

Clandestine Drug Lab Cleanup A HAZWOPER Supplement

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CLANDESTINE DRUG LAB CLEANUP - A HAZWOPER SUPPLEMENT

Learn the new regulations (AB 1078) related to the cleanup of drug lab contaminated properties. Identify the likely chemicals used at drug labs and discuss the possible risks to personnel associated with these chemicals. Explore the analytical methods used for detecting residue and determine applicable cleanup levels. You will also discuss the appropriate cleanup methods used at contaminated properties.

This course is designed for HAZWOPER (40 hour) trained personnel who develop cleanup plans, perform actual cleanup and are planning to do inspections of drug lab contaminated facilities. It is also applicable for regulatory personnel who oversee cleanup of drug lab contaminated facilities.

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Methamphetamine: “What’s the big deal?”



Amphetamine/Methamphetamine

- Methylated version of amphetamine
- Name
 - d-N-methylamphetamine
 - d-deoxyephedrine
 - 1-phenyl-2-methylaminopropane
 - CAS: N,α-dimethyl benzenethanamine
- Meth 2-15x more potent than amphetamine



Street Names for Methamphetamine

- Crystal
- Meth
- Crystal Meth
- Speed
- Tweak/Tweek
- Product
- Crank
- Tina
- Crissy
- Glass
- Ice
- Uppers
- Yaba
- Shabu shabu



Methamphetamine History

- Amphetamine synthesized 1887 by German chemist, L. Edeleano
- Recent research has shown that methamphetamine was first produced by Dr. Nagayoshi Nagai of Tokyo Imperial University in 1888 by reducing ephedrine with HI and Red Phosphorus
- Methamphetamine synthesized from methylamine and phenyl-2-propoanone 1919 by Japanese researcher, A. Ogata
- 1927 (USA): Dextro-levo-amphetamine synthesized as substitute for *ma huang* (chinese name for the herb ephedra)
- 1930: Amphetamine discovered to increase blood pressure. Marketed in 1932 as "benzedrine" in an over-the-counter inhaler to treat nasal congestion
- 1935: Amphetamine's stimulant effect first recognized and used to treat narcolepsy (compulsion to sleep)
- 1937: Amphetamine first approved by AMA for sale in tablet form. Sold by prescription for treatment of narcolepsy, ADHD and 37 other conditions.



Meth History Cont.

- 1938: First published report of amphetamine addition and psychosis
- 1940: "Methedrine" commercial trade name for methamphetamine
- Both amphetamine and methamphetamine used as performance enhancer by Japanese, German and Americans in WWII. Led to addiction problems in Japanese after the war.
- 1950-53: amphetamine distributed to US troops in Korean war
- 1951: U.S. Congress passes a law requiring prescriptions for all oral and injectable amphetamines used commonly to treat obesity, narcolepsy and depression.
- 1954: Height of Japanese addiction: 2 million users in 88.5 million population
- 1959: first report of IV injection of contents of benzedrine inhaler. OTC Benzedrine Inhalers within drawn from market. OTC Methedrine inhalers offered.



Meth History, cont.


- 1962: early reports of illicit domestic production by biker gangs
- 1965: OTC Methedrine inhalers withdrawn from market. 31 million prescriptions written: mostly to women.
- Amphetamine and methamphetamine become Schedule II drugs in 1971
- Motorcycle gangs synthesized drug using phenyl-2-propanone until late 1980's. P2P became restricted substance, so chemistry shifted to making P2P from phenyl acetic acid or other ways
- 1987, DEA busts first HI/Red Phosphorus lab in the country in California. This method has a higher yield and more potent methamphetamine. Mexican nationals take over the market from biker gangs with this method.
- Current methods (Iodine/Red P or Lithium/Ammonia) using pseudoephedrine became popular as other chemicals became illegal



Modes of Administration

- Harms associated with each:
- Slamming (Injection)
- Snorting
- Swallowing (crystal-laced drinks; homemade pills: wrapped in tissue paper and 'popped' with water)
- Smoking
- 'Booty bumping' (rectal administration)

How is it taken?

	<u>Effects felt</u>	<u>Duration</u>	 Intensity of High
• Inject	< 2 mins	3-7 hrs	
• Smoke	< 2 mins	3-7 hrs	
• Snort / rectal	5-10 mins	4-10 hrs	
• Swallow	20-60 mins	5-12 hrs	

- Doses are repeated:
 - Every 3 - 8 hrs (to stay awake)
 - Every 0.5 - 4 hrs (to remain “high”)
- Half-life:
 - How long it takes for half the drug to leave your body
 - Very long = 12 hours
(cocaine = 2; mdma (ecstasy) = 4; ketamine = 1)



Physiological Effects

- Increases heart rate (tachycardia) and blood pressure
- Increases shallow breathing (tachypnea)
- Raises internal body temperature (hyperthermia)
- Causes sweating, often profusely
- Decreases appetite
- Enlarges pupils
- Causes dry mouth and bad breath (halitosis)
- Causes pounding headaches
- Increases motor activity (can't keep still)



"Tweaking"

- Tweaking lasts 8-12 hours, depending on dose and purity; may last several days from repeated dosing
- Major symptoms may include:
 - Teeth grinding
 - Dilated pupils and staring/trance state
 - Bad breath
 - Severe paranoia and hallucinations
 - Rapid body movement; jerking
 - 'Meth bugs' (paresthesias, caused by an imbalance in sensory neurons) and may lead to picking one's skin
 - Increased motor activity/performing repetitive acts



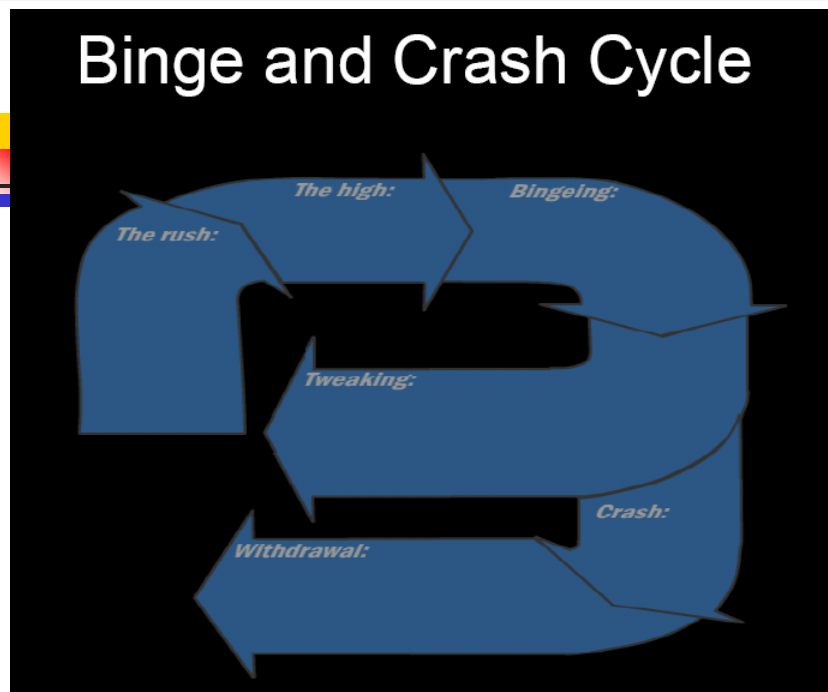
Source:
http://www.usdoj.gov/dea/concern/meth_effects.html



"Crashing"

- Withdrawal effect:
 - Extreme exhaustion
 - Sleep disorder
 - Suicidal ideation
 - Increased generalized anxiety and/or other anxiety disorders (agoraphobia)
 - Can lead to continued use ("crash avoidance")
 - Using 'downs'(sleeping pills) and/or opiates to alleviate withdrawal


Binge and Crash Cycle





Consequences

- Additional problems with meth:
 - Impaired cognitive functioning and short-term memory loss, notably abstract thinking and judgment
 - A person's ability to perceive risks and consequences while tweaking is diminished (person may engage in high risk sexual behavior, linked to HIV infection and syphilis)
 - Mixing drugs when crashing: pain killers; sleeping pills (may cause Substance Induced Amnesia if the person doesn't fall asleep)




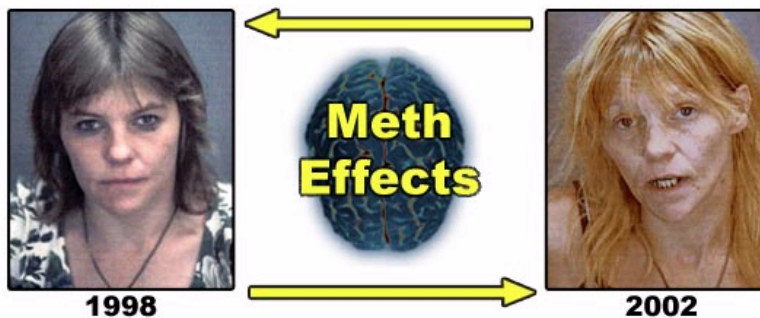
Consequences of Long-term Use

- Addiction
- Sexual compulsivity
- Anorexia; distorted body image, or phobia about weight gain
- Lethality results from kidney failure, dehydration, seizures (can occur after single use); cardiovascular events such as heart attack or stroke
- "Meth mouth": Lack of saliva production causes bacteria to grow, causing tooth decay
 - "Meth-induced osteoporosis": structural deterioration of bone tissue, which leads to bone fragility and loss of teeth

Meth Mouth

- When meth is ingested, it causes the user's blood vessels to shrink, limiting the steady blood supply that the mouth needs in order to stay healthy. With repeated shrinking, these vessels die and the oral tissues decay. Similarly, meth use leads to "dry mouth" (xerostomia), and without enough saliva to neutralize the mouth's harsh acids, those acids eat away at the tooth and gums, causing weak spots that are susceptible to cavities. The cavities are then exacerbated by behavior common in users on a meth high: a strong desire for sugary foods and drinks, compulsive tooth grinding, and the general neglect of regular brushing and flossing.

 In case you have doubt about the hazards of meth use...



Source:

http://www.usdoj.gov/dea/connern/meth_effects.html

Accessed October 18, 2005



10 Years of Meth Use



Figure 1 www.dea.gov

Crystal Releases Neurotransmitters

- Meth crosses the blood brain barrier and causes release of neurotransmitters:
- Dopamine: provides feelings of reward and pleasure
- Serotonin: provides sense of emotional stability
- Norepinephrine: stimulates arousal, drive



Dopamine

- Normally, dopamine is released, excites receptor cell, is released and pumped back into adjacent nerve ending.



Drug effects on dopamine

- Meth and heroin block the return pump, allowing dopamine to sit on receptor cell and continue firing.
 - Heroin lasts an hour
 - Meth lasts up to 12 hrs



Damage to Dopamine Transport System

- Although speed cause initial flood of dopamine, in the long term, dopamine transport system is damaged.
- This results in dopamine deficits
- Damage, although probably not permanent, is long-lasting and persistent



Damage to Dopamine Transport System

- Sensitization
- Persistence of psychotic symptoms
- Resumption of psychoses with each use
- Psychosis can be triggered by other substances
- Cognitive impairment



Cognitive Impairment

- Memory
- Verbal Learning
- Judgment
- Reasoning
- Planning, impulsivity



Meth Mimics Adrenaline

- Adrenaline prepares the body for emergencies -- to either fight or run.
- This is known as the “fight or flight” response.
- The body experiences crystal meth as an emergency, prompting appropriate physiological responses.



"Fight or Flight" Response

The body prepares for an emergency, possible injury:

- Pupils dilate to admit more light.
- Cutaneous blood vessels constrict.
- Bronchial muscles relax increased respiration.
- Heart rate and body temp increase.
- Ureters, intestines and urinary muscles constrict.
- Digestive tract movement inhibited.
- Metabolism increases.
- Body burns glucose (sugar in muscles) to provide energy.



Physiological Effects

- | | |
|--|---|
| ■ Increased heart beat | ■ Impaired speech
– jumbled word order |
| ■ Pupil dilation | |
| ■ Increased body temperature | ■ Perspiration or chills |
| ■ Vasoconstriction
- veins shrink | ■ Psychomotor agitation |
| ■ Increased metabolic rate | ■ Psychomotor retardation |
| ■ Nausea/vomiting | ■ Stroke |
| ■ Loss of appetite
– anorexia/weight loss | ■ Heart failure |
| | ■ Seizures |
| | ■ Coma |



Psychological Effects

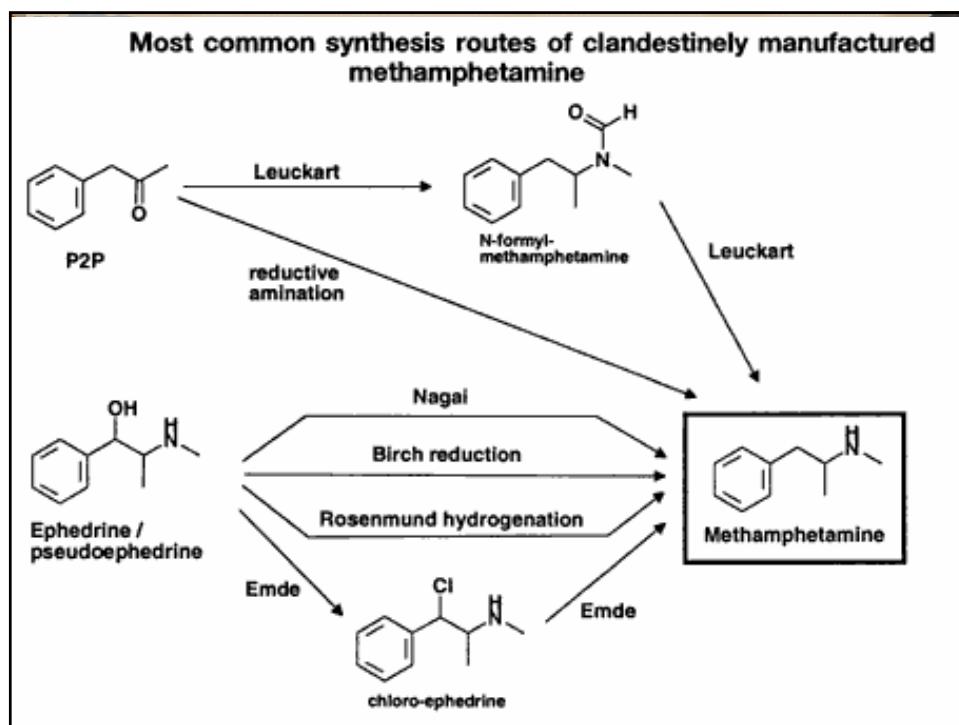
- Anxiety
- Obsessive/compulsive
- Euphoria
- Hyper-vigilance
- Tenseness
- Hallucinations
 - audio (hearing)
 - visual (sight)
 - tactile (touch)
- Paranoia
 - fearfulness
 - mistrust
- Agitation
- Apprehensiveness
- Guardedness
- Hyperacute memory
- Delusions of
 - conspiracy
 - egocentric persecution
- Psychosis



Methamphetamine Overdose

- Toxic buildup of meth levels caused by high ingestion amounts and/or delayed metabolism due to clogged liver pathways
- Sudden increase in blood pressure causes decrease in oxygen/blood to the brain (face will turn blue).
- Body temperature goes up to dangerous levels.
- Sweating (to cool down) might not occur.
- Increased risk of heart attack, stroke or coma.
- User might see spots (due to pressure on the optic nerves in the eye) or pass out.

Meth Chemistry



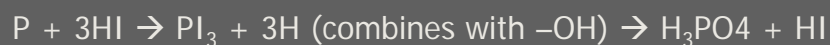
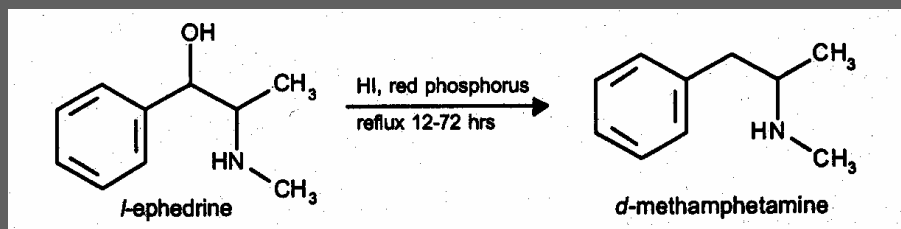
Current Methods

- ➔ Reducing
ephedrine/pseudoephedrine to
methamphetamine
 - HI-red phosphorus
 - Ammonia-lithium (Nazi method)

Old Methods

- ➔ Reducing ephedrine/pseudoephedrine to
methamphetamine
 - Chlorination and Catalytic: metal catalyst and H_2
- ➔ Reductive Amination of Phenyl-2-propanone
 - Aluminum amalgam
 - Catalytic Hydrogenation

I. HI/Red Phosphorus Reduction



Ephedrine

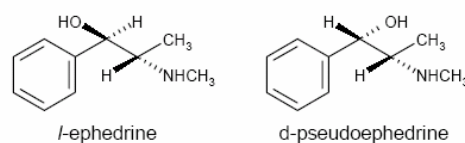
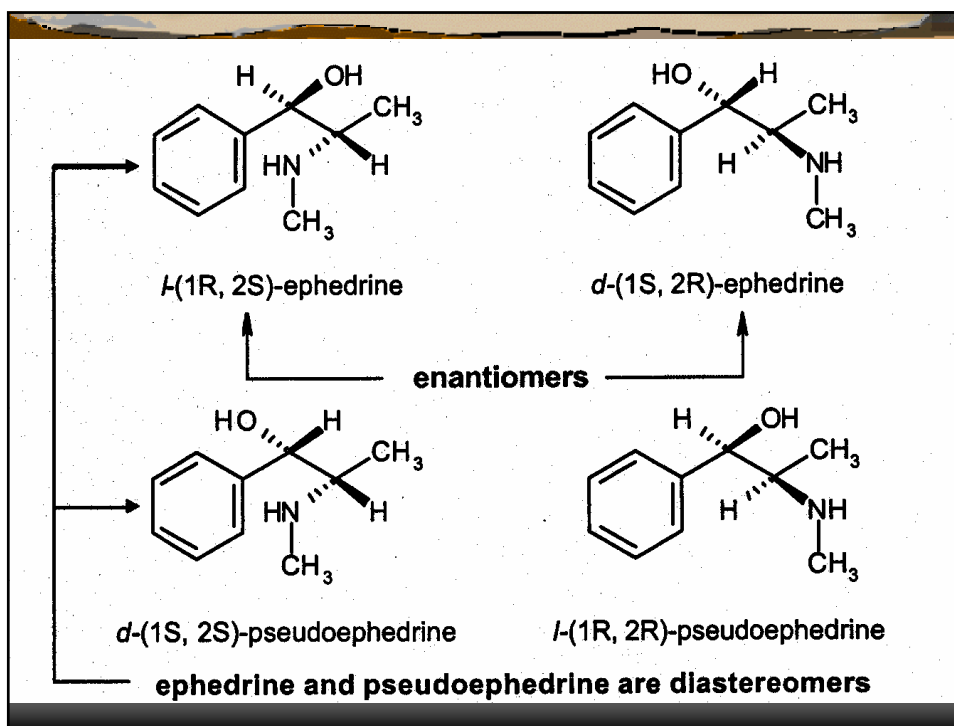


Figure 1. *l*-Ephedrine and *d*-pseudoephedrine chemical structures

- ⇒ Stereochemistry: 2 chiral center= 4 forms
 - d,l ephedrine
 - d,l pseudoephedrine (OH and NH on same side)
- ⇒ *l*-ephedrine, *d*-pseudoephedrine produce *d*-methamphetamine
- ⇒ Ephedrine used as bronchodilator;
pseudoephedrine used as decongestant



Phosphorus

⇒ Red P can only be ordered out-of-country except as a reagent

- Get from match box strike plates
 - 40% red P, 30% antimony sulfate
- Use white phosphorus
- Use hypophosphorous or phosphorous acid

⇒ Hazards

- Flammable solid (friction)
- If heated, converts to white phosphorus
 - Air reactive flammable solid
- Off-gasses phosphine, especially when heated

Phosphine

- ⇒ Off-gasses during cook
- ⇒ PEL = 0.3 ppm, IDLH = 50 ppm
- ⇒ Attributed to multiple deaths at clan labs
- ⇒ Examples of levels measured in controlled cook situations
 - Open container of red phosphorus = 1.4 ppm
 - HI/RP cook: 0-13 ppm at sample port
 - Making HI by mixing I_2 and RP: 0-42 ppm
 - Hypophosphorous acid cook: 0-85 ppm

Iodine

- ⇒ Sources
 - Hydriodic acid
 - Iodine crystals/prills from commercial sources
 - Feed supply (antibiotic, supplement)
 - Make from iodine tincture
- ⇒ Hazards
 - Severe respiratory irritant
 - PEL= 0.1 ppm
 - Corrosive
 - Oxidizer

HI/Red Phosphorus

Step 1: Tablet Extraction

- ⇒ Pseudoephedrine tablets ground up using any type of grinder
- ⇒ Tablets extracted with water or polar solvent (MeOH, denatured alcohol)
- ⇒ Filter off pill binder material
- ⇒ Evaporate off solvent to leave pseudoephedrine solid
 - Fire hazard!!

HI/Red Phosphorus

Step 2: Convert to Meth

- ⇒ Mix red phosphorus, water, pseudo and iodine
 - Heat generated by reaction alone; splatter if not added slowly or in order
- ⇒ Boil for extended period of time
 - Phosphine gas (deadly) and iodine vapor emitted during cook (deadly). Attach hose to top of reaction vessel and run into water, kitty litter.

HI/Red Phosphorus

Step 3: Isolate

- ⇒ Filter off red phosphorus
 - Waste flammable solid
- ⇒ Make solution basic (>pH 12)
 - Lot of heat generated, volatilizing meth base into the air
- ⇒ Add non-polar solvent to extract meth
 - Coleman fuel, naphtha, lighter fluid, toluene, diethyl ether, freon 11, carbon tetrachloride
 - Except for freons and heavily chlorinated solvents, all are very flammable.
 - Biphasic solution (meth in top layer if solvent lighter than water)

HI/Red Phosphorus

Step 4: Salt out

- ⇒ Separate off solvent phase
- ⇒ Bubble HCl through solvent mixture to make methamphetamine-hydrochloride
 - Used to use commercial HCl cylinders
 - Make own by mixing coarse salt and sulfuric acid, or muriatic acid and aluminum strips in a closed container with a hose
 - Levels measured during controlled cooks exceed IDLH
- ⇒ Evaporate off solvent to have meth powder
 - Flammability issue again!!

