain of custody form.

VOC-Sampling Summary – Summa® Canister Method			
Location (Room)	**Time Start**	**Time End**	**Flow Rate (liters per minute)**

Former Illegal Drug-Manufacturing Site
Sampling Report

SITE LOCATION:

_____

Lead Wipe-Sampling Summary		
Room/Appliance[1]	**Composite Locations[2]**	**Sample ID[3]**

Notes:
1. Kitchen, bathroom, bedrooms, toilet, tub, refrigerator, range/stove, etc.
2. Four or fewer subsamples from a single room, or multiple fixtures or appliances may be composited into one single sample for analysis.
3. The sample ID must be distinct from any other sample ID.
4. The sample label must include the date and time of sampling, sample ID, and total sampling area. The same information must be included on the chain of custody form.

Mercury-Sampling Summary				
Location (Room)	**Time Start**	**Time End**	**Flow Rate (liters per minute)**	**Scrubber Volume (milliliters)**

CHAIN OF CUSTODY / LABORATORY ANALYSIS REQUEST FORM

Date April 1st, 2004 Page 1 of 1

Property Owner:
Property Location:
Sampler Name:
Company/Address:

Phone:
Fax:

Sampler's Signature:

Sample I.D.	Date	Time	LAB I.D.	Sample Matrix	Number of Containers	**Methamphetamine** Lab Method	**VOCs** TO-15	**VOCs** TO-17	**Total Lead** 305/6010 or 6020 or 7421	**Mercury** NIOSH 6009						REMARKS

Analysis Requested

Relinquished By	Received By
Signature	Signature
Printed Name	Printed Name
Firm	Firm
Date/Time	Date/Time

Relinquished By	Received By
Signature	Signature
Printed Name	Printed Name
Firm	Firm
Date/Time	Date/Time

TURNAROUND REQUIREMENTS

Standard TAT

REPORT REQUIREMENTS

Level II QC

INVOICE INFORMATION

P.O. # _____

Bill to: _____

SAMPLE RECEIPT

Shipping VIA: _____
Shipping #: _____
Condition: _____

Lab No: _____

Special Instructions/Comments:

Report methamphetamine and/or lead concentrations in micrograms per 100 cm units.
Report VOC concentrations in part per million units.
Report mercury concentrations in nanograms per cubic meter units.
Laboratory is authorized to submit results to ADEC upon request from ADEC.

C Wipe-Sampling Protocols

Protocol for Collection of Wipe Samples
Methamphetamine and/or Lead

1.0 Introduction

This protocol provides for the collection of settled dust samples from hard, relatively smooth, non-porous surfaces using wipe methods. The protocol is not applicable for the collection of settled dust samples from highly textured surfaces, such as brickwork and rough concrete, and soft fibrous surfaces, such as upholstery and carpeting. The protocol is capable of producing samples for either methamphetamine or lead (separate and distinct wipe samples and subsequent analyses), with quantitative results in loading terms (micrograms per 100 square centimeters).

2.0 Equipment and Supplies

2.1 Required Sampling Equipment

- **Masking Tape**: Used for holding down sampling templates and marking sampling locations.

- **Sample Collection Containers**: Certified precleaned, 4-ounce, brown-amber, wide-mouth jar with Teflon-lined lid.

- **Sampling Templates**: A sampling template is typically a disposable cardboard cut-out of a 100-cm^2 inside area, or a 100-cm^2 area demarcated directly on the wall or other surface with masking tape. Reusable plastic, aluminum, or other materials may be used. Usually, this will be a 10-centimeter by 10-centimeter square. A variety of shapes (such as square, rectangle, square U-shaped, rectangle U-shaped, and L) may be used in variable field situations. All templates must have accurately known inside dimensions. Templates should be thin (less than 1/8-inch) and capable of lying flat on a flat surface.

- **Measuring Tape or Ruler**: Steel or plastic with divisions to 1 centimeter.

- **Wipes**: Sterile cotton gauze 10 centimeters by 10 centimeters (Johnson & Johnson®, or equivalent).

- **Methanol**: Reagent grade. Used for wetting methamphetamine sample wipes.

- **10% Nitric Acid**: Reagent grade. Used for wetting lead sample wipes. Nitric acid is needed only when the amalgam/P2P methamphetamine method of cooking has been identified.