Wastes

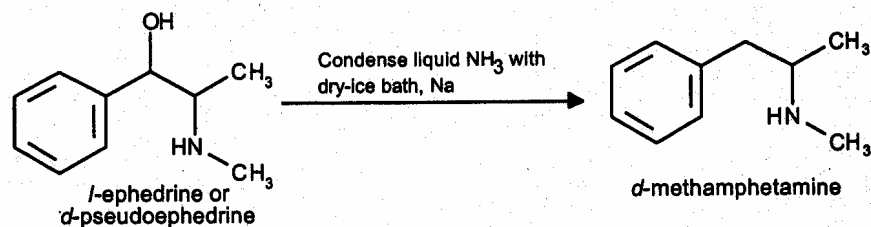
- ⇒ Red P/iodine mixtures: corrosive, off-gassing irritating or toxic gases
- ⇒ Sodium hydroxide mixture: corrosive, some meth by-products
- ⇒ Waste solvents
 - Alcohols with binder material
 - Non-polar solvents with meth by-products

Contamination

- ⇒ Iodine
- ⇒ Methamphetamine
- ⇒ HCl residual
- ⇒ Acidic/basic spills
- ⇒ Flammable solid residual
- ⇒ Solvent residuals

II. Birch Reduction

aka: "Nazi Method"



Benkeser used THF and lithium instead of sodium.
Lithium is commonly substituted for sodium

Birch Reduction

- ⇒ Mix ground-up pseudoephedrine (no extraction needed) and dry lithium (from batteries)
- ⇒ Add anhydrous ammonia until all lithium reacts
- ⇒ Add non-polar solvent to remove methamphetamine base
- ⇒ Salt-out as previously described

Chemical Hazards

- ⇒ Ammonia
 - Corrosive, toxic, cryogenic, combustible
- ⇒ Lithium
 - Corrosive, flammable solid, water reactive
- ⇒ Non-polar solvents
 - Flammable, toxic

Ammonia sources

- ⇒ Commercial and farmer nurse tanks
- ⇒ Make your own from fertilizer
 - Ammonium nitrate or sulfate
 - Lye
 - Small amount of water
 - Run tube to jar through acetone/dry ice bath to condense water
 - Collect anhydrous ammonia in jar after ice bath

Wastes from Birch Reduction

- Basic sludge from ammonia/lithium reaction
- Solvent wastes from salting-out
- Salt/sulfuric acid wastes

Contamination from Birch Reduction

- Methamphetamine residuals
- Flammable solid residual (water reactive)
- Solvents
- Hydrogen chloride contamination on surfaces from gassing-out

III. Catalytic reduction

- Pseudo added to chloroform
- Add thionyl chloride and stir 1-4 hrs
- Add diethyl ether until precipitates
- Filter and dry intermediate
- Add methanol, palladium to hydrogenator (pressure vessel)
- Add hydrogen under pressure until reaction stops absorbing hydrogen

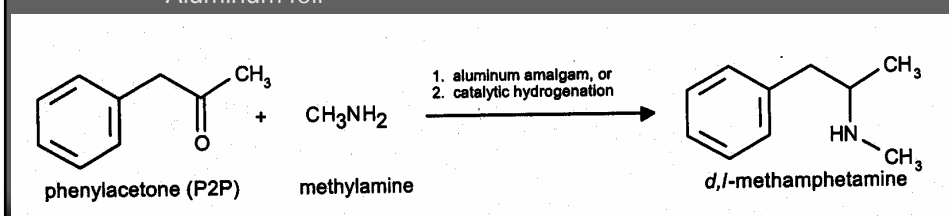
Catalytic reduction hazards

- Thionyl chloride
 - Water reactive, off-gasses sulfur dioxide, HCl
- Flammable solvents: methanol, diethyl ether
- Flammable gas under pressure: hydrogen
- Flammable solid: palladium

IV. Chemicals in older methods

⇒ Reductive Amination

- Biker dope (aluminum amalgam)
 - Phenyl-2-propanone (P2P)
 - Methyl amine: smells bad!!
 - Mercuric chloride: contamination issue
 - Aluminum foil



⇒ Catalytic Hydrogenation

- P2P, N-benzylmethylamine then reacted under pressure with hydrogen, palladium/carbon, platinum or Raney nickel

V. Make your own P2P

- Phenyl acetic acid (PAA) + acetic anhydride + sodium acetate or pyridine → P2P
- PAA + lead (II) acetate + dry distillation → P2P
- Benzaldehyde + nitroethane → 1-phenyl-2-nitropropene. Reflux w/ HCl, Fe, FeCl₃ → P2P
- Benzyl cyanide, sodium ethoxide, ethyl acetate produce intermediate. Mix with acetic acid and sulfuric → P2P
- PAA, acetic acid reacted in thorium furnace (>400°C) → P2P



Ammonia



Vol. 1, No.1: Clandestine Drug Labs/ Methamphetamine

September 2003

Recognizing Ammonia

Appearance: Pure anhydrous (i.e., without water) ammonia is a colorless gas at room temperature.

Odor: Very sharp, pungent, and suffocating odor. Olfactory fatigue can occur fairly rapidly, making a person unaware of increasing concentrations in the surrounding air.

Odor Threshold: Minimum threshold: 5 ppm.

Odor Safety Class: C (less than 50% of distracted individuals perceive warning of threshold limit value).

Vapor Density: 0.59 (air = 1.0). Ammonia is lighter than air. But vapors from pressurized ammonia are initially colder and heavier so they may concentrate near the ground or in depressions until they warm to room temperature and rise.

Containers & Packaging

Anhydrous ammonia is a gas at room temperature but becomes liquid when pressurized. It is typically found in pressurized steel tanks in a liquid form (Figure 1). Anhydrous ammonia can be obtained from commercial chemical supply companies, farms that use it for fertilizer, or from blueprint operations.

Note: Direct contact with liquid anhydrous ammonia as it is released from pressurized tanks can cause severe frostbite.

Aqueous (liquid) ammonia for household cleaning (e.g., "Parson's Ammonia") is a solution containing 5-10% ammonia gas dissolved in water. Household ammonia is not used in methamphetamine synthesis.



Figure 1: Anhydrous ammonia gas is stored and transported as a liquid in pressurized gas containers. Note greenish-blue corrosion on valves and fittings. "Secondary" containers such as these were not designed to hold ammonia and may fail at any time. Photo Courtesy of CA Department of Justice.

Role in Drug Synthesis

Ammonia is used with an alkali metal, typically lithium or sodium, in the "Nazi" method to synthesize methamphetamine.

Health Hazards

Inhalation Exposure: Vapors at a concentration of 50-100 ppm cause nose, throat, and airway irritation. This may lead to wheezing, shortness of breath, and chest pain. Inhalation of concentrated vapors may result in respiratory tract burns. Exposure to moderate or high vapor concentrations may also cause swelling in the nasal and upper respiratory tissues and fluid build-up in the lungs. This could result in breathing difficulty or life-threatening respiratory failure.

Skin (Dermal) Exposure: Direct contact can result in chemical burns, which feel soapy due to the action of ammonia on fat in tissues. Blistering, deep penetrating burns, and cell and tissue death may result. Less severe injury is characterized by gray-yellow soft regions. In severe cases, the skin appears black and leathery. Frostbite may also result from contact with anhydrous ammonia as it is released from pressurized tanks.

Eye Contact: Vapors at concentrations of 50-100 ppm cause irritation, tearing, and inflammation. Higher concentrations can cause severe injury including burns or temporary blindness. Severe exposure can damage the iris and cause cataracts. Hemorrhage, extensive loss of eye pigment, and glaucoma may also result. Contact with concentrated aqueous ammonia solutions can cause permanent eye injury, including blindness. Damage extent may not be identified for up to one week after initial injury.

Ingestion: Aqueous ammonia solutions may cause nausea, vomiting, and swelling of the lips, mouth, and throat. Ingestion of concentrated solutions may result in burns to the lips, mouth, and esophagus. Oral exposure does not typically result in systemic poisoning.

Chronic Effects: Repeated exposure may cause chronic skin, eye, and respiratory irritation. Chronic cough, asthma, and lung fibrosis may occur.

Environmental Concerns

Air: Ammonia gas is readily removed from air via wet deposition (rainfall), dry deposition, reaction with gas-phase nitric acid to form ammonium nitrate, and reaction with aerosols to produce ammonium salts.

Soil: Soil microorganisms rapidly take up ammonia; some convert it to nitrate, which is highly mobile in water. In soil, ammonia is also rapidly converted to ammonium ions.

Ground Water: The amount of anhydrous ammonia typically required for methamphetamine synthesis is not likely to cause significant ground water contamination. However, if a large spill occurs, ground water contamination may result.

Surface Water: Plants and microorganisms rapidly take up ammonia in water. Bacteria readily convert ammonia to nitrate, creating a biochemical oxygen demand several days after contamination. This can lead to depletion of dissolved oxygen and result in death to aquatic organisms, but only if large spills occur and contamination is highly significant.

Indoors: Long-term contamination of indoor surfaces by anhydrous ammonia is not a concern. If spilled, liquefied anhydrous ammonia readily evaporates into the air. However, if sources of ammonia are present, such as with a leaking storage tank or cylinder, ammonia vapors can pose an immediate health concern.

Exposure Limits

Occupational Exposure Limits (NIOSH, OSHA, & ACGIH)
 Short-Term Exposure Limit (STEL or ST): 35 ppm (24 mg/m³)
 8-Hour Time Weighted Average (TWA): 25 ppm (17 mg/m³)
 Immediately Dangerous (IDLH): 300 ppm

Preliminary Remediation Goals (PRGs)(U.S. EPA, Reg. 9):
 Air: 0.14 ppm (0.1 mg/m³)
 Soil & Water: not available

First Aid

Inhalation Exposure: Move to fresh air. Administer oxygen if needed. If breathing difficulty continues, get medical attention.

Contact with Clothing or Skin (Dermal Exposure): Remove contaminated clothing. Flush exposed skin and hair with water for at least 15 minutes. Seek immediate medical attention. Treat burns as directed by medical personnel.

Contact with Eyes: Flush exposed eyes with water or saline solution for at least 15 minutes. Remove contact lenses if possible. Seek medical attention.

Ingestion (Oral) Exposure: Do not induce vomiting or administer activated charcoal. Do not perform gastric lavage or attempt neutralization. Conscious victims should be given 4-8 ounces of water or milk. Seek immediate medical attention.

Special Concerns for Children: Children may inhale relatively larger amounts of ammonia vapors due to their faster breathing rates and greater lung size to body weight ratio. They may also receive higher doses due to their short stature. Ammonia vapors from compressed tanks may initially settle close to the ground in the typical breathing zone for children.

Handling & Safety



Chemical Hazards

Reactivity: Anhydrous ammonia reacts with strong oxidizers, acids, halogens, bleach, salts of silver, zinc, copper, and other metals. It is corrosive to copper and galvanized surfaces.

Flammability: Anhydrous ammonia is considered nonflammable; however, at very high concentrations in air [15-28% (150,000-280,000 ppm)], it will explode if ignited. Because of this, anhydrous ammonia should be treated as a flammable gas. Pressurized tanks of any kind may rupture if heated.

Chemical Incompatibilities: Anhydrous ammonia is incompatible with acids, aldehydes, amides, halogens, metals, oxidizers, plastics, and sulfur.

More Information

Office of Environmental Health
 Hazard Assessment (OEHA)
www.OEHA.CA.Gov

Department of Toxic
 Substances Control (DTSC)
www.DTSC.CA.Gov



Iodine



DEPARTMENT OF TOXIC
SUBSTANCES CONTROL

Vol. 1, No. 2: Clandestine Drug Labs/ Methamphetamine

September 2003

Recognizing Iodine

Appearance: Laboratory grade elemental iodine appears as either a fine, dark powder or as grayish-black to purple crystals that have a metallic luster. At room temperature iodine crystals readily vaporize to a violet-colored gas (Figure 1).

Odor: Characteristically strong, sharp, biting, irritating odor.

Note: Odor is not a good indicator of the presence of iodine vapors and does not provide reliable warning of hazardous concentrations which occur at levels below odor detection.

Odor Threshold: 0.8 ppm (8 mg/m³)

Odor Safety Class: D (only 10-50% of attentive persons can detect the threshold limit value concentration in air).

Vapor Density: 8.8 (air = 1.0); iodine vapor is heavier than air, and it may concentrate near the ground or in depressions.

Containers & Packaging

Commercial Products: Pure iodine crystals in brown glass bottles can be obtained from chemical supply houses.

Veterinary iodine solutions, used as antiseptics, are packaged in opaque plastic bottles. Iodine may be obtained by mild heating of its salts (e.g. sodium iodide or potassium iodide). Iodine crystals may also be obtained from iodine solutions by the addition of 30% hydrogen peroxide.

Pharmaceutical Iodine Solutions:

These are typically dilute solutions that are brown in color. **Official USP Tincture** is a topical antiseptic solution made up of 2% iodine and 2.4% sodium iodide in 50% ethanol.

Lugol's Solution is stronger, made up of 5% iodine and 10% potassium iodide in water.



Figure 1: Pure iodine crystals, heated slightly, showing some solid iodine escaping directly to the air as obvious violet-colored vapors. Because of this "sublimation" property, exposures include dermal contact with solid crystals and inhalation of vapors which may not be quite as visible as this at room temperature. Photographer, Charles Salocks.

Health Hazards

Inhalation Exposure: Iodine vapor causes eye, skin, nose and throat irritation, coughing, wheezing, and laryngitis. Exposure to high concentrations may result in airway spasm, chest tightness, breathing difficulty, severe inflammation, and fluid accumulation in the voice box, upper airways, and lungs. Some people develop allergic hypersensitivity to iodine vapor.

Ingestion (Oral) Exposure: Iodine crystals, powder, and concentrated solutions can cause burns in the mouth and throat. Ingestion may cause vomiting, abdominal pain, and diarrhea. Severe poisoning may result in headache, delirium, or a drop in blood pressure. Ingestion of 2-4 grams of solid iodine can be fatal for an average adult.

Skin (Dermal) Contact: Burns, irritation, tissue damage, and skin rash result from contact with concentrated iodine. Dilute antiseptic solutions are low in toxicity, but in some cases contact results in a sensitization reaction that includes fever, skin eruptions, and rash. Iodine can be absorbed slightly through the skin and enter the blood.

Eye Contact: Concentrated iodine vapor causes brown staining and cornea cell damage. The threshold for eye irritation is about 0.2 ppm (2 mg/m³), which is much lower than the odor detection threshold. Dilute iodine solutions produce pain, inflammation, and can damage tissues.

Chronic Effects: Effects of long-term exposure to iodine vapor in humans are not known. Iodide is an essential micronutrient in the diet. It is required in small amounts for normal function of the thyroid gland. In laboratory animals, long-term inhalation of iodine vapors disrupts thyroid function and

reduces the ability of the lungs to take up oxygen. Chronic ingestion of amounts that exceed dietary requirements causes health problems such as dietary *iodism* and *goiter*.

Role in Drug Synthesis

Iodine is used to make hydriodic acid (HI) in the Red Phosphorus/HI methamphetamine synthesis method.

Clandestine Labs/ Methamphetamine:

Iodine

Environmental Concerns

Air: No information found.

Soil: No information found.

Ground Water: Contamination of ground water by iodine is unlikely since iodine (I_2) is rapidly converted to iodide (I^-) in the presence of organic materials. Iodide has low toxicity and, in small quantities, is an essential constituent in the human diet.

Surface Water: Naturally occurring background concentrations of iodine detected in surface waters range from 4 to 336 $\mu\text{g/liter}$. Iodine is hydrolyzed to iodate (IO_3^-) and reduced to iodide (I^-) ions in water. Iodine in drinking water contributes a small amount of the total daily intake. The recommended daily intake is 150 μg . Iodine toxicity is unlikely to result from drinking water unless the water source is highly contaminated. Studies of iodine's toxicity to non-mammalian species were not identified. The Suggested No Adverse Response Level (SNARL) for iodide (I^-) in drinking water is 1.2 ppm (1.2 mg/liter).

Indoors: Long-term contamination of indoor surfaces is not expected. Elemental iodine has a vapor pressure of 0.3 mm Hg at 25° C and readily volatilizes at room temperature. If present on indoor surfaces, iodine will be removed through volatilization. Inhalation exposure could occur under these circumstances. No standards for cleanup of indoor surface iodine contamination were identified.

Exposure Limits

Occupational Exposure Limits (NIOSH, OSHA, & ACGIH)

Ceiling Limit: 0.1 ppm (1 mg/m³)

Immediately Dangerous (IDLH): 2 ppm (21 mg/m³)

Preliminary Remediation Goals (PRGs), (U.S. EPA, Reg 9):

Air, Soil & Water: not available

Handling & Safety



Inhalation Exposure: Move to fresh air. Administer oxygen if needed. If breathing difficulty occurs, get medical attention.

Contact with Clothing or Skin: Remove contaminated clothing. Flush exposed skin and hair with water for at least 5 minutes, and thoroughly wash when possible. Seek medical help if needed.

Contact with Eyes: Flush eyes with water or saline solution for at least 15 minutes. Remove contact lenses if easily removable. Seek medical help immediately.

Ingestion Exposure: Do not induce vomiting and do not administer activated charcoal. Do not perform gastric lavage and do not attempt neutralization. If victim is conscious, rinse mouth with water. Seek immediate medical attention.

Special Concerns for Children: Children may inhale relatively larger amounts of iodine vapors due to their larger lung size to body weight ratio and increased respiratory rates.

Children and others of short stature may receive higher doses, because iodine vapors are heavier than air and may concentrate near the ground in their breathing zone.

Chemical Hazards

Reactivity: Iodine is an oxidizer and is highly reactive.

Flammability: Iodine is not flammable. However, it is a strong oxidizer and supports combustion vigorously.

Chemical Incompatibilities: Iodine is incompatible with aqueous and gaseous ammonia, powdered aluminum, and active metals such as lithium, sodium, and potassium. Violent explosions may occur when mixed with acetaldehyde or acetylene gas. Large quantities of iodine may react with antimony, producing heat, flame, and explosion.

More Information

Office of Environmental Health
Hazard Assessment (OEHA)
www.OEHA.CA.Gov

Department of Toxic
Substances Control (DTSC)
www.DTSC.CA.Gov



Lithium



DEPARTMENT OF TOXIC
SUBSTANCES CONTROL

Vol. 1, No. 4: Clandestine Drug Labs/ Methamphetamine

September 2003

Recognizing Lithium

Appearance: Lithium is a soft, silvery-white metal that becomes yellowish upon exposure to moist air. It is soluble in liquid ammonia, producing a blue solution.

Odor & Odor Threshold: Not applicable. Lithium metal is odorless.

Vapor Density: Not applicable. Lithium is not volatile.

Odor Safety Class: Not applicable. Lithium is odorless. Therefore, odor provides no warning of hazard.

Containers & Packaging

Commercial: Lithium metal in the form of ribbon, wire, rod, ingot, granules, powder, or shot can be purchased from chemical supply houses. Rechargeable and non-rechargeable lithium batteries are frequently used to obtain elemental lithium for use in the illegal synthesis of methamphetamine (Figure 1, A & B).

Pharmaceutical: Lithium for pharmaceutical use contains lithium carbonate or lithium citrate, both of which are salts of elemental lithium, but lithium salts cannot be used to make metallic lithium and are not used for illicit synthesis of methamphetamine.

Role in Drug Synthesis

Elemental lithium is used as a catalyst to synthesize methamphetamine from ephedrine in the ammonia / alkali metal synthesis method commonly referred to as the "Nazi" method.

Health Hazards

General: Little information on the toxicity of elemental lithium is available. The greatest health concerns regarding lithium metal come from exposure to lithium hydroxide (LiOH); a strong, highly corrosive base formed when lithium reacts with water.

Inhalation Exposure: Since lithium metal is not volatile, inhalation is not typically a significant route of exposure for lithium metal. However, if finely divided lithium particles were inhaled, serious injury to the nasal passages, upper airways, and lungs due to formation of LiOH could result. Respiratory distress syndrome has been reported in cases of severe exposure resulting in shortness of breath, rapid breathing, and low arterial blood oxygen.

Skin (Dermal) Exposure: Dermal uptake of lithium is not likely to be a significant route of exposure. Absorption of solid lithium across the skin is poor, although contact with finely divided lithium or lithium powder might present a hazard because these forms

may react with skin moisture to form corrosive LiOH.

Eye Contact: Exposure to lithium particles may result in serious eye injury due to the formation of highly corrosive LiOH.

Ingestion: In large amounts, lithium would primarily affect the gastrointestinal (GI) tract, the central nervous system (CNS), and the kidneys. Acute GI effects include abdominal pain, nausea, vomiting, and diarrhea. CNS effects include tremors, loss of muscle coordination, muscle rigidity, lethargy, and exaggerated reflexes. Sedation, mental confusion, agitation, seizures, and coma may occur at high doses. Symptoms associated with kidney

toxicity are an initial increase in urine output, subsequent elevation in blood non-protein nitrogen, and finally, diminished urine output. Other potential adverse effects include cardiac arrhythmias, low blood pressure, and kidney toxicity.



Figure 1: Lithium is a light-weight silvery colored metal used to synthesize methamphetamine. It is collected from camera batteries [A] and other small button type batteries [B]. Once these batteries are broken open, the lithium [B.1.] immediately begins to react with air [B.2.]. Photographers, Charles Salocks and Caron Poole.

Clandestine Labs/ "Meth":

Lithium

Environmental Concerns

General: Only small amounts of lithium are required for synthesis of methamphetamine. For this reason, waste generated by a clandestine methamphetamine lab is unlikely to result in significant lithium contamination of soil, surface water, or ground water.

Soil: The earth's crust naturally contains lithium with varying concentrations depending upon location. As noted above, contamination of soil is unlikely.

Ground Water & Surface Water: No information available.

Drinking Water: California state standards for lithium compounds in drinking water have not been established.

Indoors: Lithium surfaces may become coated with a mixture of lithium hydroxide, lithium carbonate, and lithium nitride. Lithium hydroxide is extremely corrosive; however, since the amount of lithium used is small, the amount of lithium hydroxide formed will also be small.

Handling & Safety



First Aid

Inhalation Exposure: Move to fresh air. If victim is not breathing, give artificial respiration. If victim has difficulty breathing, give oxygen. Keep victim in a half upright position. Get medical attention immediately.

Contact with Clothing or Skin (Dermal Exposure): Remove contaminated clothing. Flush exposed skin and hair with water for at least 15 minutes. Thoroughly wash with soap and water when possible. Seek medical attention if necessary.

Contact with Eyes: Flush exposed eyes with water for at least 30 minutes. Remove contact lenses if possible. Seek immediate medical attention.

Ingestion (Oral) Exposure: If victim is conscious, give 2-4 cups of milk or water. Do not induce vomiting. Seek medical attention.

Special Concerns for Children: Children may not recognize the dangers associated with chemical exposures. They may therefore be more susceptible to accidental or purposeful exposures.

Exposure Limits

Occupational Exposure Limits (NIOSH, OSHA & ACGIH)

Short-Term (STEL): not established.

Threshold Limit (TLV): not established.

Immediately Dangerous (IDLH): not established.

Preliminary Remediation Goals (PRGs):

Air: not established.

Soil: Residential: 1,600 ppm (1,600 mg/kg)

Industrial: 20,000 ppm (20,000 mg/kg)

Water: 730 ppb (730 µg/L)

Chemical Hazards

Reactivity: Lithium is less reactive than sodium and much less reactive than potassium. Freshly cut surfaces tarnish in air due to reaction with oxygen and nitrogen. Pieces of lithium metal react slowly with water to liberate hydrogen, a flammable gas.

Flammability: Lithium is a flammable solid. Finely divided and powdered lithium metal may ignite in air at ambient temperatures and reacts vigorously with water to form hydrogen gas and a strong caustic solution of lithium hydroxide. Since reaction with water may lead to spontaneous ignition, powdered or granular lithium should not be combined with water. If heated to its melting point (357 °F, or 181 °C), lithium is likely to ignite spontaneously.

Chemical Incompatibilities: Water and air.

More Information

Office of Environmental Health
Hazard Assessment (OEHA)
www.OEHA.CA.Gov

Department of Toxic
Substances Control (DTSC)
www.DTSC.CA.Gov



Sodium



Vol. 1, No. 6: Clandestine Drug Labs/ Methamphetamine

September 2003

Recognizing Sodium

Appearance: Sodium is a soft, silvery, solid metal that can readily be cut with a knife. Lustrous when freshly cut (Figure 1, A.1.), it rapidly tarnishes to a dull gray in air (Figure 1, A.2.). Sodium may develop an outer crust of sodium oxide, which may appear sponge-like. Sodium dissolves in liquid anhydrous ammonia forming a blue solution. At higher concentrations, these solutions are copper colored and have a metallic luster.

Odor & Odor Threshold: Not applicable. Sodium is odorless.

Odor Safety Class: Not applicable. Sodium is odorless.

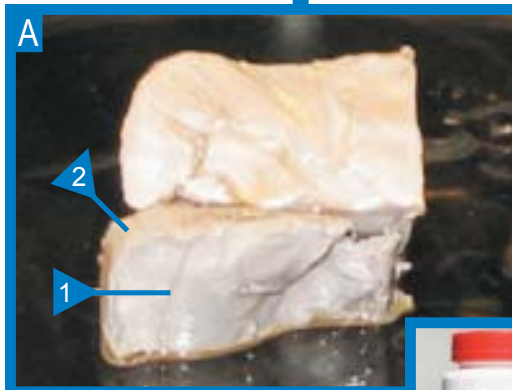
Vapor Density: Not applicable. Sodium is not volatile.

Containers & Packaging

Commercial: Sodium is available from commercial labs in the form of ingots, lumps, or sticks. It is packaged in containers filled with mineral spirits or kerosene, or packaged under nitrogen. It is also sold as 30-40% dispersions in toluene, mineral spirits, light oil, or paraffin wax. Operators of clandestine drug laboratories may produce "homemade" sodium by electrolysis of sodium hydroxide. The most common commercial source of sodium hydroxide is Red Devil® lye (Figure 1, B.).

Pharmaceutical: There are no pharmaceutical uses of elemental sodium.

Figure 1: Pure sodium is soft, silvery in color, and shiny when first cut [A.1.]. Pure sodium rapidly forms a dull gray oxidation crust when exposed to air [A.2.]. Sodium metal can be obtained from electrolysis of sodium hydroxide containing products like the drain cleaner shown here [B.]. Photographers, Charles Salocks and Caron Poole.



Health Hazards

General: Sodium metal reacts with water to produce highly caustic sodium hydroxide (NaOH), which can cause severe chemical burns resulting in permanent damage to all biological tissues. Reaction of sodium with water also generates heat which may result in thermal burns. NaOH is effectively neutralized by contact with tissue and does not produce systemic toxicity. Short-term contact with small amounts of sodium, followed by rapid recovery, is not likely to cause long-term effects.

Inhalation Exposure: Inhalation of vapors is not a typical route of exposure to solid sodium. Inhalation of finely divided solid particles or liquid suspensions could produce burns in the nose, mouth, throat, and upper respiratory tract.

Skin (Dermal) Exposure: Direct contact with sodium can cause deep, serious burns which appear soft and moist and are very painful. Less severe exposures result in inflammation, redness, and swelling of the skin. Irritation may become apparent within minutes of exposure. Fatalities have occurred following contact with finely divided sodium dispersed in hydrocarbon solvents such as mineral oil or toluene.

Eye Contact: Direct eye contact can result in serious burns. Formation of lesions, destruction of cells and tissue, inflammation, and opacification of the cornea may result. Ulcerations may progress for several days following exposure. Potential effects include cataracts, glaucoma, adhesion of the eyelid to the eye, blindness, and eye loss.

Role in Drug Synthesis

Elemental sodium, an alkali metal, is used as a catalyst in the anhydrous ammonia / alkali metal "Nazi" method of methamphetamine synthesis to convert the precursor ephedrine or pseudoephedrine product to methamphetamine.

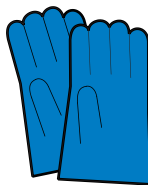
Ingestion: Once ingested, sodium will react vigorously with saliva in the mouth and esophagus to produce severe chemical and thermal burns of the mouth, esophagus, and stomach. Symptoms of serious injury to the esophagus include constricted airways, vomiting, drooling, and abdominal pain.

Environmental Concerns

General: Elemental sodium reacts immediately with water and a number of organic compounds to form sodium hydroxide (NaOH) and hydrogen gas (H_2). Unless it is protected from contact with moisture, sodium is unlikely to persist in the environment. Typically only small amounts of elemental sodium are needed for methamphetamine synthesis. Wastes generated by small scale clandestine methamphetamine labs are unlikely to contain sufficient amounts of sodium to result in significant contamination of air, soil, surface water, or ground water.

Indoors: Sodium may form an outer layer of solid NaOH on surfaces, which can remain very reactive and hazardous. Because of the formation of NaOH, corrosion and destruction of surfaces may be apparent in areas where sodium was spilled. If accessible surfaces were contaminated with sodium and resulting NaOH, potential routes of exposure include direct skin contact and ingestion resulting from hand-to-mouth activity.

Handling & Safety



* If in finely divided powder form.



First Aid

General: If exposed to sodium metal, in general it is critically important to seek medical attention immediately.

Inhalation Exposure: Move to fresh air. If victim has difficulty breathing, give oxygen. If victim is not breathing, give artificial respiration. Keep victim in a half upright position.

Contact with Clothing or Skin (Dermal Exposure): Remove contaminated clothing. Flush exposed areas with water for 15 minutes or more and wash thoroughly when possible. Treat burns as directed by medical personnel.

Contact with Eyes: Flush exposed eyes with water for at least 15 minutes. Remove contact lenses if possible.

Ingestion (Oral) Exposure: Do not induce vomiting. Conscious victims should be given water.

Special Concerns for Children: Toxic effects may be greater since gastric acid in children

is not strong enough or present in great enough amounts to neutralize even small amounts of strongly alkaline compounds. Children may not recognize the dangers associated with chemical contact and may therefore be more susceptible to accidental and/or purposeful exposures. Children may think pure sodium metal is food since it may be confused with cream cheese or even chewing gum.

Chemical Hazards

Reactivity: Sodium reacts violently with water, including moisture in the air, and dilute acids to form caustic NaOH and highly flammable hydrogen gas. The reaction generates considerable heat, melting the sodium and frequently igniting the hydrogen gas. Sodium reacts explosively with dilute sulfuric acid. It also reacts with organic compounds containing oxygen, nitrogen, sulfur, fluorine, chlorine and bromine, carboxyl, or hydroxyl groups. In general, finely divided sodium reacts much more quickly and more vigorously than large pieces of sodium.

Flammability: Sodium ignites spontaneously if heated to temperatures above 120°C (250°F). Finely divided sodium may ignite at much lower temperatures. Since sodium melts at 98°C, transition from a solid to a liquid is an indication that sodium is approaching its auto-ignition temperature. Combustion of sodium produces sodium oxide smoke, which is hazardous and highly irritating.

Chemical Incompatibilities: Water and organic compounds containing reactive groups noted above.

Exposure Limits

Occupational Exposure Limits (NIOSH, OSHA, & ACGIH)

Short-Term Exposure Limit (STEL): not established
8-Hr Time Weighted Average (TWA): not established
10-Hr Time Weighted Average (TWA): not established
Immediately Dangerous (IDLH): not established

Preliminary Remediation Goals (PRGs) (U.S. EPA, Reg. 9):

Air, Soil, & Water: not established

More Information

Office of Environmental Health
Hazard Assessment (OEHHA)
www.OEHHA.CA.Gov

Department of Toxic
Substances Control (DTSC)
www.DTSC.CA.Gov



Red Phosphorus



Vol. 1, No. 12: Clandestine Drug Labs/ Methamphetamine

September 2003

Recognizing "Red-P"

Appearance: Red phosphorus (Red-P) is a solid at room temperature. It is found as crystalline or amorphous granules, or as pills or powder (Figure 1, A.). The color varies from orange-red, to violet, dark red-purple, or dark reddish brown.

Odor & Odor Threshold: Not applicable. Red-P is not volatile. It is odorless at room temperature.

Odor Safety Class: Red-P is odorless. **Note:** Odor provides no warning of hazard.

Containers & Packaging

Commercial: Red-P is a component of matchbook strike plates (Figure 1, B.). Clandestine methamphetamine lab cooks may use scrapings from matchbook strike plates as a source of Red-P. Red-P is available from chemical supply houses (Figure 1, C.), but it is a U.S. Drug Enforcement Agency List I chemical and sales are subject to record keeping and reporting requirements. Red-P is also used in electroluminescent coatings, in flame retardants for polymers, in the production of safety matches, pyrotechnics, incendiary shells, smoke bombs, and tracer bullets; as well as in the manufacture of fertilizers, pesticides, and semiconductors. It is also used in organic synthesis reactions and in the manufacture of phosphoric acid, phosphine gas and other phosphorus-containing chemicals.

Pharmaceutical: There are no pharmaceutical uses of Red-P.

Role in Drug Synthesis

Red phosphorus is combined with elemental iodine to produce hydriodic acid (HI). HI is used to convert pseudoephedrine or ephedrine to methamphetamine.

Health Hazards

General: Pure Red-P does not usually represent a significant health hazard. It is essentially non-volatile, insoluble in water, and poorly absorbed into the body. Red-P does react with water vapor and oxygen in air to form extremely toxic phosphine gas, phosphorus oxyacids, white phosphorus, and phosphoric acid. Red-P may also be contaminated with white phosphorus (White-P) and/or yellow phosphorus (Yellow-P), which are toxic. Yellow-P is a form of White-P that contains impurities.

Inhalation Exposure: Inhalation of Red-P dust causes respiratory tract irritation, coughing, and bronchitis. If contaminated with White-P, it can also cause liver or kidney damage.

Skin (Dermal) Exposure: Prolonged and/or repeated contact with Red-P may cause irritation or dermatitis. If White-P is present, deep, slow healing chemical burns may result. If ignited, Red-P may cause thermal burns.

Eye Contact: Red-P can produce eye irritation and corneal injury. If White-P is present, severe irritation and burns may result.

Ingestion: Pure Red-P is considered non-toxic. However, if contaminated with White-P, it may cause systemic poisoning. Systemic symptoms include a garlic odor on the breath, irritation of the digestive tract, stomach pains, vomiting, diarrhea, liver and kidney damage, anemia and other blood disorders, and cardiovascular effects, or death. Long term ingestion of Red-P contaminated with White-P may cause jaw bone degeneration ("phossy-jaw").

Special Concerns for Children: Children may not recognize the chemical dangers and may be more susceptible to accidental or purposeful exposures.



Figure 1: Red phosphorus is easily recognizable as a dark red to purple solid powder [A]. It can be obtained from scrapings off match box strike plates [B] and other incendiary products or from commercial chemical supply companies [C]. Photos Courtesy of CA Department of Justice. Photographer, Charles Salocks.

Clandestine Labs/ "Meth":

Red Phosphorus

Chemical Hazards

Reactivity: Red-P reacts with water vapor and oxygen in air to form extremely toxic phosphine gas, phosphorus oxyacids, white phosphorus, and phosphoric acid. These reactions are accelerated by higher temperatures or trace amounts of metals, including those found in household plumbing.

Flammability: Red-P is a flammable solid and may pose a moderate explosion hazard by chemical reaction or on contact with organic materials. Though stable, it is readily combustible. It will not ignite spontaneously, but may be ignited by heat, friction, static electrical spark, oxidizing agents, or physical impact. It may re-ignite after being extinguished. The auto ignition temperature for Red-P is 260°C (500°F). At high temperatures, even in the absence of air, Red-P can burn, producing White-P.

Chemical Incompatibilities: Red-P reacts with oxidizing agents, reducing agents, peroxides, strong alkalies (e.g., sodium hydroxide or potassium hydroxide), halogens, halides, and organic matter. If it comes in contact with oxidants (e.g., chlorine, fluorine, or bromine), Red-P may burn spontaneously or explode. Red-P reacts vigorously with cesium, lithium, potassium, rubidium, sodium, and sulfur. It explodes when combined with ammonium nitrate and moist chlorates. Red-P is incompatible with metals including aluminum and magnesium powders, beryllium, copper and copper containing alloys, manganese, metal oxides (copper oxide manganese dioxide, lead oxide, mercury (II) oxide, silver oxide, and chromium trioxide), metal peroxides (lead peroxide, potassium peroxide, and sodium peroxide), and metal sulfates (barium sulfate and calcium sulfate). Red phosphorus is also incompatible with nitric acid.

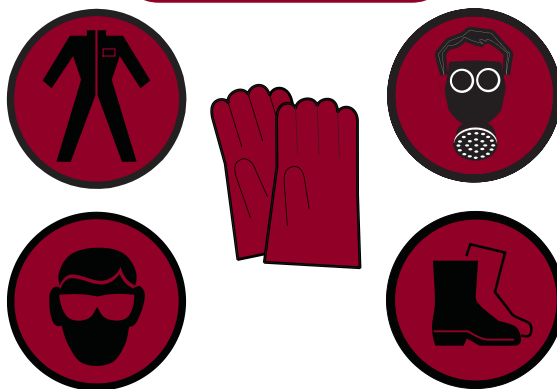
Conditions to Avoid: Avoid light, ignition sources, dust generation, excess heat, oxidizers, flammable materials, friction, and physical impact. Under wet alkaline conditions, red phosphorus slowly releases phosphine gas, which is highly toxic and highly flammable.

Environmental Concerns

General: Red phosphorus will slowly degrade to highly toxic phosphine gas (PH_3) and phosphorus acids in the environment. Phosphine is reactive and usually undergoes rapid oxidation. The final products, phosphates, are harmless. In wastewater, Red-P will adsorb to sewage sludge. Red phosphorus is harmful to aquatic organisms.

Indoors: If contamination occurs, Red-P would be expected to persist. On indoor surfaces it would be found as a solid where spilled. Skin contact and ingestion resulting from hand-to-mouth activity could occur.

Handling & Safety



First Aid

Inhalation Exposure: Move to fresh air. If victim has difficulty breathing, give oxygen; if not breathing, give artificial respiration. Keep victim in a half upright position. Get medical attention immediately.

Contact with Eyes: Flush eyes with water for at least 15 minutes. Get medical attention.

Contact with Clothing or Skin (Dermal Exposure): Remove contaminated clothing and shoes. Flush exposed areas with water for 15 minutes or more. Get medical attention.

Ingestion (Oral) Exposure: Do not induce vomiting. If victim is conscious, give 2-4 cups of water or milk. Seek immediate medical attention.

Exposure Limits

Occupational Exposure Limits (NIOSH, OSHA, & ACGIH): not established.

Preliminary Remediation Goals (PRGs)
(U.S. EPA, Reg. 9): Air, Soil & Water: not established

More Information

Office of Environmental Health
Hazard Assessment (OEHHA)
www.OEHHA.CA.Gov

Department of Toxic
Substances Control (DTSC)
www.DTSC.CA.Gov



Coleman Fuel



Vol. 1, No. 9: Clandestine Drug Labs/ Methamphetamine

September 2003

Recognizing Coleman Fuel

Synonyms: petroleum ether, petroleum naphtha, light hydrotreated petroleum distillates, white gas, Amsol 10, Kensol 10, VM&P (varnish makers & painters) naphtha, camp fuel, and petroleum benzin.

Appearance: Clear, colorless liquid.

Odor: Similar to the odor of rubber cement.

Odor Threshold and Odor Safety Class: Not available.

Vapor Density: 3.0 (air = 1.0). Coleman Fuel vapors are heavier than air. They may collect near the ground or in depressions.

Containers & Packaging

Coleman Fuel represents a class of commercially available petroleum-based products that are often marketed under the following names:

Amsol 10, Kensol 10, White Gas, VM&P Naphtha, Ozark Trail®, Camp Fuel, and Coleman Fuel®. These products are complex mixtures of light hydrotreated petroleum distillates containing up to 25% n-hexane, 15% cyclohexane, and less than 0.001% benzene by weight. Light hydrotreated petroleum distillates are typically packaged in metal cans (Figure 1, A & B) but may also be found in chemically resistant plastic bottles or jugs.



Figure 1: Coleman Fuel [A], designed for use in camp stoves, lanterns and heaters, is a petroleum-based organic solvent used to illegally synthesize methamphetamine. Similar commercial camp fuel products are sold under different brand names such as Ozark Trail® [B]. These and other organic solvents are readily found in hardware and sporting goods stores. Photos Courtesy of CA Department of Justice.

Role in Drug Synthesis

Coleman Fuel and other light hydrotreated petroleum distillates are petroleum-based, nonpolar solvents, which are used in the Hydriodic Acid/Red Phosphorus, Nazi and other methods of methamphetamine synthesis to extract methamphetamine base from the reaction solution.

Health Hazards

General: Coleman Fuel and petroleum distillates are acute irritants that cause moderate burning, redness, and swelling of body tissues upon contact. Regardless of exposure route, these also act as central nervous system depressants causing light-headedness, dizziness, nausea, headache, giddiness, loss of appetite, muscle weakness, impaired motor function, loss of coordination, blurred vision, and drowsiness.

Inhalation Exposure: Inhalation of Coleman Fuel and other petroleum distillates may cause severe respiratory tract irritation, pulmonary edema (swelling and fluid build up), loss of consciousness, and suffocation. Potentially fatal chemical pneumonitis can also result from aspiration of Coleman Fuel into the lungs.

Skin (Dermal) Exposure: Short-term contact results in mild irritation. Long-term exposure can result in chronic dermatitis and localized defatting of the skin. Systemic toxicity may also result from absorption through the skin.

Eye Contact: Direct contact may result in burning, tearing, redness, and swelling. If untreated, tissue damage may result.

Ingestion: Ingestion of Coleman Fuel or other

petroleum distillates can cause burning and irritation in the mouth, esophagus, stomach, and intestines.

Chronic Effects: Repeated exposure to Coleman Fuel and its constituents, such as n-hexane, over a period of weeks to months can result in damage to sensory and motor nerve cells. Effects include burning, numbness, or tingling in the feet, legs or hands, paralysis, and even permanent brain damage. Prolonged exposure may also damage the kidneys, liver, and respiratory system.

Clandestine Labs/ "Meth":

Coleman Fuel

Environmental Concerns

No environmental data are available specifically for Coleman Fuel. The following sections are based on petroleum ether.

Air: In the atmosphere petroleum ether will exist primarily as a vapor. It will be readily degraded by reaction with sunlight. Removal from the air may also occur through wet deposition.

Soil: Petroleum ether readily evaporates from wet and dry soils and is expected to quickly biodegrade. Petroleum ether and Coleman Fuel are both complex hydrocarbon mixtures. Their adsorption to sediment and mobility within soil will vary based on the estimated ability of their chemical components to bind to carbon in soil (K_{oc} values of 81 to 650). Chemicals with short chain structures (5-6 carbon atoms) and lower molecular weights will migrate more quickly through soil than heavier compounds. Lighter molecules have greater potential to contaminate groundwater.

Surface Water: When released to water, petroleum ether is expected to biodegrade as well as evaporate into air. Accumulation in aquatic organisms is not likely to be a concern.

Ground Water: In cases of large spills, Coleman Fuel may migrate down into the soil before it evaporates. There it may continue on to contaminate ground water sources.

Indoors: Long-term contamination of indoor surfaces by petroleum ether hydrocarbon mixtures is not a concern, because these light hydrocarbon chemicals quickly evaporate.