2.2 General Supplies

- **Field Notebooks**: Bound with individually numbered pages.
- **Indelible Ink Marker**: Black ink.
- **Ink Pens**: Black ink.
- **Packaging**: Bubble wrap for sample, Ziploc® bags for bubble-wrapped samples, clear strapping tape for sealing shipping coolers.
- **Plastic Bags**: Trash bags with ties.
- **Nitrile or Latex Gloves**: Powderless (gloves with powder should not be used).
- **Shipping Cooler(s)**: With sufficient gel ice to maintain samples at 4±2° Celsius (40±4° Fahrenheit).
- **Optional Forms**: Sampling report form and chain-of-custody form.
- **Custody Seals**: Used to seal custody of individual samples for purposes of legal defensibility.

3.0 Sampling Procedure

Following is a summary or overview of this procedure:

STEP 1. Select a sampling location. Don a clean pair of gloves.

STEP 2. Mark the sampling location using a template or masking tape that equals 100 cm^2. Photograph the sample location (optional). Discard gloves.

STEP 3. Don a clean pair of gloves. Remove gauze wipe from packaging, and wet gauze wipe lightly with either methanol (for methamphetamine sample) or 10% nitric acid (for lead sample). Squeeze off any excess wetting agent. The wipe should not drip during wipe sampling. Fold wipe in half.

STEP 4. Perform first wiping side to side in an “S” motion (see Figure 4-1), covering entire sample area. Apply pressure to the fingertips during wiping.

STEP 5. Turn wipe over. Perform second wiping top to bottom in an "S" motion, covering entire sampling area. Apply pressure to the fingertips during wiping.

STEP 6. Place wipe in brown-amber, 4-ounce sampling jar, and cap with Teflon-lined lid.

STEP 7. Label the sample container with the date, time collected, sample identification, and other pertinent information (total sample size).

STEP 8. Discard gloves in a trash bag.

Please note that it is important to change gloves as instructed because contamination may be transferred from one sample location to another potentially clean sample location.

If a composite sample is being collected, repeat Steps 1 through 6 using a new wipe, a new template, and clean gloves. The wipes for the composite sample are placed in a single sample jar and the total sample area is noted on the sample label.

D

Vacuum-Sampling Protocols

Protocol for Collection of Vacuum Samples
Methamphetamine and/or Lead

1.0 Introduction

This protocol provides for the collection of samples from surfaces using vacuum methods. The protocol is suitable for the collection of samples from hard and highly textured surfaces, such as brickwork and rough concrete, and soft, fibrous surfaces, such as upholstery and carpeting. This protocol can be used to produce samples for methamphetamine or lead.

Procedures presented in this protocol are intended to provide a method for collection of samples that cannot be conducted using wipe collection methods. In addition, these procedures are written to utilize equipment that is readily available and in common use for other environmental sampling applications.

Because of the flow dynamics inherent in the vacuum method, results for vacuum samples are not likely to reflect the total contaminants contained within the sampling area. This protocol generally will have a collection bias toward smaller, less dense, particulates. However, the protocol, if performed as written, will generate particulate data that will be consistent and comparable between operators performing the method.

Collecting samples by vacuuming offers the advantages for sampling dusty, non-porous surfaces and porous surfaces such as carpeting, ceiling tiles, ventilation systems filters, and cloth seats. Vacuum samples must be collected using only high-efficiency particulate air (HEPA) vacuum samplers. Vacuum samples are obtained using a Dust Collection Filter Sock (manufactured by Midwest Filtration Company, Fairfield, Ohio, or equivalent) to the inlet nozzle of a HEPA vacuum sampler.

Conventional home or industrial vacuum cleaners should not be used for sample collection because these vacuum cleaners can further disperse contamination if filtration is insufficient. HEPA vacuum samples are not appropriate in sample locations where insufficient dust mass is collected.

2.0 Equipment and Supplies

2.1 Required Sampling Equipment

- **Vacuum Sampler**: HEPA vacuum sampling system configured with a filter sock.

- **Filter Sock**: 0.8-micrometer, filter sock.

- **Masking Tape**: Used for holding down sampling templates and marking sampling locations.

- **Sampling Templates**: 100-square-centimeter (cm^2) inside area, reusable aluminum or plastic, or disposable cardboard or plastic template. A variety of shapes (such as square, rectangle, square U-shaped, rectangle U-shaped, and L) may be used for variable field situations. All templates must have accurately known inside dimensions. Templates should be thin (less than 1/8-inch), and be capable of lying flat on a flat surface.

- **Sample Collection Container**: 50 or 100 milliliter conical or centrifuge tube with Teflon-line lid.

- **Secondary Sample Collection Container**: Ziploc® plastic bags for holding and transporting the filter cassettes, or socks in sampling containers.

- **Measuring Tape or Ruler**: Steel or plastic divisions to at least 1 centimeter.

2.2 General Supplies

- **Field Notebooks**: Bound with individually numbered pages.

- **Indelible Ink Marker**: Black ink.

- **Ink Pens**: Black ink.

- **Packaging**: Bubble wrap for sample, Ziploc® bags for bubble-wrapped samples, clear strapping tape for sealing shipping coolers.

- **Plastic Bags**: Trash bags with ties.

- **Nitrile or Latex Gloves**: Powderless (gloves with powder should not be used).

- **Shipping Cooler(s)**: With sufficient gel ice to maintain samples at $4 \pm 2°$ Celsius ($40 \pm 4°$ Fahrenheit).

- **Forms**: Sampling report form and chain-of-custody form.

- **Custody Seals**: Used to seal custody of individual samples if desired for legal defensibility.

3.0 Sampling Procedure

3.1 Vacuum-Sampling Procedure

The following procedure assumes that the air-sampling pump has been warmed up, and sufficient flow ($\leq$2.5 L/min) verified by the manufacturer, vendor, or via a flow meter or other calibration device.

Following is a summary or overview of this procedure:

STEP 1. Select a sampling location. Don a clean pair of gloves.

STEP 2. Mark the sampling location using a template or masking tape that equals 100 cm^2. Photograph the sample location (optional). Discard gloves.

STEP 3. Don a clean pair of gloves. Prepare the vacuum and filter (sock or cartridge, depending on the type of vacuum sampler).

STEP 4. Perform the first vacuuming side to side in an "S" motion (see Figure 4-5), covering the entire sample area.

STEP 5. Perform the second vacuuming top to bottom in an "S" motion (see Figure 4-5), covering the entire sample area.

STEP 6. Place cartridge in brown-amber, 4-ounce sampling jar. Cap with Teflon-lined lid, or place sock in conical sampling tube and cap with Teflon-lined lid.

STEP 7. Label the sample container with the date, time collected, sample identification, and other pertinent information (total sample size).

STEP 8. Discard gloves in a trash bag.

Please note that it is important to change gloves as instructed because contamination may be transferred from one sample location to another potentially clean sample location.

If a composite sample is being collected, repeat Steps 1 through 8 using a new filter sock, a new template, and clean gloves. The socks for the composite sample are placed in a single sample container and the total sample area is noted on the sample label.

E Protocols for Volatile Organic Compound Sampling

Protocol for Collection of Air Samples Using a Summa® Canister for Volatile Organic Compounds

The following sampling method has been excerpted and revised from the United States Environmental Protection Agency's (EPA's) *Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air, Second Edition, Compendium Method TO-15, Determination of Volatile Organic Compounds (VOCs) in Air Collected in Specially-Prepared Canisters and Analyzed by Gas Chromatography/Mass Spectrometry (GC/MS)* (January 1999, EPA/625/R-96/010b).

The method, referred to as *TO-15*, involves the use of a Summa® vacuum canister, which when opened (by simply turning a valve) draws an air sample into the canister for subsequent analysis by the laboratory. While there are other methods to test for volatile organic compounds (VOCs) in air, TO-15 provides lower detection limits and models real conditions more effectively than other methods. In addition, sampling is a simple process, and the physical integrity of the canister prevents damage to, or loss of, the sample.

VOCs exist in many household items, including nail polish remover, some cleaning compounds, oil-based paints, glues and adhesives, and new carpeting. **For this reason, VOC sampling should occur:**

- **After decontamination is complete,**
- **Before any new carpeting or painting activities, and**
- **After the residence has been well ventilated (see Section 4.3).**

The residence is not ventilated during sampling. The residence should be at room temperature, typically 68° to 74° Fahrenheit. All exterior doors and windows should be closed. The canister is placed in the middle of the room where the former methamphetamine laboratory existed and placed on a table, rather than on the floor. The exact height is not critical, but is intended to approximate the breathing zone of a young child (approximately 3 feet).