Exposure Limits

For Petroleum Distillates, Occupational Exposure Limits (NIOSH, OSHA, & ACGIH)

Ceiling Limit (C) (15-minutes): 444 ppm (1800 mg/m³)

8-Hr Time Weighted Average (TWA): 500 ppm (2000 mg/m³)

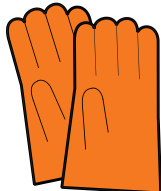
10-Hr Time Weighted Average (TWA): 86 ppm (350 mg/m³)

Immediately Dangerous (IDLH): 1100 ppm (4455 mg/m³)

Preliminary Remediation Goals (PRGs)

(U.S. EPA, Reg. 9): Air, Soil, & Water: not established

Handling & Safety



First Aid

Inhalation Exposure: Move to fresh air. Administer oxygen if needed. If breathing difficulty occurs, get medical attention.

Contact with Clothing or Skin (Dermal Exposure): Remove contaminated clothing. Flush exposed skin and hair with water for at least 5 minutes, and wash with soap and water if possible. Seek medical attention if irritation or rash appears.

Contact with Eyes: Flush exposed eyes with water for at least 15 minutes. Remove contact lenses if possible. Seek immediate medical attention.

Ingestion (Oral) Exposure: Do not induce vomiting. Seek immediate medical attention. If vomiting occurs, keep head below hips to reduce chances of aspiration into lungs.

Special Concerns for Children: Children may inhale relatively larger amounts of vapors due to their faster respiratory rates and greater lung size to body weight ratio. Children may

also receive higher doses due to their short stature since Coleman Fuel vapors, being heavier than air, may concentrate near the ground.

Chemical Hazards

Reactivity: Coleman Fuel is stable under normal conditions but can be an explosion hazard if fumes come in contact with ignition sources, heat, or intense sunlight.

Flammability: Coleman Fuel can form flammable mixtures with air and flash at room temperature. The lower explosive limit (LEL) for n-hexane is 1.2% (by volume, room temperature); the upper explosive limit (UEL) is 7.5%. Similar explosive ranges have been reported for petroleum distillates and Amsol 10. Coleman Fuel vapor is heavier than air. Vapor may travel considerable distances to a source of ignition and flash back.

Chemical Incompatibilities: Strong oxidizers.

More Information

Office of Environmental Health
Hazard Assessment (OEHA)
www.OEHA.CA.Gov

Department of Toxic
Substances Control (DTSC)
www.DTSC.CA.Gov



Phosphine



Vol. 1, No. 5: Clandestine Drug Labs/ Methamphetamine

September 2003

Recognizing Phosphine

Appearance: Phosphine is a colorless gas at room temperature.

Odor: Disagreeable, garlic-like, or decaying fish odor when found in commercial products. Pure phosphine gas is odorless.

Odor Threshold: Minimum: 0.03 ppm Average: 0.5 ppm.

Odor Safety Class: D (only 10-50% of distracted individuals perceive warning of the permissible exposure level). **Note:** *Odor is not a good indicator of the presence of phosphine vapors and does not provide reliable warning of hazardous concentrations which occur at levels below odor detection.*

Vapor Density: 1.2 (air = 1.0). Phosphine is slightly heavier than air.

Containers & Packaging

Commercial: Aluminum and zinc phosphide release phosphine gas when exposed to moisture. Both products are used as rodenticides. Aluminum phosphide is also used as a grain fumigant. Commercial pesticides containing aluminum phosphide are Celphos, Phostoxin, and Quick Phos. Phosphine gas for air monitoring instrument calibration is available from chemical supply companies in pressurized containers.

Pharmaceutical: There are no pharmaceutical uses of phosphine gas.

Role in Drug Synthesis

Phosphine gas is an unintended, undesirable, and potentially lethal by-product produced during the manufacture of methamphetamine using the Hydriodic Acid/Red-Phosphorus method (Figure 1).

Health Hazards

Inhalation Exposure: Inhalation is the primary route of exposure for phosphine gas. Effects from short-term exposure to high concentrations (greater than 2 ppm) may result in severe lung irritation, cough, and chest tightness. Neurological effects include dizziness, lethargy, convulsions, and coma; agitation and psychotic behavior are often present as well. Signs of phosphine toxicity include rapid and/or irregular heart rate, low blood pressure, shock, nausea, abdominal pain, vomiting, diarrhea, and cardiac arrest. Most acute symptoms occur within the first few hours after exposure; however, the onset of liver and kidney toxicity and severe fluid accumulation in the lungs (pulmonary edema) may be delayed for up to 72 hours. For this reason, persons with known exposure to phosphine gas should be hospitalized and observed for several days.

Skin (Dermal) Exposure: Direct skin contact is not likely to be a significant route of exposure for phosphine gas.

Eye Contact: Direct eye contact may cause irritation, tearing, pain, swelling, and sensitivity to light.

Ingestion: If ingested, certain types of waste generated by clandestine methamphetamine labs may result in the release of phosphine gas in the stomach. Symptoms of chemicals that produce phosphine internally when ingested are similar to those that occur following acute inhalation of phosphine gas.

Chronic Effects: Long-term exposure to low concentrations (0.5 to 2 ppm) include anemia, bronchitis, nausea, vomiting, abdominal pain, diarrhea, tremors, double vision, impaired gait, and difficulty speaking. Liver and kidney damage, structural changes in chromosomes of peripheral blood cells, and chemical-induced asthma may also occur.



Figure 1: Photo of a heat-resistant vessel containing a hydriodic acid / red phosphorus methamphetamine synthesis reaction mixture. Phosphine gas is an unwanted potentially lethal by-product generated during the synthesis. Phosphine may be present in the air space above the liquid reaction mixture. *Photo Courtesy of CA Department of Justice.*

Clandestine Labs/ "Meth":

Phosphine

Environmental Concerns

Air: Phosphine is extremely volatile. It is found as a gas at room temperature and will readily disperse in the atmosphere. Any residue of phosphine present in or generated by solid or liquid waste should quickly disperse in the air.

Soil and Water: Large amounts of buried phosphorus-containing waste may generate phosphine gas in large enough quantities to present a significant source of soil and ground water contamination. However, the amount of phosphine gas produced by a typical clandestine laboratory does not represent a significant threat to soil or ground water. Due to its extreme volatility, any release of phosphine to surface water would quickly evaporate to the surrounding air.

Indoors: Phosphine will not likely accumulate on indoor surfaces but may be present as a gas in indoor environments.

Natural Occurrence: Phosphine is formed in small amounts from the putrefaction of organic matter. Detection of low concentrations of phosphine in drains, sewers, or septic systems would not be unexpected and should be noted if found.

Exposure Limits

Occupational Exposure Limits (NIOSH, OSHA, & ACGIH)

Short-Term Exposure Limit (STEL): 1 ppm (1.4 mg/m³)

8-Hr Time Weighted Average (TWA): 0.3 ppm (0.4 mg/m³)

10-Hr Time Weighted Average (TWA): 0.3 ppm (0.4 mg/m³)

Immediately Dangerous (IDLH): 50 ppm

Preliminary Remediation Goals (PRGs)

(U.S. EPA, Reg. 9):

Air: 0.31 µg/m³

Soil, residential: 18 mg/kg

Soil, industrial: 180 mg/kg

Tap Water: 11 µg/m³

More Information

Office of Environmental Health
Hazard Assessment (OEHHA)
www.OEHHA.CA.Gov

Department of Toxic
Substances Control (DTSC)
www.DTSC.CA.Gov

Handling & Safety



First Aid

General: People have died from exposure to phosphine gas at methamphetamine labs. There is no specific antidote for this chemical. Medical treatment is generally supportive.

Inhalation Exposure: Move to fresh air. If victim has difficulty breathing, give oxygen. If victim is not breathing, give artificial respiration. Get medical attention immediately.

Contact with Clothing or Skin (Dermal Exposure): Remove contaminated clothing. Flush exposed skin and hair with water for at least 15 minutes. Thoroughly wash with soap and water when possible. Get medical attention immediately.

Contact with Eyes: Flush eyes with water for at least 30 minutes. Get medical attention immediately.

Ingestion (Oral) Exposure: Do not induce vomiting. Seek immediate medical attention.

Special Concerns for Children: Children may inhale relatively larger amounts of phosphine gas due to their faster

respiratory rates and greater lung size to body weight ratio. Children may also receive higher doses due to their short stature. Phosphine is slightly heavier than air and may settle close to the ground in the breathing zone typical for children.

Chemical Hazards

Reactivity: Phosphine combines violently with oxygen and halogenated compounds. Phosphine also reacts with copper, silver, gold, and salts of these metals as well as with air, oxidizers, chlorine, acids, and moisture.

Flammability: NFPA flammability rating = 4 (very flammable). The lower explosive limit in air = 1.8 % (26 g/m³). Phosphine is very flammable and potentially explosive. It may ignite spontaneously on contact with air.

Chemical Incompatibilities: Phosphine reacts with air and moisture along with copper, halogenated hydrocarbons, chlorine, oxidizers, and acids.



Sodium Hydroxide



Vol. 1, No. 7: Clandestine Drug Labs/ Methamphetamine

September 2003

Recognizing "NaOH"

Appearance: Sodium hydroxide (NaOH) is found as solid white granules, chips, or pellets. Solid forms rapidly absorb water vapor from the air. This process generates heat and results in the formation of concentrated solutions of NaOH. Concentrated solutions of NaOH in water are clear in color.

Odor & Odor Threshold: Not applicable. NaOH is not volatile and is odorless at room temperature.

Odor Safety Class: NaOH is odorless. **Note:** Odor provides no warning of hazard. Irritation of the nose and throat provides an indication of exposure to a concentration of dust, or fumes if heated, that is sufficient to produce initial symptoms of toxicity.

Containers & Packaging

Commercial: NaOH is one of several alkaline materials referred to as "lye". It is also packaged as caustic soda or soda lye. Commercial products in solid form include Red Devil® Lye and Drano® drain opener (Figure 1, A & B), while liquids include Easy Off® oven cleaner and Liquid-Plumner® drain opener. Concentrated solutions of sodium hydroxide in water are available from commercial chemical supply companies.

Pharmaceutical: There are no pharmaceutical uses of sodium hydroxide.



Figure 1: Commercial drain openers such as Red Devil® Lye [A] and Drano® [B] contain sodium hydroxide which can be used in the illegal synthesis of methamphetamine. Photographers, Charles Salocks and Caron Poole.

Role in Drug Synthesis

Sodium hydroxide is used to make sodium, an alkali metal that functions as a catalyst in the anhydrous ammonia/ alkali metal ("Nazi") method. NaOH is also used in a number of synthesis methods to raise the pH of methamphetamine reaction solutions.

Health Hazards

General: NaOH is highly corrosive. It is a powerful irritant by all routes of exposure. Low level exposure causes irritation, burning, and inflammation of the skin, eyes, nose, throat, windpipe and lungs. Higher level exposure causes severe burns resulting in permanent damage to all tissue it contacts. The mechanism of damage is two-fold: 1) thermal burns result from heat generated when NaOH combines with moisture in the body, and 2) chemical burns result from reaction with organic molecules. NaOH produces damage on contact, often very quickly; but, it does not go on to cause systemic toxicity, i.e., damage other places in the body.

Inhalation Exposure: Acute, high concentration exposures cause severe burns, swelling of the voice-box, lung edema (accumulation of fluid), and irreversible obstructive pulmonary disease. Long-term lower level exposure can result in chest pains, shortness of breath, ulceration of the nasal passages, persistent hoarseness, and reactive airway dysfunction syndrome (RADS), a chemical-induced asthma.

Skin Exposure: Concentrated NaOH causes deep, serious, painful, soft, and moist burns. Dilute solutions may not produce pain initially but can result in serious burns if allowed to remain

on the skin. Chronic effects include dermatitis.

Eye Contact: Tissue damage, inflammation, and opacification of the cornea may occur. Cataracts, glaucoma, adhesion of the lid to the eye, eye loss, and blindness may result. Damage may progress for 72 hours or more following exposure.

Ingestion: Severe injury to the mouth, esophagus, and stomach may result. Symptoms of injury include vomiting, drooling, pain, rapid and feeble pulse, collapse, and shock.

Clandestine Labs/ "Meth":

Environmental Concerns

General: As a contaminant in surface water, NaOH would be expected to raise the pH. NaOH is highly reactive and is rapidly neutralized by organic chemicals in soil. For this reason, it is not expected to significantly contaminate ground water or soil. Sodium hydroxide in air is subject to wet deposition (washout by rainfall) and dry deposition. NaOH readily combines with water vapor. The resulting aerosol or mist is corrosive.

Indoors: Sodium hydroxide may be found as a solid or a concentrated liquid on indoor surfaces. Solid forms may slowly "melt" by absorbing water vapor from air, forming a highly concentrated solution. If contamination occurs, NaOH would be expected to persist. The persistence of solid or liquid residues will depend on the nature of the surface and to what degree it is porous. Skin contact and ingestion resulting from hand-to-mouth activity could occur. Clean-up standards for NaOH on surfaces have not been established.

Chemical Hazards

Reactivity: Mixed with water, solid forms and concentrated solutions (>40%) of NaOH may generate enough heat to ignite combustible materials. NaOH reacts with all mineral and organic acids, forming the corresponding salts. The heat generated may be sufficient to raise the temperature of liquids above the boiling point. This could result in sporadic, dangerous "bumping" of solutions. NaOH reacts with metals, such as aluminum, tin, and zinc generating flammable hydrogen gas.

Flammability: Sodium hydroxide is noncombustible. However, if solid NaOH is mixed with water or acid it may generate enough heat to ignite combustible materials.

Chemical Incompatibilities: Sodium hydroxide is corrosive to most metals. Sodium hydroxide is incompatible with acids, halogenated organic compounds, and nitromethane. Mixing NaOH with acid may generate substantial heat. Reaction with trichloroethylene (TCE) spontaneously forms dichloroacetylene, which is flammable. Reaction with metals, such as aluminum, tin, and zinc generates flammable hydrogen gas.

Sodium Hydroxide

First Aid

Inhalation Exposure: Move to fresh air. If victim has difficulty breathing, give oxygen. If not breathing, give artificial respiration. Keep victim in a half upright position. Get medical attention immediately.

Contact with Clothing or Skin (Dermal Exposure): Rapid decontamination is critical. Remove contaminated clothing and shoes. Flush exposed skin and hair with water for 15 minutes or more. Get medical attention.

Contact with Eyes: Flush eyes with water for at least 15 minutes. Get medical attention immediately.

Ingestion (Oral) Exposure: Do not induce vomiting. If victim is conscious, give 4-8 ounces water or milk. Do not administer activated charcoal or attempt to neutralize. Seek immediate medical attention.

Special Concerns for Children: Stomach acid in children may not be not strong enough or present in great enough

amounts to neutralize even small amounts of NaOH. Therefore, toxic effects in children may be greater. The behavior patterns of children may also result in more frequent contact with contaminated surfaces.

Exposure Limits

Occupational Exposure Limits (NIOSH, OSHA, & ACGIH)

Ceiling Limit (C): 2 mg/m³

Short-Term Exposure Limit (STEL): not established

8-Hr Time Weighted Average (TWA): 2 mg/m³

10-Hr Time Weighted Average (TWA): not established

Immediately Dangerous (IDLH): 10 mg/m³

Preliminary Remediation Goals (PRGs)

(U.S. EPA, Reg. 9): Air, Soil, & Water: not established

More Information

Office of Environmental Health
Hazard Assessment (OEHA)
www.OEHA.CA.Gov

Department of Toxic
Substances Control (DTSC)
www.DTSC.CA.Gov



Hydrogen Chloride



DEPARTMENT OF TOXIC
SUBSTANCES CONTROL

Vol. 1, No. 3: Clandestine Drug Labs/ Methamphetamine

February 2004

Recognizing "HCl"

Appearance: Anhydrous hydrogen chloride (HCl) gas is colorless to slightly yellow at room temperature. When exposed to air, HCl gas condenses with moisture in the air to produce dense, white, and corrosive hydrochloric acid vapors.

Hydrochloric acid is a colorless or slightly yellow fuming, aqueous liquid formed by dissolving HCl gas in water. Yellowing is caused by trace amounts of iron, chlorine, or organic matter impurities.

Odor: Pungent. Immediately irritating at 5 ppm (7.5 mg/m³).

Odor Threshold: 0.26 ppm (0.4 mg/m³).

Odor Safety Class: C (less than 50% of distracted individuals perceive warning of threshold limit).

Vapor Density: 1.3 (air =1.0). Hydrogen chloride gas is heavier than air and may accumulate close to the ground or in depressions.



A



B

Figure 1: Anhydrous hydrogen chloride gas is stored as a liquid in pressurized containers [A]. Aqueous solutions of hydrogen chloride are called hydrochloric acid or muriatic acid [B] and are found in commercial chemical or swimming pool supply houses. Photos: Courtesy of CA Department of Justice.

Containers & Packaging

Anhydrous HCl is a gas at room temperature but becomes liquid when put under pressure. Anhydrous (e.g. without water) HCl gas is typically stored and transported as a liquid in pressurized tanks (Figure 1, A). Aqueous solutions of hydrogen chloride are called hydrochloric or muriatic acid (Figure 1, B). Hydrochloric acid is used as an ingredient in toilet bowl cleaners. HCl solutions can also be purchased at pool supply and hardware stores as an acidifier, cleaner, and disinfectant.

Role in Drug Synthesis

HCl is used to produce the solid hydrochloride salt of methamphetamine. Both aqueous and gaseous forms can be used, but HCl gas is more effective.

Health Hazards

General: HCl is severely corrosive and irritating to all body tissues. Prolonged exposure may cause permanent effects.

Inhalation Exposure: HCl gas causes burning and irritation of the nose and throat, coughing, choking, sneezing, breathing difficulty, chest pain, and headache. Inhalation of anhydrous HCl gas can be fatal if exposure to concentrations of 0.1% in air occur even for a few minutes. Exposure to high concentrations of liquid or gaseous HCl can result in constriction of the airways, swelling, fluid build up and tissue death in the lungs, rapid breathing and pulse, shock, decreased blood pressure, tooth discoloration, gum and nosebleeds. HCl vapor is heavier than air. Asphyxiation might occur in confined, un-ventilated areas.

Skin (Dermal) Exposure: Direct contact with fumes or liquid can cause corrosive burns. Irritation, pain, inflammation, and ulceration can result. Frostbite may occur with exposure to anhydrous HCl as it is released from tanks.

Eye Contact: Fumes can cause extreme irritation. Contact with liquid HCl can result in pain, swelling, corneal erosion, tissue death, and may cause permanent eye damage.

Ingestion: HCl ingestion can cause pain, irritation, nausea, vomiting, thirst, difficulty swallowing, salivation, corrosive burns, ulceration, and perforation of the gastrointestinal tract, which can be fatal.

Other effects include chills, fever, and kidney inflammation.

Special Concerns for Children: Children may inhale larger doses of HCl due to their greater lung size to body weight ratio and increased inhalation rates. Short stature may also be a risk since vapors may concentrate near the ground.

Clandestine Labs/ "Meth":

Hydrogen Chloride

Environmental Concerns

Air: HCl gas is subject to wet deposition (washout by rainfall). HCl gas readily combines with water in the air to form HCl acid.

Soil: Anhydrous HCl gas readily combines with soil moisture to form HCl acid. HCl acid, an aqueous solution, can infiltrate soil and dissolve minerals, especially carbonates. This process typically results in neutralization of the HCl acid. However, if large amounts of HCl acid are spilled, infiltration and downward migration through the soil column may occur.

Ground Water: HCl acid can readily move through soil spaces where it may come in contact with, and may acidify, ground water. If significantly neutralized by organic and mineral components in the soil, or if diluted with sufficient amounts of water, ground water contamination can be minimized.

Surface Water: HCl dissociates almost completely in water to form acidic hydronium ions. Acidified water can be neutralized with agricultural lime (CaO), crushed limestone (CaCO₃), or sodium bicarbonate (NaHCO₃).

Indoors: Long-term contamination of indoor surfaces by anhydrous HCl is not likely a concern since it is a gas at room temperature and will typically dissipate. Care should be taken not to inhale HCl gas or vapors from HCl acid. If spilled on indoor surfaces, HCl acid can be neutralized by the addition of common bases, such as sodium bicarbonate. Spills should be addressed as recommended for hazardous materials cleanup of aqueous acids.

Exposure Limits

Occupational Exposure Limits (NIOSH & ACGIH)

Ceiling Limit: 2 ppm

8-Hr Time Weighted Average (TWA): not established

Immediately Dangerous (IDLH): 50 ppm (75 mg/m³)

Preliminary Remediation Goals (PRGs)(U.S. EPA, Reg. 9):

Air: 14 ppb (21 µg/m³). Soil & Water: not established

Handling & Safety



First Aid

Inhalation Exposure: Remove affected person to fresh air. Monitor for respiratory distress. Administer oxygen and assist ventilation as required. Seek medical attention immediately. Severe respiratory tract irritation can progress to pulmonary edema, the onset of which may be delayed up to 24 to 72 hours after exposure.

Contact with Clothing or Skin (Dermal Exposure): Remove contaminated clothing. Flush exposed areas with water for at least 5 minutes. Thoroughly wash with soap and water when possible. Seek medical attention if needed.

Contact with Eyes: Flush exposed eyes with water or saline solution for at least 15 minutes. Remove contact lenses if possible. Seek immediate medical attention.

Ingestion (Oral) Exposure: Do not induce vomiting, do not give activated charcoal, and do not attempt to neutralize. Give 4-8 oz. of water or milk. Seek medical attention.

Chemical Hazards

Reactivity: HCl acid is highly corrosive and reacts with nearly all metals. It reacts with oxidizers releasing chlorine gas. When mixed with water, it releases large amounts of heat.

Flammability: HCl is not flammable, but in contact with strong bases (e.g., ammonium hydroxide or sodium hydroxide), an explosive reaction can occur. Flammable hydrogen gas can be produced when HCl contacts metals. Containers holding HCl gas or hydrochloric acid may explode when heated and corrosive HCl fumes may result. Water used to control a fire may become corrosive or toxic due to HCl acid contamination.

Chemical Incompatibilities: HCl is incompatible with alkalis, amines, copper, copper alloys, hydroxides, zinc, sulfuric acid, and organic materials.

More Information

Office of Environmental Health
Hazard Assessment (OEHA)
www.OEHA.CA.Gov

Department of Toxic
Substances Control (DTSC)
www.DTSC.CA.Gov



Methamphetamine

“Meth”

DEPARTMENT OF TOXIC
SUBSTANCES CONTROL

Vol. 1, No. 8: Clandestine Drug Labs/ Methamphetamine

September 2003

Recognizing “Meth”

Appearance: The hydrochloride salt of methamphetamine (Meth-HCl) is a yellow or white crystalline powder. Street grade Meth may occur in any number of colors depending on how it was manufactured and what impurities exist in the final product. (Figure 1, A-D). Street Meth-HCl is also found as “Ice”, which appears as bright clear crystals of high purity. The free base of methamphetamine (Meth-base) is a yellow to brown liquid, which is soluble in organic solvents (e.g., Coleman Fuel). Meth-base liquid can be converted to Meth-HCl solid by bubbling hydrogen chloride gas through the Meth-base layer.

Chemical Forms: There are two isomeric chemical forms of methamphetamine, *d*- and *l*-Meth. The *d*- form is a potent central nervous system (CNS) stimulant. Meth produced by clandestine labs is usually found as the *d*- isomer. *l*-Meth has little CNS activity and is used for the temporary relief of nasal congestion.

Pharmaceutical Products: *l*-Meth is found as the active ingredient in over-the-counter products including Vicks® Vapor Inhaler®. When used as directed, *l*-Meth does not represent a significant health hazard. *d*-Meth is a controlled substance, Drug Enforcement Agency, Schedule II, but it is legally available by prescription for

treatment of attention deficit disorder with hyperactivity and for short-term treatment of obesity.

Odor: Meth-HCl is odorless but has a bitter taste. Meth-base has a sharp biting odor resembling geranium leaves. Meth-base is volatile at room temperature.

Health Hazards

Routes of Exposure & General Effects: Meth-HCl can be smoked (inhaled), snorted, injected, or ingested. The route of exposure primarily affects the rate of absorption and onset of effects. Injection and inhalation produce the most rapid effects. Meth is a central nervous system stimulant. Once absorbed it produces the same physiological effects regardless of exposure route.

Acute Effects: Meth is irritating to skin, eyes, mucous membranes, and the upper respiratory tract. Eye contact may cause pupil dilation and retraction of the upper lid. Acute intoxication can cause dizziness, headache, dry mouth, a metallic taste, anorexia, insomnia, tremor, rash, chest pain, difficulty breathing, fainting, blurred vision, dilated pupils, impotence, bluish skin color, lung congestion, convulsions, and coma. Overdose may cause exaggeration of reflexes, rapid breathing, confusion, panic states, aggressiveness, hallucinations, brain oxygen loss, elevated body temperature, skeletal muscle wasting, fatigue, depression, acute paranoia, and a schizophrenic-like state. Other effects include nausea, vomiting, diarrhea, cramps, irregular heartbeat, high or low blood pressure, and circulatory collapse.

Chronic Effects: Long-term exposure may cause severe skin conditions, insomnia, irritability, poor concentration,

hyperactivity, personality changes, weight loss, teeth grinding and tooth loss, ulcers of the lips and tongue, physical and psychological dependence, anxiety, fear, compulsive behavior, delirium, disorientation, hallucinations, or a psychotic schizophrenic-like condition with possible self-injury.

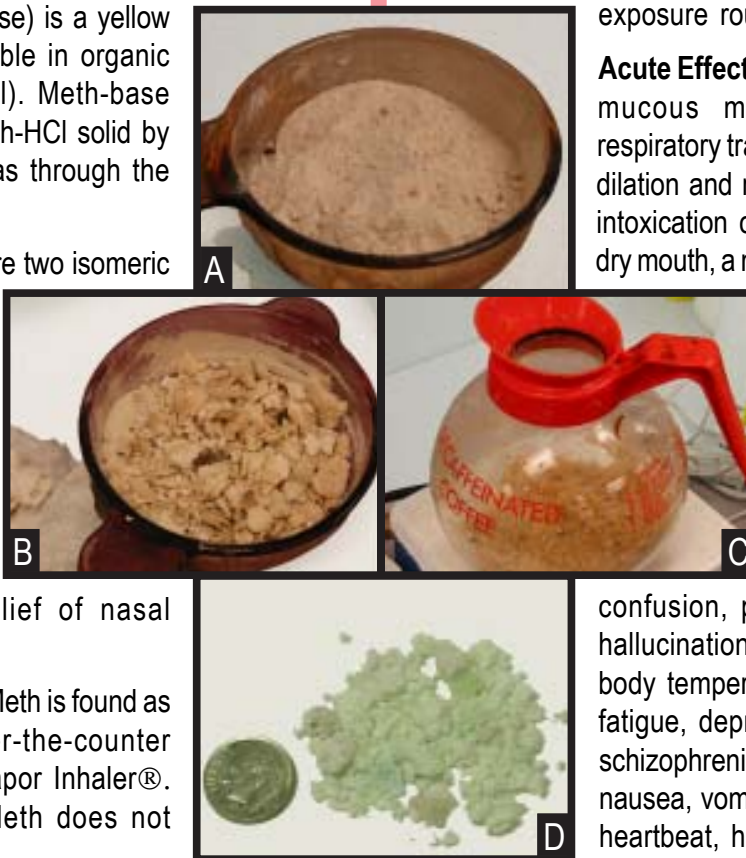


Figure 1: In the final synthesis stages, a methamphetamine-HCl slurry is often dried in heat-resistant household or restaurant style glass dishes [A-C]. The drug is typically found as a solid cake or in broken chunks in these dishes. Street grade Meth varies greatly in color depending on the type and quality of the synthesis method used [D]. Photos Courtesy of CA Department of Justice.

Clandestine Labs “Meth”:

Methamphetamine

Environmental Concerns

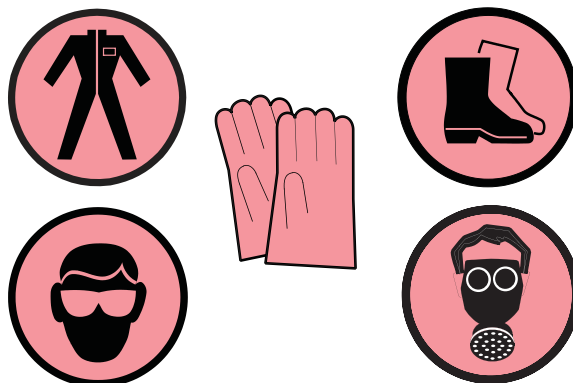
Air & Soil: No information available.

Ground Water & Surface Water: No information available.

Indoors: Meth-base is volatile. Depending on environmental conditions it may persist on indoor surfaces for several days. Meth-HCl is a stable solid and may persist on surfaces for months or longer. Several states in the U.S. have developed clean-up standards for Meth contamination of indoor surfaces. These range from 0.1 to 5 µg Meth /100 cm² surface area.

None of these standards is based on toxicity criteria or on estimates of potential exposure that might result from contact with Meth-contaminated surfaces. If funding were provided, the California Environmental Protection Agency's Office of Environmental Health Hazard Assessment could develop a risk-based advisory standard for Meth residues on indoor surfaces and could continue to evaluate field sampling and analysis methods for measuring levels of methamphetamine contamination on indoor surfaces and other areas around dwellings.

Handling & Safety



First Aid

Inhalation Exposure: Move to fresh air. Give artificial respiration if not breathing. If breathing difficulty occurs, give oxygen and seek medical attention.

Contact with Clothing or Skin (Dermal Exposure): Remove contaminated clothing. Flush exposed skin and hair with water for at least 15 minutes. Thoroughly wash with soap and water when possible. Methamphetamine can be absorbed through the skin. Seek medical attention if needed.

Contact with Eyes: Flush exposed eyes with water or saline solution for at least 15 minutes. Remove contact lenses if possible. Seek immediate medical attention.

Ingestion (Oral) Exposure: Contact the local poison control center or a physician immediately. Wash out mouth with water if person is conscious. Do not make an unconscious person drink fluids or vomit. If vomiting does occur, keep head lower than hips to help

prevent aspiration. If unconscious, turn person's head to the side to help prevent aspiration.

Special Concerns for Children: Meth-base is volatile and may pose an inhalation hazard. Children may inhale relatively larger amounts of vapors due to their faster respiratory rates and greater lung size to body weight ratio. Meth-HCl found on surfaces may be absorbed through the skin or inhaled as solid “dust” particles in the air. Long-term use of stimulants in children can cause growth suppression. Methamphetamine passes into breast milk and can be detected in a breast-fed infant's urine.

Exposure Limits

Occupational Exposure Limits (NIOSH, OSHA, & ACGIH)

Ceiling Limit (C): not established

Short-Term Exposure Limit (STEL or ST): not established

8-Hr Time Weighted Average (TWA): not established

10-Hr Time Weighted Average (TWA): not established

Immediately Dangerous (IDLH): not established

Preliminary Remediation Goals (PRGs) (U.S. EPA, Reg. 9):

Air, Soil & Water: not established

Chemical Hazards

Reactivity: Meth-HCl is stable at normal temperature and pressure.

Flammability: Meth-HCl is a slight fire hazard. Dust in air may ignite or explode. Hazardous combustion or decomposition products include carbon monoxide, carbon dioxide, and nitrogen oxides. Combustion of meth-HCl may produce hydrogen chloride gas.

Chemical Incompatibilities: Strong oxidizing agents.

More Information

Office of Environmental Health
Hazard Assessment (OEHA)
www.OEHA.CA.Gov

Department of Toxic
Substances Control (DTSC)
www.DTSC.CA.Gov

Sampling and Cleanup

What are we looking for?

State Cleanup Levels for <u>Meth</u> Labs								
State	<u>Meth</u>	Hg	<u>Pb</u>	VOC	<u>Cor</u>	Red P	Iodine	Septic
Sac Co	0.1 µg/100 cm ²	50 ng/m ³	20 µg/ft ²					
AK	0.1 µg/100 cm ²	50 ng/m ³	2 µg/100 cm ²	1 ppm				
Az	0.1 µg/100 cm ²	3 µg/m ³	4.3 µg/100 cm ²	1 ppm	pH 6-8	stain	stain	<700 mg/l acetone
Arkansas	0.5 µg/ft ²							
CA	0.1 µg/100 cm ²	50 ng/m ³	20 µg/ft ²					
CO	0.5 µg/100cm ²	1 µg/m ³	40 µg/ft ²				22 µg/100 cm ²	
MI	0.5 µg/100cm ²	1 µg/m ³	40 µg/ft ²				22 µg/100 cm ²	
NC	0.1 µg/100 cm ²	0.3 µg/m ³	4.3 µg/100 cm ²					
OR	0.5 µg/ft ²	50 ng/ft ²	10 µg/ft ²	1 ppm	pH 2-12.5			
SD	0.1 µg/100 cm ²	50 ng/m ³	20 µg/ft ²	1 ppm	pH 6-8	stain	stain	
TN	0.1 µg/100 cm ²	50 ng/m ³	40 µg/ft ²	1 ppm				
UT	0.1 µg/100 cm ²	50 ng/m ³	20 µg/ft ²					
WA	0.1 µg/100 cm ²	50 ng/m ³	20 µg/ft ²	1 ppm				

Where are we going to sample?

- Data research to determine on-site chemicals and location of activities
- Look for obvious staining
- Consider dumping locations
 - Plumbing traps
 - Septic systems
 - Waste pits
- Use of real-time instruments, indicators

How much to sample?

- Follow local agency guidance!!
- Representative sampling
 - Every type of media in vicinity
- Random sampling
- Composite sampling
 - Combine up to 4 samples of same type of material together
- Wipe versus bulk
- Quality control
 - Cross-contamination: change gloves!!
 - Field and Trip blanks
 - Preservatives
 - Chain-of-custody

Methamphetamine Analytical Methods

- No NIOSH approved method yet; to be published within 6 months (personal communication from NIOSH)
- Current Gas Chromatography Method used: USEPA SW 846, 8270d, "Semi-volatile Organic Compounds"
- Alternative: US Pharmacopia Method 621, HPLC-UV

General Wipe Sample Method (from NIOSH 9102, Elements on Wipes)

1. Wearing a clean pair of powder-less, plastic gloves, place the template over the area to be sampled and secure it. If the area to be sampled is in a confined area and a template cannot be used, measure the sampling area, and delineate the area to be sampled with masking tape.
2. Remove a wipe from its package, and unfold it.
3. Wipe the surface to be sampled using fingertips held together and applying firm pressure. Use an overlapping 'S' pattern to cover the entire surface with horizontal strokes.
4. Fold the exposed side of the wipe in, and wipe the same area using vertical 'S'-strokes.
5. Fold the wipe again to reveal an unexposed surface, and wipe the surface a third time as described in step 3.
6. Fold the wipe, exposed side in, and place it into a clean hard-walled sample container (e.g., 50-mL centrifuge tube). Seal securely and label the sample container.
NOTE: Compositing of wipe samples is not recommended, because (a) they cause sample preparation and analytical difficulties, and (b) site-specific analytical information is lost.
7. Clean the template in preparation for the next wipe sample using water or a wipe. A disposable template may also be used.
8. Remove gloves and discard. Clean gloves should be worn for each new sample.
9. Field blanks: 10% of samples, at least three per batch. Remove unexposed wipes from packaging and place into sample containers. The field blanks should be collected at the beginning, middle, and end of sampling.

Labs

- DataChem Labs, Salt Lake City
 - LC/MS, 0.05 μg /wipe sample
 - \$35/sample for 3 day TAT
- Assay Technology, 800-833-1258
 - HPLC, 1 μg /ft², 0.11 μg /100 cm²
 - \$65/sample

- EMSL, 800-220-3675 (Philadelphia, PA)
 - Sample types
 - Bulk - Submit drywall, carpet, or ceiling tile samples (2 sq. in.)
 - Wipe - Using sterile cotton gauze, wipe a 10 cm square area
 - Vacuum Bag - Submit contents of vacuum bag (1-2grams)*
 - GC/MS, method 8270
 - 75\$/sample, 2-5 TAT
 - email Scott Van Etten: Svanetten@emsl.com

Analytical Methods for other chemicals

- Mercury: EPA 7471a, Mercury
 - Solid sample
 - Atomic Absorption
- Lead: EPA 6010, Lead in Surface Wipes
 - ICP (0.001 $\mu\text{g}/100\text{ cm}^2$)
- VOCs: EPA 5035, Volatile Organics
 - 40 ml VOA vials w/teflon caps

Real-time Methods

- Photoionizing detector for low ppm VOCs
- Mercury vapor meter
- pH paper
- Haz-Cat kits
- Starch spray to identify iodine contamination
- Only useful to help identify areas of probable contamination. Agencies will NOT accept these for clearance.

Micro-vacuuming

- Based on ASTM D5756-02: Standard Test Method for Microvacuum Sampling and Indirect Analysis of Dust by Transmission Electron Microscopy for Asbestos Mass Concentration
- Use high flow pump with glass fiber cassette, vacuum area
 - Analyze filter for meth
 - Qualitative vs quantitative
- Useful for sampling:
 - Porous materials
 - "soft" goods: carpet, drapes

Sampling Studies

- National Jewish Medical and Research Center, Colorado (John Martyny et. al.)
 - "Chemical Exposures associated with Clandestine Methamphetamine Laboratories"
 - "Chemical Exposures associated with Clandestine Methamphetamine Laboratories using the Anhydrous Ammonia Method of Production"
 - "Methamphetamine Contamination on Environmental Surfaces Caused by Simulated Smoking of Methamphetamine"
 - "A 24-Hour Study to Investigate Chemical Exposures Associated with Clandestine Methamphetamine Laboratories"
 - "Chemical Exposures Associated with Clandestine Methamphetamine Laboratories using the Hypophosphorous and Phosphorous Flake Method of Production"

Surface Methamphetamine Levels from various labs

Location	$\mu\text{g}/100\text{cm}^2$
Night Stand	2800
Ceiling Fan	2500
Microwave	2400
Bath Exhaust Grill	1600
Microwave	1700
Hotel Table	920
Kitchen Stove	790
Floor	520
Return Air Vent	450
Living room Table	430

Results

- Aimed at law enforcement
- Considerable sampling for meth during and after cooking process
- Meth emitted as a vapor primarily during “gassing out” phase
- Found everywhere, not just in immediate vicinity of cook
- Levels up to 16 mg/cm² found (usually much less)
- Can re-suspend meth, HCl and iodine by household activities

Sampling studies, cont.

- Salt Lake Valley Health Department, Kevin M. Okleberry, MS, LEHS
- Sampling data and examples

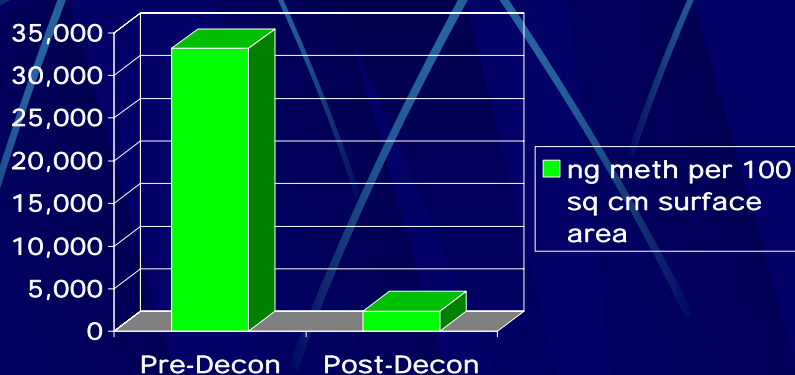
How Much Meth is Present?

- Average meth level on surfaces in Utah labs prior to decontamination is 33,143 nanograms (ng) per 100 cm² surface area; range is from 30 ng to 771,000 ng/100 cm² (total of 18 properties sampled)
- Sampling before decontamination is not required under new regulations

How Much Meth is Left?

- Average meth residue level after first decontamination is 2,389 ng/100 cm², range is 10 ng to 59,000 ng/100 cm² (total of 34 properties sampled)
- Additional decontamination often required to remove remaining residue

Average Levels of Meth Residue



How Hazardous is It?

- Prescription dose of methamphetamine for ADHD is usually 20-25 mg (25,000 μg) daily.
- Using a dermal uptake equation and the 0.1 $\mu\text{g}/\text{cm}^2$ cleanup level, a toxicologist from OEHHA calculated that an infant would have a daily uptake of 0.3 $\mu\text{g}/\text{day}$.
- Pre-decontamination levels of meth in some labs may approach or exceed prescription dosage, especially for children (adjusted for weight)
- No long-term studies of hazards of low-level exposure to methamphetamine residue

Typical Dosage Amounts

- A first time user will typically start with 1/8 gram.
- A regular user will typically start a "run" with a "quarter" (a quarter of a gram).
- On a 3 day run, an average user might use between 3 "quarters" (of a gram) to 1 gram or more.
- During a 3 day run, a regular injector will average 3-8 injections (depending on tolerance levels and how he/she chooses to divide the drug).
- The high from a "quarter" of meth will typically last between 6-8 hours (depending on tolerance & quality).