In order to obtain a representative sample, a composite or time-weighted average sample is collected. This means that the canister is fitted with a special flow device (e.g., critical orifice), which regulates the flow of the air sample into the canister over a period of several (8 to 12) hours. When the canister is ordered from the laboratory, it must be specified that a time-weighted average sample will be obtained.

There should be a threaded cap, which must be removed from the orifice before sampling. Next, the sampler notes the time and pressure (on the canister gauge) and opens the canister valve. The building, room, and canister are left undisturbed for several hours during the day, or possibly overnight. Afterward, the sampler returns, notes the

time and pressure, closes the canister, and replaces the cap. Refer to Section 4.3.1 and Figure 4-6 for additional sampling procedures.

An identification tag is attached to the canister. At minimum, the canister serial number, sample identification, location, date, and time of sampling (hour and minutes) are recorded on the tag. The canister is routinely transported back to the analytical laboratory in a canister-shipping case.

The laboratory does most of the work. In preparation for indoor air sample collection with the Summa® canister, the laboratory evacuates the canister to a negative pressure vacuum, certifies that the canister is clean and free of any contaminants, and leak tested before sample collection in accordance with the technical specifications of the method.

Standard laboratory turnaround time is seven to 10 business days. Typical cost is $250 for the canister, flow controller, and analyses. The sampler pays to ship the sample back to the laboratory.

F Mercury-Sampling Protocols

Protocol for Collection of Air Samples for Mercury Vapors

1.0 Introduction

This protocol provides for the collection of air samples for mercury analysis.

2.0 Equipment and Supplies

Mercury vapor sampling requires:

1. Air-monitoring pump and sampling line.
2. Flow calibration device.
3. Sorbent sampling tube.

This equipment is of technical specification. The pump and calibration device can be leased, and sorbent tubes and sampling lines purchased from a vendor.

2.1 Required Sampling Equipment

One possible sampling equipment set includes:

- **Sampling pump:** SKC Series 222 low flow pump kit.
- **Calibration kit:** DC Lite calibration kit.
- **Sorbent tubes:** SKC #226-17-1A.

2.2 General Supplies

- **Field Notebooks**: Bound with individually numbered pages.
- **Indelible Ink Marker**: Black ink.
- **Ink Pens**: Black ink.
- **Packaging**: Bubble wrap for sample, Ziploc® bags for bubble-wrapped samples, clear strapping tape for sealing shipping coolers.
- **Plastic Bags**: Trash bags with ties.
- **Nitrile or Latex Gloves**: Powderless (gloves with powder should not be used).
- **Shipping Cooler(s)**: With sufficient gel ice to maintain samples at 4±2° Celsius (40±4° Fahrenheit).

- **Optional Forms**: Sampling report form and chain-of-custody form.

- **Custody Seals**: Used to seal custody of individual samples for purposes of legal defensibility.

3.0 Sampling Procedure

Following is a step-by-step summary of this procedure:

STEP 1. Prepare sampling location on table in middle of room.

STEP 2. Don a clean pair of sampling gloves. Break ends of sorbent tube immediately before sampling.

STEP 3. Connect air-monitoring pump to sample line, sorbent tube, and calibration device. Turn pump and calibration device on, and adjust flow device to 0.2 liter per minute. Record the time and exact flow.

STEP 4. Remove flow calibration device, and allow pump with sorbent tube to run for 6 to 8 hours.

STEP 5. Don a clean pair of sampling gloves. Record the exact time, and turn off the pump. Remove sorbent tube, and replace caps. Package tube in Ziploc® bag and bubble wrap in cooler with gel ice for delivery to laboratory at 4±2° Celsius (40±4° Fahrenheit). On the laboratory request form, note the total number of minutes sampled.

STEP 6. At least one blank tube is also sent to the laboratory. For the blank, quickly break off the ends of the tube, and cap immediately. . Package tube in Ziploc® bag and bubble wrap in cooler with gel ice for delivery to laboratory at 4±2° Celsius (40±4° Fahrenheit). Name the blank *other room*, and on the sample request form, provide a "dummy" number of minutes.