Case Studies of Actual Labs Decontaminated Under Utah's Regulation

Example Case #1

- House that new owner suspected to be a meth lab, due to neighbor reports
- No contamination noted during initial assessment
- Iodine “bled” through paint months after initial inspection, new inspection of house 18 months later found extensive iodine staining

Results

- Tests showed elevated levels of methamphetamine throughout house
- Highest level was 56 $\mu\text{g}/100 \text{ sq cm}$ in room where staining was heaviest
- Contractor completely gutted most of the house, due to extensive iodine staining

Conclusions

- Iodine staining was most prevalent in basement laundry room
- Humidity from washer may have helped “draw out” the iodine residue under the paint
- Elevated meth residue levels were discovered at least 18 months after any cooking occurred

Case Example #2

- Large house recently occupied by new owners
- Owners received reports of drug manufacturing by previous owners
- Property was assessed by a listed contractor, some suspected iodine stains found
- Owners had two different contractors sample property

Results

- All four samples taken by contractors for testing were below the limit of 0.1 $\mu\text{g}/100 \text{ sq cm}$
- Suspected stains were determined not to be iodine, no other obvious signs of contamination were noted

Conclusions

- Owners completely cleaned the house prior to moving in; they may have unwittingly decontaminated the house at that time

Case Example #3

- Large lab was found in storage unit; unit measured about 10 ft by 30 ft
- Preliminary sample in unit revealed methamphetamine levels above 29,000 ng
- Contractor who assessed property noticed a 2-inch gap between the walls and the ceiling and a tube placed in the gap on one side
- Health Department required sampling of adjacent units to determine extent of contamination

Gaps and Vent Tube

Results of First Round

- Samples showed methamphetamine levels of over 10,000 ng and 9,000 ng in adjacent units
- These units also had gaps in walls, raising possibility of contamination in adjacent units
- Health Department required sampling of these units to determine contamination

Results of Second Round

- All adjacent units had levels of methamphetamine significantly above the regulatory limit
- Gaps were found in all walls in all the units, allowing any vapors from process to spread throughout the complex
- Owner will sample adjacent units

Layout of Storage Units

1,650 ng meth per 100 sq cm	9,623 ng meth per 100 sq cm	Lab Site 27,488 ng meth per 100 sq cm	10,703 ng meth per 100 sq cm	3,570 ng meth per 100 sq cm
7,610 ng meth per 100 sq cm				
4,460 ng meth per 100 sq cm				

Conclusions

- Contamination was found several units not adjacent to the unit that was used as a lab
- The gaps between the walls and ceiling and the tube allowed the heated reaction vapor to spread to other units
- Sampling is continuing at this time

Case Example #4

- Large, older house with basement and detached garage
- Mother (owner) lived upstairs, adult children (meth cooks) lived downstairs
- Lab was found in garage, lab equipment and glassware were found in a basement bathroom
- No evidence of contamination was noted in upstairs portion of house

Lab Setup and Glassware

Results

- Investigation revealed that mother was unaware of cooking in house
- Preliminary sample from upstairs kitchen was negative; downstairs samples all revealed significant contamination
- House had a single heating system, samples were taken upstairs near vents
- Low levels of contamination were found upstairs near the heating vents

Results of Preliminary Sampling

Downstairs Samples		Upstairs Samples	
Bedroom ceiling	17,494 ng/100 sq cm	Kitchen stove top	<100 ng/100 sq cm
Bedroom table	1,375 ng/100 sq cm	Computer room	692 ng/100 sq cm
Bathroom ceiling	29,611 ng/100 sq cm	Bathroom ceiling	325 ng/100 sq cm

Conclusions

- Meth dust or vapor from the cooking process probably was circulated through the house by the furnace fan
- Affected areas upstairs were decontaminated as well as rooms in basement

Lessons Learned

- Meth and iodine vapor can migrate throughout a structure, and significantly contaminate surfaces in rooms not used for cooking
- High levels of meth residue may be present without obvious signs of contamination
- Iodine can “bleed” through paint months or years after initial contamination
- Proper decontamination of property can remove almost all chemical residues

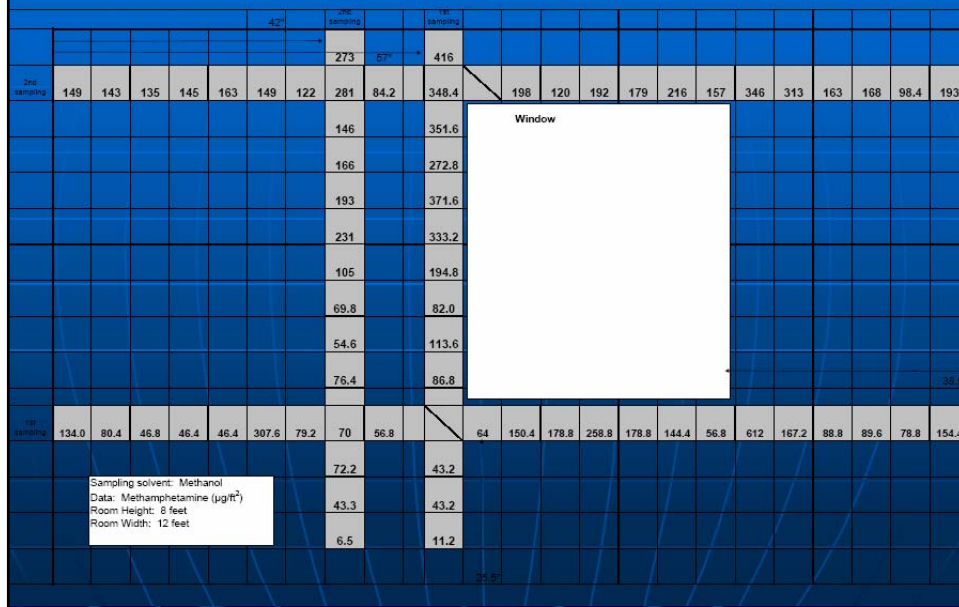
Sampling Studies, Cont.

- Minnesota Dept. of Health/Pollution Control Agency study on meth deposition in building materials (Kate Gaynor & Steve Lee)
- Used to revise Clan Lab Cleanup Guidance

Mn Results

- Meth samples higher closer to ceiling than floor
- Meth samples always highest near the cooking area
- Meth penetrates a variety of materials including upholstery
- Micro-vacuuming gives better indication of presence of meth in porous surfaces than does wipe sampling
- Serial wiping of the same area only slightly reduces total concentration (much more absorbed into the material than wiped off)
- Meth samples on top of ceiling fan blades MUCH higher than nearby wipe results: dust on blades probably absorbs meth more easily

Meth Distribution Sampling



Serial Methanol Wipes of Meth Lab Contaminated Painted Drywall

- First wipe 127 $\mu\text{g}/\text{ft}^2$
- Second wipe 111 $\mu\text{g}/\text{ft}^2$
- Third wipe 117 $\mu\text{g}/\text{ft}^2$
- Fourth wipe 100 $\mu\text{g}/\text{ft}^2$

- Paint peel 997 $\mu\text{g}/\text{ft}^2$

Serial Washing Meth Lab Contaminated Painted Drywall

- First wash pad 40 $\mu\text{g}/\text{ft}^2$
- Second wash pad 49 $\mu\text{g}/\text{ft}^2$
- Third wash pad 37 $\mu\text{g}/\text{ft}^2$
- Water rinse pad 19 $\mu\text{g}/\text{ft}^2$

- Methanol wipe 225 $\mu\text{g}/\text{ft}^2$
- Paint and paper peel 3603 $\mu\text{g}/\text{ft}^2$

Sampling Observations Affected MN Cleanup Guidance

- Throw carpet and all except high value low contact materials will remove much meth mass.
- HEPA vacuuming will remove some meth from rough porous surfaces.
- Washing walls will remove little of the wall's meth.
- Painting or sealing to isolate most meth.

Process-based Cleanup Guidance

- If a lab is identified, chemicals or waste stored, presume meth contamination throughout structure.
- Do a rigorous standard cleanup
 - Remove carpet, furniture, low value contents
 - HEPA, wash 2x to prep for painting or sealing
 - Paint or seal 2x
 - Wash high-value contents as possible
 - Consider structure use and materials for non-occupancy areas for cleaning plan
- Goal is meth mass reduction/isolation

Mn Cleanup Guidance based on Risk Acceptance

● No Residual: bulldoze house and completely rebuild

● Minimal acceptable risk:

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

● Acceptable Residual Risk:

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

Cleanup Methods DTSC Survey Results

● Walls

- Visible contamination
 - Remove (71%), decontaminate, (43%), Repaint (29%)
- No visible contamination
 - Decontaminate (57%), Repaint (43%)

● Floors

- Carpet: visible contamination
 - Remove (86%) or bleach (14%)
- Carpet: no visible contamination
 - Shampooed (57%), removed or treated with baking soda (20%) and "other" (14%)

Cleanup Methods, cont.

● Floors

- Linoleum w/staining
 - Removal (71%), wash (14%) or bleach (14%)
- Linoleum w/o visible stain
 - Wash (71%), bleach or treat with baking soda (29%)
- Hardwood w/staining
 - Remove (71%), wash (43%) or bleach/baking soda rinse (14%)
- Hardwood w/o staining
 - Wash (57%), bleach or baking soda rinse (14%), "other" (57%)

● Encapsulation by paint or other sealers

- After multiple washings

Cleanup cont.

- HVAC system
 - Consider especially if serves multiple units
 - Replace all filters
 - Remove vents and clean including surfaces near registers (supply and return)
 - Consider cleaning ductwork
 - Assess AC and furnace
- Porous materials: dispose
 - Clothing, linens, draperies, upholstered furniture, carpeting, paper goods & books
- Waste Disposal
 - Municipal landfill or hazardous waste

Effectiveness of Bleach in Cleanup

● DTSC Study 2/2/04

Table1. Results of the GC/MS analysis after the Methamphetamine solution and cleaning solvents were added:

Cleaning Solvents	Breakdown of Methamphetamine	By- Products Produced
Septi-Zyme	No Breakdown	Produced unknown by-products
Ultra Clorox Bleach®	90% Breakdown	Produced unknown by-products
Crystal Simple Green®	No Breakdown	Produced unknown by-products
Pine Sol®	No Breakdown	Produced unknown by-products
Liqui-Nox®	No Breakdown	No by-products produced
TSP detergent	No Breakdown	No by-products produced

Guidelines for Environmental Sampling at Illegal Drug Manufacturing Sites

Revised November 30, 2005



For more information:

www.doh.wa.gov/ehp/ts/cdl.htm

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Please call 1-800-525-0127 (TTY/TDD 1-800-833-6388).

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The following guidelines describe recommended procedures for collecting, handling, and transporting septic, soil, methamphetamine wipe, and caustic samples. Standard operating procedures (SOPs) are required to ensure collection of samples that are representative, accurate, and defensible. Modification of procedures may be acceptable and the guidelines are intended to allow flexibility. However, any deviation from the SOP outlined in these guidelines should be documented in the sampling plan as to the extent of and reason for the deviation. Deviations from the SOP should be pre-approved by local health staff before sampling is conducted.

Sampling shall be conducted only by qualified personnel as defined in WAC 246-205-531(2)

“Collection of samples shall be performed by Department of Ecology staff; Department of Health certified CDL supervisors; or local health officers...”

I. GENERAL RECOMMENDATIONS:

A. EQUIPMENT AND SUPPLIES:

OBJECTIVE: Equipment and supplies needed to conduct scientifically defensible environmental sampling.

Equipment Purchased from either a Certified Laboratory or Laboratory Supply Company:	Supplies Purchased from Retail Stores:
<ul style="list-style-type: none"> Filter papers Sample collection containers Analytical grade methanol Disposable templates Sludge judge Disposable plastic pipette Squeeze bottle pH Indicator paper Laboratory grade distilled water (ASTM Type II) Cooler Analytical Request/Chain of Custody form Chain of Custody seals 	<ul style="list-style-type: none"> Field notebook Stainless steel spoon Large stainless steel container Disposable templates Disposable gloves Thumbtacks Masking tape Permanent ink marking pen Permanent ink ball-point pen Labels for collection containers 2 Equipment storage containers* Caddy Pre-moistened hand wipes Zip lock bags Ice or frozen ice packs** Camera Distilled water Paper towels Trash bags Person Protective Equipment (PPE) <p>* One storage container for off-site and one for on-site.</p> <p>** Must be able to maintain 4° C.</p>

A. EQUIPMENT AND SUPPLIES (continued)

1. Use equipment from either a certified laboratory or a laboratory supply company. Supplies can be purchased at retail stores, laboratory supply companies, and some analytical laboratories.
2. Equipment and supplies should be clean (sterilized if required) and in proper working condition before using.
3. Store equipment/supplies in a clean, secure storage container designated for only sampling media/supplies. Storage container is kept in a limited access area to avoid contamination and is never taken to a drug lab site.
 - a) Decontamination contractors are responsible for the safe custody of all sampling equipment from the time they receive it from the analytical laboratory until the time they use it and relinquish it back to the laboratory.
 - (1) Signed or initialed chain of custody seals should be maintained on appropriate equipment/supplies.
4. Store and transport sampling equipment/supplies separate from PPE and all other equipment used to decontaminate properties.
5. Use equipment/supplies only one time and properly dispose of them upon completion of the sampling project.
 - a) Exceptions to this rule exist and include supplies such as the caddy, "on-site" equipment storage container and stainless steel tools, which may be reused after proper decontamination.
6. Whatman 40 filter paper is recommended, although the following have equivalent performance and can also be used; Whatman 41, 42, 43, 44, 540, 541, Ahlstrom 54, VWR 454 and S&S WH Medium.
7. Sample collection containers consist of standard laboratory 4-ounce containers and 40ml vials. All containers have Teflon-lined lids.
8. Templates should be thin (less than 3mm), capable of lying flat on a surface and stiff enough to maintain their shape. Area sampled is 100 cm² (10cm by 10 cm) for single (discrete) samples, and four 25 cm² (5 cm by 5 cm) areas for composite samples.
9. Gloves should be powderless.

B. OFF-SITE SAMPLING PREPARATION

OBJECTIVE: To minimize contamination of sampling equipment and supplies and increase sampling efficiency while on-site.

1. Verify that the sampling plan has been pre-approved by the local health department. Sampling plan should include detailed descriptions of sampling techniques for each matrix being sampled (surface wipes, soil, surface water, drinking water, and septic tanks), sample location and type (single or composite).
2. Review approved sampling plan and determine what equipment/supplies are needed for the sampling project. Bring extras for unexpected occurrences and store them in the on-site storage container until needed. Note that the on-site storage and mailing containers are not brought into the contaminated/decontaminated area.
3. Conduct sampling preparation before going on site.

B. OFF-SITE SAMPLING PREPARATION (continued)

4. Lay out a disposable surface cover (such as a plastic tablecloth) in an area free from contamination to use as your preparation site.
5. Put on gloves.
6. Pre-label sampling collection containers using permanent ink. Each container must have a securely affixed label containing the following information.
 - a) Site ID--record the facility (ex. Use the address number)
 - b) Sample ID--assign a number
7. Prepare a blank. (Note: For composite samples, the blank should consist of 4 filter papers).
8. Place sampling equipment and supplies needed for the sampling project into the on-site storage container.

C. ON-SITE SAMPLING PROCEDURES

OBJECTIVE: To collect representative samples in a consistent manner that can be replicated.

1. Eating, drinking, smoking, or other activities that may introduce contamination is prohibited during on-site sampling procedures.
2. Conduct sampling with two people; one person as the "Sampler," and the other person as the "Record Keeper." It is recommended that both the "Sampler" and the "Record Keeper" meet the qualifications of WAC 246-205-531(2) and be certified CDL Supervisors.
3. Put on appropriate PPE.
4. Conduct a walk-through to ensure site is ready to sample.
5. Transfer equipment/supplies from on-site storage container to caddy. Do not bring storage container into the contaminated area.
6. Continue with additional steps, outlined below, for on site sampling procedures for methamphetamine, VOCs and caustics.

D. FIELD QUALITY CONTROL (QC)

OBJECTIVE: To evaluate precision of the sampling process.

1. Field quality control (QC) samples typically consist of blank, duplicate and equipment rinsate samples. It is at the discretion of the local health staff to determine which QC samples are taken. Often staff will waive the collection of duplicates or rinsates for soils or septic sampling since, at the initial stage of investigation, sampling is being conducted to determine the presence of contamination only. Depending upon the initial sampling results, and at the discretion of local health staff, additional sampling, including QC samples, may be required.
2. MEDIA BLANK: A media blank is taken for methamphetamine wipe samples. The media blank is prepared off-site by the contractor and consists of placing a filter paper into a sample collection container, wetting it with methanol and tightly securing the lid. The container is carried on site, never opened and returned to the laboratory for analysis.

D. FIELD QUALITY CONTROL (QC) (continued)

3. FIELD DUPLICATE (REPLICATE): A field duplicate is an independent sample that is collected at the same time and as close as possible to the sample it is replicating. The site environmental sample and the duplicate sample are taken separately from the same location or source, stored in separate containers, and analyzed independently.
 - a) Methamphetamine: Historically, duplicate wipe samples were collected as “back up” samples in case a sample container were to break during transport or for potential legal proceedings. However, since methamphetamine’s holding time has not been established, duplicate samples are no longer taken for this purpose. If for some reason, duplicate meth wipe samples are taken, they are submitted to and stored by the analytical lab. Normally, CDL Contractors should not keep duplicates due to lack of ability to maintain conditions necessary to preserve sample integrity.
 - b) Methamphetamine: Duplicates are not taken to evaluate precision of sampling process due to the variability of sampling media (the non-uniform dispersion of methamphetamine residue).
4. EQUIPMENT RINSATE: An equipment rinsate consists of rinsing the sampling equipment with laboratory grade distilled water (ASTM Type II) after the equipment has been decontaminated and prior to sampling. The rinse water is collected and analyzed.

E. CHAIN OF CUSTODY RECORD

OBJECTIVE: To provide accountability for and documentation of sample integrity from the time the contractor receives sample equipment until the samples are transferred to a courier or analytical laboratory.

1. Use a custody record supplied by the analytical laboratory.
2. Chain of custody begins when contractor receives equipment from the analytical laboratory or other supplier. The CDL contractor is responsible for the care and custody of sampling equipment. Chain of custody seals should be maintained on stored equipment. Each time a seal is broken, it shall be initialed, dated and recorded. A new custody seal is placed on remaining equipment being stored for future use.
3. The assigned field sampler is responsible for care and custody of samples from the time they are collected until they are properly transferred by signature to a courier or laboratory.
4. As few people as possible should handle samples.
5. Use permanent ink to enter the following information:
 - a) Project Name
 - b) Sampling Site Address
 - c) Sample Number (#125-1) (Do not put down location of the sample)
 - d) Sample Date (Date sample was taken)

E. CHAIN OF CUSTODY RECORD (continued)

- e) Sample Time (Time sample was taken)
- f) Sample Type (Single, composite)
- g) Sampled area (100 cm²)
 - (1) For Media Blank Sample: Record an area that is consistent with the area you typically sample and the number of wipes submitted with the media blank sample (100 cm² wipe).
- h) Analysis Requested (Methamphetamine, VOC)
- i) Field Notes (example: suspect high concentration in sample # 125-1, noted strong solvent odor)
- j) Number of Containers
- k) Report In: (Keep analytical results consistent with area sampled. Since discrete and composite sample areas are currently both 100cm², results would be reported in 100 cm²).
- l) Turnaround Time
- m) Signatures of sampling personnel
- n) Signatures of all personnel handling and receiving samples
- o) Date and Time samples received

F. TRANSPORTATION OF SAMPLES

OBJECTIVE: To preserve integrity of samples during transportation.

1. Place methamphetamine and VOC samples in a cooler, filled with ice, immediately after collecting the sample. Temperature of 4°C must be maintained.
2. Package containers in cooler in a manner that prevents breakage.
3. Complete analytical request and chain of custody form.
4. Place form inside a waterproof, zip lock bag and include it with the mailing.
5. Attach chain of custody seal to outside of cooler.
 - a) Sign and date custody seal.
6. Deliver samples to analytical lab within 24 hrs of completing sampling, by mail courier service or personal delivery.
7. Retain shipping receipts.

G. DECONTAMINATION PROCEDURE FOR EQUIPMENT/SUPPLIES

OBJECTIVE: To avoid cross contamination through proper decontamination of equipment and supplies.

1. Decontaminate using the following procedure:
 - a) Wash the item thoroughly with soap and water. Recommended soaps are Liquinox or Alconox.
 - b) Rinse the item thoroughly with distilled water.
 - c) Rinse stainless steel equipment with analytical grade methanol.
 - d) Air dry.
 - e) Wrap stainless steel supplies in aluminum foil.

H. SITE CLEAN UP AND PERSONNEL DECONTAMINATION:

OBJECTIVE: To avoid cross contamination through proper waste disposal and personnel decontamination.

1. Dispose of used and unused sampling equipment into trash bags.
 - a) Properly dispose of trash bags.
2. Remove PPE and dispose of in trash bags.
3. Decontaminate PPE that will be reused.
4. Store PPE separate from sampling equipment/supplies.
5. Wash hands with pre-moistened hand wipes or soap and water.

I. SAMPLE LOG FORM OR FIELD NOTEBOOK:

OBJECTIVE: To sufficiently document field sampling activities to allow review of all aspects of sampling.

1. Document all field-sampling activities on a sample log form or in a bound all weather notebook with sequentially numbered pages.
2. New field notebooks are required for each sampling project to avoid cross contamination between projects.
3. Use permanent ink and record information in a legible manner.
4. Correct errors by drawing a single line through the error so it remains legible, and adjacent to the error, have the responsible individual date and sign the correction.
5. Document any deviation from approved procedures in the sampling plan.
6. Maintain field book in an accessible location that protects it from damage and loss.
7. Record the following standard information in field notebook:
 - a) Project Name
 - b) Project Address
 - c) Date of Project
 - d) Name of personnel and tasks they performed
 - e) Purpose of Project
 - f) Arrival and Departure Times
 - g) Field instruments used
 - h) Instrument calibrations
 - i) Sample Number
 - j) Sample Location
 - k) Surface Type
 - l) Time each sample was taken
 - m) Weather
 - n) Pertinent conversations
 - o) Sign each page

J. HANDLING AND STORAGE OF METHANOL

OBJECTIVE: To reduce risk of personal injury and cross contamination of methanol.

1. Methanol is a toxic and flammable liquid and must be handled and stored with all safety precautions related to toxic and flammable liquids.
2. Store small amounts of methanol and frequently replenish supply.

J. HANDLING AND STORAGE OF METHANOL (cont'd)

3. Place a signed or initial chain of custody seal over bottle top and neck.
4. Inhalation of methanol vapors must be avoided. Containers must be handled in a ventilated area.
5. Protective gloves should be worn when handling containers with methanol.
6. Methanol should be stored away from open flames, areas of extreme heat and other ignition sources.

II. METHAMPHETAMINE WIPE SAMPLES

OBJECTIVE: Using methanol-moistened filter papers to collect wipe samples from hard, non-porous surfaces from areas of 100 cm² (10 cm x 10 cm) for single, discrete samples and 25 cm² (5 cm x 5 cm) for composite samples. Samples are taken from dry or relatively dry surfaces.

A. OFF-SITE SAMPLE PREPARATION

1. Follow steps described in "I-B" (OFF-SITE SAMPLING PREPARATION), and continue as described below:
2. Remove lids from sample collection containers, placing them top down on a contamination-free surface.
3. Put on clean pair of gloves.
4. Fold filter papers into quarters and place into sample collection containers. Only one filter paper per container.
5. Saturate filter papers with methanol until wet but not dripping (approximately 40 drops, or 2 milliliters). Excess methanol should be poured onto a paper towel and properly disposed of.
6. Secure lids tightly on containers and replace into shipping box.
7. Pre-label templates to match with labels on sample collection containers.
8. Place other equipment/supplies in zip lock bags that are then placed in the on-site storage container. Take only the equipment/supplies needed for the sampling job to the drug lab site.
9. Prepare sample log form/field notebook.

B. ON-SITE SAMPLING PROCEDURE FOR SINGLE SURFACE (DISCRETE) WIPES

1. Proceed to first sampling location;
 - a) Wash hands with pre-moistened hand wipes.
 - b) Sampler and Record Keeper put on clean gloves.

B. ON-SITE SAMPLING PROCEDURE FOR SINGLE SURFACE (DISCRETE) WIPES (cont'd)

- c) Record Keeper hands a template to the Sampler.
- d) Sampler attaches template to pre-designated sampling location. Caution should be taken so as not to touch the area within the template.
- e) Proceed to the next sampling locations and repeat procedure. When finished securing templates, have the Record Keeper take a photo of each template that includes a reference point.
- f) Sampler and Record Keeper put on clean gloves.
- g) Record Keeper removes the corresponding sample collection container and fills in required information on container label.
- h) Information consists of the date and time the sample was taken.
- i) Record Keeper unscrews the container lid (always keeping the lid in their hand).
- j) Sampler removes the filter paper from the container and inspects the filter paper to ensure that it is still wet. If it has dried out, do not use it. Use one of the extra sample collection containers you brought for unexpected occurrences.
- k) Keep the filter paper folded in quarters.
- l) Grasp the folded filter paper between the thumb and fingers. Place the filter paper on the surface to be sampled. Press down firmly, but not excessively, with the fingers, being careful not to touch the sample surface with thumb.
- m) First Wipe: Using firm pressure, horizontally wipe the surface within the template side to side in an overlapping “Z” pattern. Wipe so that the entire selected surface area is covered. End with a scooping motion. Avoid wiping the template.
- n) Second Wipe: Open the wipe and fold the sampled side in. With a clean quarter section exposed, vertically wipe the surface within the template side to side in overlapping “N” pattern. Wipe so that the entire selected surface area is covered. End with a scooping motion. Avoid wiping the template.
- o) Fold the filter paper so the sampled side is folded in.
- p) Rough surfaces should be “blotted” uniformly, rather than wiped.
- q) Sampler inserts the folded filter paper into sample collection container.
- r) Record Keeper secures lid and places container back into cooler with ice (cooler is not brought into the contaminated/decontaminated area).
- s) Repeat sampling procedures outlined above at each sampling location, making sure to change gloves.
- t) Follow steps I-E, Chain of Custody Record through I-I, Sample Log Form.

C. ON-SITE SAMPLING PROCEDURE FOR COMPOSITE SURFACE WIPES

1. A composite sample is the collection of multiple samples taken from different locations that are combined and analyzed as a single sample. The sample area of each of the four wipe samples that comprise the composite sample is 25 cm² (5 cm x 5 cm). Thus, the total area for each composite sample group equals 100 cm².

To collect a composite sample that accurately represents the condition of the drug lab, the sample consists of four discrete samples collected from:

- Four surface areas each measuring 25 cm².
- Similar surfaces or media.
- An area where contamination is expected to be relatively evenly dispersed.

It is at the discretion of the local health staff to determine where to collect the composite samples.

2. A separate filter paper is used for each sample location. Thus, each composite sample group will include four filter papers. Before sampling, each filter paper is stored in individual containers to prevent wetted filter papers from sticking together and tearing.
3. Follow the same sampling procedures outlined for discrete surface wipe samples with the following exceptions:
 - a) The same pair of gloves may be used to collect each of the four samples that comprise the composite sample group. However, each set of composite sample groups will require use of a new pair of gloves.
 - b) Use the same side of the filter paper to horizontally and vertically wipe the surface:
 1. Keep the filter paper folded in quarters, and horizontally wipe the selected surface.
 2. Use the same side of the filter paper used to horizontally wipe to also vertically wipe the surface.
 - c) Upon completion of each composite sampling group, all four of the filter papers used to collect the composite sample are placed into a single sample collection container. Only one sample collection container shall be used to store the four used composite wipes.

D. FIELD QUALITY CONTROL

1. Trip Blank:
 - a) A trip blank is defined in the CDL Program as a quality control check to verify that methamphetamine was not introduced during sample preparation and transport. The trip blank is taken onto the sampling site where it is carried *unopened* throughout the

sampling process. It is not used to wipe surfaces. The trip blank sample is transported, along with the wipe samples, to the analytical laboratory for analysis.

- b) Trip blank samples should be consistent with the actual site surface wipe samples which they accompany. For example, if all samples are composites, the accompanying trip blank should consist of four filter papers. In the “area sampled” part of the chain of custody form, for a trip blank, you would write “100 cm².” The sampler should treat blank samples just like regular meth wipe samples so that the lab will not be able to distinguish them from actual site environmental meth wipe samples.

III. WASTEWATER SAMPLING

Objective: To collect wastewater samples from septic tanks for waste characterization using methods that minimize VOC losses.

A. OFF-SITE SAMPLE PREPARATION

1. Conduct Off-Site Sampling Preparation outlined in “I-B”.
2. Prior to sampling, the septic tank must have been sufficiently excavated to indicate whether the tank consists of one or two chambers.
3. Transfer sampling equipment/supplies from on-site storage container to sampling caddy.

B. ON-SITE SAMPLING PROCEDURES

1. Remove access cover from the first (or only) chamber and locate outlet baffle.

SAMPLING LOCATION IN TANKS WITH ONE CHAMBER:

- a) Samples are collected from the baffle on the outlet end of the chamber.

SAMPLING LOCATION IN TANKS WITH TWO CHAMBERS:

- a) Samples are collected from the baffle on the outlet end of chamber one.
2. Move any floating surface matter away from the insertion point of the sludge judge. Do not collect any matter in the sludge judge.
 3. Follow instructions for correct usage of a sludge judge.
 4. Insert the sludge judge into the tank, lowering it until you hit the bottom.
 5. Trap the sample inside the sludge judge.
 6. Remove the sludge judge and fill two 40ml vials.
 7. Samples may be taken without preservative (procedure “a”) or with preservative (procedure “b”) in the vial. Sampling procedure is determined by the sampler’s confidence and ability to maintain sample integrity.

- a) FIELD SAMPLE TAKEN WITHOUT A PRESERVATIVE IN THE VIAL
 - (1) Notify and coordinate with the analytical laboratory that you will be submitting unpreserved samples.
 - (2) Empty the collected sample into a stainless steel or glass container that is large enough to hold the entire amount.
 - (3) Use a pipette, or stainless steel cup to fill vial to the top, leaving no headspace.
 - (4) Secure the lid. Check for air bubbles by slapping the vial's side against the palm of your hand and turning the vial upside down. If there is an air bubble larger than a pea, remove the lid and add more sample. Repeat until no air bubbles larger than a pea exist.
 - (5) Place sample containers in cooler with enough ice or ice packs to maintain temperature of 4° C.
 - (6) Samples with no preservatives must be immediately delivered or mailed to the laboratory.
- b) FIELD SAMPLE TAKEN WITH A PRESERVATIVE IN THE VIAL
 - (1) Empty the collected sample into a stainless steel or glass container that is large enough to hold the entire amount.
 - (2) Use a pipette, or stainless steel cup to fill vial to the top, leaving no headspace. Take extra precaution not to cause overflow, resulting in loss of the preservative.
 - (3) Secure lid. Check for air bubbles by slapping the vial's side against the palm of your hand and turning the vial upside down. If there is an air bubble larger than a pea, remove the lid and add more sample. Repeat until no air bubbles larger than a pea exist. Take extra precaution not to cause overflow, resulting in loss of the preservative.
- 13. Place sample containers in cooler with enough ice or ice packs to maintain temperature of 4° C.
- 14. Follow steps I-E, "Chain of Custody Record" thru I-I, "Sample Log Form."
- 15. Replace access cover.

C. FIELD QUALITY CONTROL

- 1. It is at the discretion of the local health staff to determine which QC samples are taken. Often staff will waive the collection of duplicates or rinsates wastewater sampling. The reason for this is that at the initial stage of investigation, sampling is being conducted to determine if potential contamination exists. Based upon initial sample results, additional sampling, including QC samples, may be required at the discretion of the local health staff.

IV. COLLECTING SOIL SAMPLES

Objective: To collect soil samples for volatile organic compounds (VOC) analysis using EPA Method 5035A. This method was developed to minimize the loss of VOCs during the collection and handling of soil samples, and replaces the previous “jar-packing” method.

EPA Method 5035A establishes specific procedures for preparation and analysis for low and high soil VOC concentration samples, and for field and laboratory sample handling and preservation. Although the Method provides numerous options for collecting and handling soil samples for VOC analysis, Washington State Department of Health is requiring that certified CDL decontamination contractors abide by the following collection procedures:

- 1) Request the analytical laboratory to use the high soil VOC concentration method *
- 2) Collect unpreserved soil samples and immediately submit to the laboratory**
- 3) Use a zero headspace coring tool to collect the soil samples***
- 4) Collect a minimum of one sample per location****
- 5) Collect a dry weight sample*****

* Although the high concentration method is applicable to most of the commonly-encountered drug lab chemicals, it should be noted that for some chemicals, such as benzene that have soil cleanup levels below 200 ppb, the low concentration method will be necessary.

** It is crucial that you communicate and coordinate with your analytical laboratory *prior* to collecting any soil samples to assure that the lab is prepared to receive, store, and analyze the samples.

*** Zero headspace samplers are airtight coring devices that provide for the collection, storage and delivery of unpreserved soil samples, while minimizing VOC losses.

**** At sites where you suspect the presence of chemicals that have cleanup levels above and below 200 ppb, two or more samples from the same sampling location will be required.

***** A dry weight sample of soil must be collected to allow for a determination of moisture content, and the normalization of data to a dry-weight basis. Use approximately 10 grams of soil for the dry weight sample.

The specific Method 5035A soil sampling and handling procedures being required by DOH are described in detail below. In some situations, and only with the approval and oversight of the local health officer, other 5035A procedures, such as on-site sample preservation and use of non-zero headspace sample collection devices might be allowed. If site-specific situations arise that are more suited to these or other soil sampling methods, the CDL contractor will first need to discuss

these alternate methods with the local health officer and receive approval to use them.

**A. CONDUCT OFF-SITE SAMPLE PREPARATION
as OUTLINED IN “I-B (OFF-SITE SAMPLING PREPARATION)”**

B. ON-SITE SAMPLING PROCEDURES

Using a zero headspace sampler, the field sampler needs to:

1. Collect, cap, and label the sample.
2. Place the sample(s) on ice to maintain the sample(s) at a temperature of 4 degrees Celsius, plus or minus 2 degrees ($4^{\circ}\text{C} \pm 2^{\circ}$).
3. Deliver the sample to the lab immediately after collection.

**Zero Headspace Sample Collection for High Level Analysis (≥ 200
 $\mu\text{g/kg}$)**

Each sample point requires a minimum of:

- One 5 gram zero-headspace sampling device, designed to be used only one time.
- One dry weight sampling container (4-ounce jar, 40 ml vial, or similar container).
- Soil sampling coring device, such as a T-handle.
- Paper toweling.

Sampling procedure:

1. Designate one person as the sampler and the other as the record keeper.
2. Transfer the sampling equipment/supplies from the on-site storage container to the sampling caddy.
3. Take care to not overly disturb the soil in order to minimize the loss of VOCs.
4. Collect sample from a freshly exposed surface by scraping away the top inch of soil. Carefully remove organic debris, such as twigs, rocks, leaves, etc., from the sampling location before collecting the sample.
5. Use an EPA-approved zero headspace sampling device to collect 5 grams of soil. Upon approval by the LHJ, 25 grams of soil may be collected if extra sample volume is needed for special circumstances, such as the presence of peat moss or the need for additional laboratory analysis.
6. Remove the sampling device and sampling cap from the package and slide the plunger rod up and down to ensure plunger moves freely.
7. Push plunger rod down until the small o-ring rests against the tabs
8. Attach the T-handle to the sampling device by depressing the locking lever on the T-handle.
9. Align the slots on the sampling body with the locking pins on the T-handle and insert the sampling body into the T-handle.

10. Turn the sampling body in a clockwise direction to secure it
11. After the sampling body is secured in the T-handle, push the sampling device into the freshly exposed soil until the coring body is completely full. When full, the small o-ring will be centered in the T-handle viewing hole.
12. Remove sampler from the soil.
13. Use paper toweling to wipe excess soil from the sampling device coring body exterior.
14. Cap coring body while it is still on the T-handle.
15. Push the cap over flat area of ridge and twist to lock cap in place. Cap must be seated to seal sampler.
16. Remove the capped sampler from the T-handle by depressing the locking lever on the T-handle while twisting and pulling sampler from T-handle.
17. Lock the plunger by rotating extended plunger rod fully counter-clockwise until wings rest firmly against the tabs.
18. Attach completed tear-off label from the sampler bag to the cap on the sampling device coring body.
19. Place sampling device into the mailing pouch.
20. Place the mailing pouch in a zip-lock baggie
21. Place the sample on ice in a cooler at $4^{\circ}\text{C} \pm 2^{\circ}$.

Dry Weight Sample:

At least one dry weight sample must be collected for each location sampled. The dry weight sample is used by the lab for moisture content analysis so that it can normalize the soil VOC concentration to a dry-weight basis.

22. Collect dry weight sample by collecting soil adjacent to where you collected the first sample.
23. Collect sample from a freshly exposed surface by scraping away the top inch of soil with a stainless steel spoon. Carefully remove organic debris, such as twigs, rocks, leaves, etc., from the sampling location before collecting the sample.
24. Use a stainless steel spoon to fill the dry weight container with approximately 10 grams of soil. The dry weight sample container can be a 4-oz. wide mouth glass jar, a 40-ml VOA vial, or other suitable container.
25. Store sampling device with soil sample and dry weight sample container with soil sample at $4^{\circ}\text{C} \pm 2^{\circ}$.
26. Follow steps I-E, "Chain of Custody Record" through I-I, Sample Log Form."
27. Deliver sample containers to the lab immediately after sampling. Include sufficient ice to maintain the samples at $4^{\circ}\text{C} \pm 2^{\circ}$.

Cemented soils, course, or rocky soils: Most zero head space sampling devices cannot be used for sampling these types of soils.

Consult with your local health officer to discuss other sampling options when these types of soil conditions are present.

Non-cohesive, sandy soils: Zero head space sampling devices can be used for these types of soils by carefully scooping the soil into the sampling device and quickly capping it.

For Low Level Analysis (< 200 µg/kg): Two samples are required. Follow same procedure as outlined for High Level Analysis except collect an additional sample.

C. FIELD QUALITY CONTROL:

Quality control (QC) samples are used to evaluate precision of the sampling process. Field quality control samples typically consist of blank, duplicate and equipment rinsate samples. It is at the discretion of the local health staff to determine whether QC samples are needed, and if so, what kind. LHJ staff will often waive the collection of duplicate or rinsate QC samples. The reason for this is that at the initial stage of CDL site investigation, sampling is being conducted to determine the presence of contamination. The results of these initial samples will dictate whether additional samples, including QC samples, will be required by local health staff.

References on Soil Sampling:

1. Collecting and Preparing Soil Samples for VOC Analysis. Implementation Memorandum #5. Washington State Department of Ecology. June 17, 2004.
2. Soil VOC Sampling for EPA Method 5035A Analysis. Course ID: CHEM – 501. Northwest Environmental Training Center, Seattle, Washington.
3. D6418-04 Standard Practice for Using the Disposable En Core Sampler for Sampling and Storing Soil for Volatile Organic Analysis. American Society for Testing and Materials (ASTM).
4. D4547-98 Standard Guide for Sampling Waste and Soils for Volatile Organic Compounds. American Society for Testing and Materials (ASTM).
5. Closed System Purge-and-Trap and Extraction for Volatile Organics in Soil and Waste Samples. Draft Revision 1, July 2002. U.S. Environmental Protection Agency.

V. SAMPLING FOR CORROSIVES

OBJECTIVE: To collect samples from hard, non-porous surfaces to identify caustic areas that need to be neutralized or designated as dangerous waste.

A. ON-SITE SAMPLING PROCEDURE

1. Put on a clean pair of gloves.
2. Pour a small amount of deionized water onto indicator strip.
3. Place the indicator strip on the surface to be sampled.
4. Remove the indicator strip and compare the resultant color with the kit's color key.
5. Repeat steps 1-4 as necessary.

VI. WATER SAMPLING

A. LAKES, STREAMS AND OTHER SURFACE WATER SAMPLES

A common method for collecting water from ponds, lakes and streams is by dipping the sample bottle to obtain water at or near the surface. This technique is effective because many chemicals remain on the water surface. If physical conditions preclude the dip method or if subsurface samples are needed, alternate methods are available using a sampling jar attached to a telescoping pole, hand pumps, or weighted water samplers.

1. SAMPLING PROCEDURE

- a). Collect at least one liter of water into a certified clean glass jar and secure with a Teflon-lined lid. Avoid collecting sediments.
- b). Label jar, attach custody seal, and prepare sample for transport to the laboratory.

B. SURFACE SLICK SAMPLES

If water depth prevents dipping a bottle to collect a slick on the water surface, the preferred method is the —saturation“ pad technique. It may be appropriate to composite several pads for a single sample. Do not re-dip a pad or use both sides to collect a surface slick. Collected material can be washed away if the pad is re-dipped.

1. SAMPLING PROCEDURE

- a. Fold an 11 cm filter paper (Whatman 40 ashless or equivalent) or gauze pad into a 2.5 cm square.
- b. Grasp the pad firmly with stainless steel forceps and saturate the pad with the slick. Roll the pad into a cylinder and place into a glass jar and secure with a Teflon-lined lid.
- c. Label jar, attach custody seal, and prepare sample for transport to the laboratory.

C. WELL WATER SAMPLES

Purging the Well – “Purging the well“ means removing the volume of water standing in the well casing and/or in the water distribution system and replacing that water with new water from the aquifer. The purpose is to insure that a representative sample of the aquifer is collected.

1. SAMPLING PROCEDURE

- a. If there is no tap at the well head, use the closest tap to the well head.
- b. Purging is not necessary on wells which are pumped continuously, but measurements of temperature, conductivity (the ability to conduct an electric current) and pH should still be recorded. If a well is pumped dry during the purging process, it may be considered adequately purged and the sample can be collected as soon as the well casing is recharged.
- c. Flow may be diverted with a hose during the purging process, but the hose must be removed before samples are collected.

C. WELL WATER SAMPLES (continued)

One of the following methods should be used:

Method One: Open the tap all the way and allow water to flow into a catch bucket. Water should flow for approximately five minutes before readings are taken for conductivity, temperature, and pH. After five minutes and while water continues to flow, conductivity, temperature and pH should be measured at approximate one minute intervals until three consecutive readings indicate that parameters have stabilized. Readings may be considered stable when temperature measurements vary by no more than $+ 0.5^{\circ}\text{C}$, conductivity readings vary by no more than $+ 1\%$ and pH readings vary by no more than $+ 0.1$ pH unit. It may be assumed that the source is adequately purged when stable readings for two parameters are obtained. After readings have stabilized, remove the hose and begin sampling.

Method Two: Three to five well casing water volumes (storage volumes) should be purged from the well.

The storage volume is calculated as follows:

- 1). $\text{Volume (V)} = 3.14 \times R^2 \times D \times 7.48 \text{ gal/ft}^3$
V = Borehole volume (gallons)
R = Radius of the well bore (feet)
D = Depth of well (feet)
- 2). Flow should be measured using a five-gallon bucket and a stopwatch. Record readings in the field notebook.
- 3). Calculate the amount of time (in minutes) that the well should be purged in order to remove the required 3-5 times the well volume:

$\text{Time} = 3 \text{ (or } 5) \times \text{Volume of borehole (in gal) required flow rate (in gal/min) in minutes}$

- 4). After the required minimum volume has been purged and while water continues to flow, conductivity, temperature and pH should be measured at approximately one minute intervals until three consecutive readings indicate that parameters have stabilized. These measurements should be recorded in the field notebook. Samples should be collected after the required well volume has been purged and readings for conductivity, temperature, and pH have stabilized.

2. FIELD MEASUREMENTS

Specific conductivity, pH and temperature should be measured on-site and during purging of the well. Well water should be

C. WELL WATER SAMPLES (continued)

pumped continuously into a bucket or other container until three consecutive readings taken at one minute intervals indicate the three parameters have stabilized.

- a) Conductivity - The conductivity of a water sample gives an indication of the concentration of dissolved solids in the water. Conductivity should be measured with a temperature-compensated instrument, reading directly in micromhos/cm at 25°C. The cell should be checked before initial use and unless otherwise stated by the manufacture. The instrument should be calibrated daily during regular use against a 0.00702 N potassium chloride (KCl) solution with a specific conductivity of 1,000 micromhos/cm at 25°C. Routine checks are made by using a standard solution within the anticipated conductivity range of the sample at ambient temperature.
- b). Temperature - Temperature should be recorded by an electronic reading thermometer or mercury thermometer accurate to + 0.5° C.
- c). Hydrogen Ion Concentration (pH) - The pH of a solution is a measure of the effective hydrogen ion concentration. It should be measured with an instrument having an accuracy of 0.1 units. Since pH is temperature sensitive, it is important that pH calibration standards be within +1°C of the sample solution for precise determinations.

3. SAMPLE COLLECTION

- a. Samples should be collected as close to the well as possible, from a tap located before the water has passed through any pressure or water storage tanks or treatment systems. If it is not possible to collect a sample from the water system before the well water storage tank, then the volume of water in the storage tank must be taken into account when purging the system.
- b. There should be sufficient space to place the bottle under the tap without grazing the neck interior against the faucet.
- c. Leaking taps which allow water to flow out from around the stem of the valve handle and down the outside of the faucet, or taps in which water tends to run up on the outside of the lip, should be avoided as sampling locations.
- d. Aerator, strainer, and hose attachments on the tap should be removed before sampling. If a steady stream of water cannot be obtained from the tap after removing such devices, a more suitable tap should be sought.

C. WELL WATER SAMPLES (continued)

- e. Water flow should be steady to avoid dislodging material lining the inside of the pipe. A smooth-flowing stream at moderate pressure without splashing should be obtained. Water flow should not be adjusted immediately prior to or during actual sample collection.
 - f. Excessive flow and the resulting turbulence can affect metals, volatile organics, and many other chemicals. Samples should be disturbed as little as possible (e.g., turbulence, agitation, and exposure of water sample and containers to the atmosphere).
 - g. During sample collection, the bottle cap should not be placed on the ground or in a pocket. The bottle should be held in one hand and the cap in the other, keeping the bottle cap right side up (threads down) using care not to touch the inside of the cap. Be careful to avoid losing the Teflon liner in certain bottle caps. Avoid contaminating the sample bottle with fingers or permitting the faucet to touch the inside of the bottle. When filling any container, care should be taken that splashing drops of water from the ground or sink do not enter either the bottle or cap. A clean polyethylene sheet placed on the ground may be helpful in maintaining a clean work area.
 - h. Samples should be labeled and held on ice, if required, immediately after collection.
 - i. Samples should be collected in the following order:
 - #1) Volatile Organic Compounds (VOC)
 - #2) Other Organic Compounds, Metals and Inorganics
4. Volatile Organic Compounds (VOC)
- a. Samples to be analyzed for purgeable organic compounds should be taken in 40 ml vials and secured with screw caps containing a Teflon septum.
 - b. Two vials should be filled for each sample.
 - c. The investigator should determine if the water to be sampled contains chlorine. If the water contains no chlorine, two 40 ml vials, each containing 2 drops of 1:1 HCl, should be filled with the sample and labeled. If the sample contains no chlorine **and only if** the sample will be analyzed within 24 hours, preservation with HCl is not necessary.
 - d. Samples should be collected before chlorination or other pre-treatment if at all possible. If this is not possible and the sample contains chlorine, the following procedure for sample collection and preservation should be followed:
 - e. Fill a 40 ml vial, containing 10 mg sodium thiosulfate, to the shoulder (where the vial necks down to the top) with sample,

C. WELL WATER SAMPLES (continued)

add 2 drops of 1:1 HCl, then fill completely with sample. Label the vial.

NOTE: Sodium thiosulfate and acid preservatives should be added in this order and in two separate steps because HCl reacts with sodium thiosulfate.

- f. Vials should be completely filled, with no air bubbles. Extreme caution should be exercised when filling a vial, to avoid any turbulence which could also produce volatilization. The sample should be carefully poured down the side of the vial to minimize turbulence. As a rule, it is best to gently pour the last few drops into the vial so that surface tension holds the water in a “convex meniscus”. The cap is then applied and some overflow may be lost, but air space in the bottle is eliminated. After capping, turn the bottle over and tap it to check for bubbles; if any are present, discard the sample and sample bottle and repeat the procedure with a new bottle.

5. Other Organic Compounds, Metals, and Inorganics

- a. All containers and tubing, used for collection of samples for other organic compounds, metals and inorganic analysis, should be prepared as provided by standard cleaning procedures.
- b. When possible, the sample should be collected directly into the appropriate sample container. If this cannot be physically accomplished, an intermediate collection device may be used, such as a smaller sampling bottle, which has been cleaned according to standard procedures.

REFERENCES

1. American Society for Testing and Materials D4840-99 Chain-of-Custody Procedures
2. American Society for Testing and Materials E 1728-99 Field Collection of Settled Dust Samples Using Wipe Sampling Methods for Lead Determination by Atomic Spectrometry Techniques
3. American Society for Testing and Materials D 4547 Sampling Waste and Soils for Volatile Organic Compounds
4. United States Department of Housing and Urban Development Lead Wipe Sampling for Contaminated Dust
5. United States Environmental Protection Agency EPA SW 846-5035 EPA 600/4-82-029 Handbook for Sampling and Sample Preservation of Water and Wastewater

APPENDIX A

Rationale for the Establishment of the Washington State Department of Health's Clandestine Drug Lab Program Decontamination Standards

July 2005

Washington State passed legislation in 1990 mandating the cleanup of properties contaminated by illegal clandestine drug lab (CDL) activity in order to protect the health of future occupants of the properties¹ The legislation authorized the Washington State Department of Health (DOH) to develop numeric decontamination standards and certify cleanup contractors to evaluate and clean up illegal drug labs. The goal of the decontamination standards is to provide protection for all people, particularly for infants and children, who are thought to be the most susceptible to the toxic effects of residual chemicals. This susceptibility is a result of numerous factors, including the young child's developing physiology, higher intake of food, air, and fluids in proportion to their body weight compared to adults, and their unique behavior patterns. The decontamination standards must be attained before local health jurisdictions (LHJs) can clear a residence for reoccupancy.

The standards were developed to address chemicals associated with the manufacture of methamphetamine, since these types of labs represent the majority of illegal drug labs in Washington State. As new illegal drug manufacturing methods and processes are developed, and different chemicals and byproducts are produced, additional standards may need to be incorporated in the regulation. Although a large variety of chemicals may be found at illegal methamphetamine manufacturing labs, DOH selected four of primary concern commonly associated with these types of labs; methamphetamine, total volatile organic compounds (VOCs), lead, and mercury. The decontamination standards are listed in section 541 of Chapter 246-205 WAC, and are as follows:

Chemical	Type of sample	Decontamination standard
Methamphetamine ⁽¹⁾	Surface area wipe	$\leq 0.1 \mu\text{g}/100\text{cm}^2$
Total Volatile Organic Compounds (VOCs) ⁽²⁾	Air	1 ppm
Lead (total) ⁽³⁾	Surface area wipe	$\leq 20 \mu\text{g}/\text{ft}^2$
Mercury ⁽⁴⁾	Air	$\leq 50 \text{ng}/\text{m}^3$

(1) Units are in micrograms of methamphetamine per one hundred square centimeters of surface area.

(2) Units are in parts per million.

(3) Units are in micrograms of lead per square foot of surface area.

(4) Units are in nanograms of mercury per cubic meter of air.
(one thousand nanograms equals one microgram).

Methamphetamine Standard

DOH reviewed the scientific literature on the health effects of methamphetamine and other amphetamine-related drugs. These studies focused primarily on prenatal exposure during pregnancy in humans and on high dose studies in animals. Studies on the health effects associated with chronic exposures to low concentrations of methamphetamine are not available.

Human and Animal studies

The effect of methamphetamine on the development of the nervous system is known from studies of fetuses exposed in the womb of female methamphetamine users. No studies have evaluated the health effects of children directly exposed to methamphetamine in illegal drug labs. The studies have shown significantly lower intelligence testing scores compared to infants not exposed in the womb, and that those exposed may be at risk later in life for subtle neurological abnormalities.² Numerous physical malformations resulting from prenatal exposure to amphetamine and methamphetamine have been reported including cleft lip, cardiac defects, low birth weight, reduced head circumference, biliary atresia, cerebral hemorrhage, low body fat, systolic murmur, and undescended testes.³

Numerous animal studies have been conducted to evaluate the health effects of methamphetamine exposure. Studies conducted on rats and monkeys have demonstrated the adverse effects of methamphetamine on the central nervous system, selective reductions in brain serotonin and dopamine concentrations, and neurological damage.⁴ In a 1998 study, rats exposed to methamphetamine were observed to have increased occurrences of retinal hemorrhages compared to control groups.⁵ In another 1998 study conducted on baboons, methamphetamine produced long-term decreases on brain dopamine axonal markers at all doses tested.⁶ In a 1994 rat study, methamphetamine-treated groups exhibited reduced locomotor activity compared to untreated groups.⁷ A 2003 rat study supported the position that neonatally methamphetamine-exposed animals may exhibit hypoactivity.⁸ In other studies, reduced body weights were observed in rats exposed to methamphetamine.

DOH's Approach

A quantitative exposure/risk assessment was not conducted during development of the methamphetamine standard, since studies about the potential long-term health risks associated with chronic, low-level exposure to methamphetamine are not available, controlled human exposure studies are unlikely for ethical reasons, and available toxicity data are limited. Washington State adopted a preventative approach that recognized the potential of the magnitude of childhood exposures and associated health risks because of the number of children found living in residential CDLs. Because of the extent of the CDL problem in Washington State, DOH did not want to wait for the derivation of methamphetamine-specific toxicity factors and the completion of a quantitative risk assessment before establishing a decontamination standard for methamphetamine. DOH chose to adopt a feasibility-based approach when establishing the current methamphetamine standard. This approach was based on the following primary considerations:

1. Analytical limitations and;
2. A cleanup level to which methamphetamine could reasonably be achieved.

Currently, other states, private researchers, and the National Alliance for Model State Drug Laws are working towards the assessment of appropriate indicator chemicals and the development of health-based decontamination standards that state and local drug lab programs can choose to adopt when assessing and remediating illegal drug labs. In addition, federal legislation is being introduced to address site assessment and remediation issues, and to identify new methamphetamine detection technologies, research needs, and other data gaps. DOH will continue to use its current methamphetamine decontamination standard until additional research demonstrates the appropriateness of a different standard.

In February 2005, the Colorado Department of Public Health (CDPH) prepared a paper that attempted to correlate existing states' detection-based cleanup standards for methamphetamine to known health-effect-based concentrations.⁹ In doing so, CDPH estimated residential methamphetamine exposures using standard exposure assumptions. Using these standard exposure assumptions, the estimated dose for an infant exposed to 0.1ug/100 cm² methamphetamine (the Washington State decontamination standard) was 50 times lower than the most protective reference dose derived by CDPH. The reference dose was based on reproductive toxicity. What this indicates is that the current Washington State methamphetamine decontamination standard appears to be well below levels that would be expected to cause adverse noncancer health effects, such as reproductive toxicity, for persons chronically exposed to methamphetamine at the 0.1 ug/100cm² decontamination standard.

Total Volatile Organic Compounds (VOC) Standard

Volatile Organic Compounds (VOCs) were recognized as being common to all CDL sites. VOCs include many different chemical compounds, a number of which are used in the manufacture of illegal drugs including toluene, acetone, methanol, petroleum distillates, and ethers, among others. DOH believed it was most practical and cost-effective to test for total VOCs, rather than require testing for dozens of individual VOCs in air. Using the portable photoionization detector (PID), total VOCs can routinely be detected at the 1 part per million (ppm) level.

When establishing the VOC standard, DOH also recognized that by the time the remediated residences are reoccupied, levels of VOCs are expected to be lower as a result of the removal of the primary sources of the VOCs, such as the bulk chemicals and porous household materials. Additionally, volatilization of residual VOCs to significantly lower levels will likely have occurred. DOH also recognized the fact that studies have documented the presence of "background" levels of VOCs in ambient and indoor air.¹⁰ Sources of these background VOCs include industrial and automobile emissions, consumer products, and building materials, among others. For this reason, it was not realistic for DOH to require VOC levels to be zero or below reasonable background levels.

Lead (Pb) Standard

DOH recommends testing for lead only at residences where it is evident that the amalgam (P2P) method or other methods involving lead were used. Currently, methods involving lead are rarely seen at drug lab sites in Washington State.

The health effects from chronic exposure to lead, and its particular health implications for fetuses, infants, and toddlers are well documented. Young children and the developing fetus are more vulnerable to lead poisoning than adults. Lead can affect almost every organ and system in the body, the most sensitive being the central nervous system. Lead also damages kidneys and the reproductive system.¹¹

DOH considered existing health and toxicity information when establishing the decontamination standard for lead. DOH also considered the presence of background levels of lead often found in older homes, since lead-based paint is frequently present in such homes where many illegal drug labs are found. The current 20 micrograms per square foot (20 µg/ft²) lead wipe standard is one half of the U.S. Department of Housing and Urban Development's (HUD) current floor wipe clearance standard and one half of the U.S. Environmental Protection Agency's (EPA) lead hazard standard. DOH also considered the growing body of scientific data that indicates the blood lead threshold for adverse health effects, including nervous system effects, is lower than the CDC's current 10 micrograms of lead per deciliter of blood lead level of concern. Given this data, DOH believed it was prudent to establish a lower lead wipe standard than the current HUD and EPA standards.

Mercury (Hg) Standard

DOH recommends testing for mercury only at residences where it is evident that the amalgam (P2P) method, or other methods involving mercury were used. Currently, methods involving mercury are rarely seen at drug lab sites in Washington state.

Exposure to mercury can harm the brain, heart, kidneys, lungs, and immune system of people of all ages. Short-term exposure to high levels of metallic mercury vapors may cause lung damage, increases in blood pressure or heart rate, skin rashes, and eye irritation. Inhalation of mercury vapor is particularly harmful. Fetuses and young children are more sensitive to mercury's health effects than adults. Mercury's effects upon the fetus include brain damage, mental retardation, incoordination, blindness, seizures, and inability to speak. A nursing infant can also be exposed to mercury from breast milk. High levels of mercury in the bloodstream of the fetus and young child may harm the developing nervous system.¹²

The mercury decontamination standard is more protective than current Washington State Department of Ecology and federal health/risk-based screening levels for mercury. Because of the severity of health effects associated with mercury exposure, DOH chose to use the lowest measurable amount using standard sampling and analytical methods as the basis of the standard. DOH also established a lower mercury standard than existing state and federal health-based screening levels to account for cumulative exposures from other sources of mercury, such as from diet, air, dental amalgams, and some commercial paints. For example, ambient background concentrations of mercury in air have been documented, and are reported to average approximately 10-20 ng/m³, with higher

concentrations in industrialized areas.¹³ To account for these background exposures or “body burdens”, DOH set the mercury decontamination standard below existing health-based screening levels.

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AB 1078 HSC 25400.10-45

Methamphetamine Contaminated
Property Cleanup Act of 2005



Article 1, Findings & Definitions

- *Designated Agency: designated by LHO*
 - *CUPA*
 - *Fire or Environmental Health*
 - *Local Agency enforcing Housing Law*
- *PSA Workplan*
- *PSA Report*
- *Property Owner (excludes mobile homes)*
 - *Hopefully to be corrected by AB 2587*

Article 2, Establishment of Remediation and Re-occupancy Standards

- 25400.16: Standards for safe human occupancy
 - 20 $\mu\text{g}/\text{ft}^2$ lead
 - 50 ng/m^3 Hg
 - 0.1 $\mu\text{g}/100\text{ cm}^2$ meth
- These levels change when OEHHA adopts a health-based target remediation standard for meth

Other State Standards

State Cleanup Levels for Meth Labs								
State	Meth	Hg	Pb	VOC	Cor	Red P	Iodine	Septic
Sac Co	0.1 $\mu\text{g}/100\text{ cm}^2$	50 ng/m^3	20 $\mu\text{g}/\text{ft}^2$					
AK	0.1 $\mu\text{g}/100\text{ cm}^2$	50 ng/m^3	2 $\mu\text{g}/100\text{ cm}^2$	1 ppm				
Az	0.1 $\mu\text{g}/100\text{ cm}^2$	3 $\mu\text{g}/\text{m}^3$	4.3 $\mu\text{g}/100\text{ cm}^2$	1 ppm	pH 6-8	stain	stain	<700 mg/l acetone
Arkansas	0.5 $\mu\text{g}/\text{ft}^2$							
CA	0.1 $\mu\text{g}/100\text{ cm}^2$	50 ng/m^3	20 $\mu\text{g}/\text{ft}^2$					
CO	0.5 $\mu\text{g}/100\text{ cm}^2$	1 $\mu\text{g}/\text{m}^3$	40 $\mu\text{g}/\text{ft}^2$				22 $\mu\text{g}/100\text{ cm}^2$	
MI	0.5 $\mu\text{g}/100\text{ cm}^2$	1 $\mu\text{g}/\text{m}^3$	40 $\mu\text{g}/\text{ft}^2$				22 $\mu\text{g}/100\text{ cm}^2$	
NC	0.1 $\mu\text{g}/100\text{ cm}^2$	0.3 $\mu\text{g}/\text{m}^3$	4.3 $\mu\text{g}/100\text{ cm}^2$					
OR	0.5 $\mu\text{g}/\text{ft}^2$	50 ng/ft^2	10 $\mu\text{g}/\text{ft}^2$	1 ppm	pH 2-12.5			
SD	0.1 $\mu\text{g}/100\text{ cm}^2$	50 ng/m^3	20 $\mu\text{g}/\text{ft}^2$	1 ppm	pH 6-8	stain	stain	
TN	0.1 $\mu\text{g}/100\text{ cm}^2$	50 ng/m^3	40 $\mu\text{g}/\text{ft}^2$	1 ppm				
UT	0.1 $\mu\text{g}/100\text{ cm}^2$	50 ng/m^3	20 $\mu\text{g}/\text{ft}^2$					
WA	0.1 $\mu\text{g}/100\text{ cm}^2$	50 ng/m^3	20 $\mu\text{g}/\text{ft}^2$	1 ppm				

Article 3: LHO Responsibilities

- *25400.17 :*
 - *City/County will comply with the uniform regulations of this chapter.*
 - *LHO can delegate*
 - *If meth lab activity has taken place, LHO shall assume that meth manufacture has led to some degree of chemical contamination and take action pursuant to this chapter*

25400.18

- *W/in 48 hrs of notification by law enforcement, LHO post notice*
 - *"Warning"*
 - *statement meth lab seized there*
 - *date of seizure*
 - *address/location*
 - *name and contact # of agency posting property*
 - *statement hazardous chemicals/waste may be present*
 - *unlawful to enter until advised it is safe to do so*
 - *statement that anyone destroying the notice is subject to civil penalty up to \$5K*
 - *statement that anyone who violates the notice is subject to civil penalty up to \$5K*

25400.19

- *W/in 5 working days of notice by law enforcement, LHO shall inspect the property, including evidence of chemical use, staining, release, spillage. LHO may request copies of law enforcement reports or HW manifests to evaluate the following:*

- length of time property used for manufacture or storage*
- extent of the property actually used*
- chemical process involved*
- chemicals that were removed*
- location of the manufacture/storage relative to habitable areas*

25400.20

- Upon completion of inspection, LHO determines if contamination present. If so, see 25400.22. If not contaminated, LHO has 3 days to remove posted notices and prepare documentation that states:
 - findings and conclusions
 - name of property owner
 - parcel id
- within 10 d of non-contamination determination, LHO shall send a copy to the property owner and the local agency responsible for housing law enforcement.

25400.22

- (a) W/in 10 working days of determining contamination, LHO shall:
 - (1) if real property, record with county recorder a lien on the property:
 - o the name of the agency
 - o the date on which the property is determined to be contaminated
 - o the legal description and assessor's parcel #
 - o record owner of property
 - o amount of lien, either \$200 or costs incurred by LHO, including inspection and recorders fee
 - (2) Issue an order to occupants of the property, outstanding persons and county recorders office that occupancy is prohibited

- (c) Force of a judgment lien. Cannot be removed until
 - o *Property owner satisfies the lien and LHO issues release in 25400.27*
 - o *Lien otherwise released under applicable law**
- (d) Lien issued by certified mail or in person to occupants and owner*
- (e) If whereabouts of persons unknown,....*
- (f) LHO shall mail copy to anyone with interest in property*

- *Order shall include:*
 - *Description of property*
 - *Parcel #*
 - *Vehicle id# if applicable*
 - *Description of LHOs course of action*
 - *Specification of penalties for non-compliance*
 - *Prohibition on use of portions of property contaminated*
 - *Description of measures property owner will have to take to decontaminate the property*
 - *Indication of the potential health hazards involved*
 - *Statement that the property owner who fails to provide disclosure is subject to \$5K penalties*

- (h) LHO provide copy to agency responsible for house law enforcement*
- (i) LHO to post order in conspicuous place on property within 1 working day*

Article 4: Site Assessment and Remediation

- 25400.25
 - Property owner/occupant shall immediately vacate property*
 - Within 30 days, PO shall demonstrate that a drug lab remediation firms has been retained*

- 25400.26

- PO shall use authorized contractor, retain documentation for 3 years after place is considered habitable.
- PO/Contractor shall submit PSA Work plan within 30 days after being retained
- Within 10 working days of PSA Work plan submitted, LHO shall review to determine compliance with 25400.35. If deficiencies, LHO shall notify PO within 15 days of date plan submitted. If approved, LHO shall notify PO within 15 days.
- Once PSA done, PO/Contractor shall prepare PSA Report (25400.37) and submit.
- If PSA report indicates no contamination requiring remediation, LHO acts (25400.27)
- Once PSA Work plan approved by LHO, must be completed w/in 90 days.

- 25400.27

- If LHO determines property has been remediated, LHO shall issue “no further action” determination. W/in 10 working days of the determination or receiving payment for lien (whichever is later), LHO shall:
 - Release the lien; the release shall specify:
 - o Name of agency who filed lien
 - o Recording date of release
 - o Legal description and APN
 - o Record owner of property
 - o Recording instrument, or book & page of the lien being released
 - Send a copy of the release stating the property is remediated, does not violate human occupancy standards to the PO, Local Housing Agency and recipients in 25400.22

- 25400.28

- *Until PO receives no further action notice from LHO, PO shall:*
- *Notify prospective buyers of pending order and provide copy. Prospective buyer shall acknowledge receipt of order in writing.*
- *Provide written notice to tenants who have applied to rent. They shall provide written receipt before signing of lease. Notice shall be attached to lease.*

Article 5. Remediation of Contaminated Property by a City or County

- 25400.30

- *If PO doesn't comply, local govt can take action to either remediate or get court order to force PO to cleanup. If LHO can't find PO within 10 days, govt may remediate. If govt remediates, PO is liable for all costs, including, but not limited to:*
 - *Posting and securing the property*
 - *Notification of affected people*
 - *Actual expenses related to recovery of cost, lab fees, cleanup services, removal costs, admin and filing fees*
- *If PO doesn't pay up, govt may place nuisance abatement lien on property*

Article 6: Requirements for Property Assessment and Cleanup

- 25400.35
 - LHO shall establish a written plan for conducting the remediation, including procedures for PSA Work plan preparation, conducting the PSA, preparation of the PSA Report

- 25400.36
 - PSA Work plan shall include:
 - Physical description of the property
 - Summary of the info from law enforcement, LHO including discussion of the relevance to the contamination including areas suspect of contamination
 - o Duration of lab operation and # batches cooked
 - o Hazardous chemicals manufactured
 - o Recipes and methods used
 - o Chemicals/equipment found by location
 - o Location of contaminated cooking/storage areas
 - o Visual assessment of severity of contamination inside and outside of the structure
 - o Assessment of contamination in adjacent rooms, structures
 - o Disposal methods observed at or near the site, including dumping, burning, burial, venting or drain disposal
 - o Comparison of the chemical on the manifest with known methods of mfg
 - o Determination whether method indicated the use of mercury or lead, including lead acetate, mercuric chloride, mercuric nitrate

– Description of the areas to be sampled and basis for the selection. Indicate decision process used to determine where NOT to sample. PSA WP include primary and secondary areas of concern

- Primary areas include:*
 - o Obvious staining*
 - o Processing/cooking area; may include floors, walls, ceilings, glassware, working surfaces, furniture, carpeting, draperies, plumbing fixtures and drains, HVAC vents*
 - o Any disposal area including sinks, toilets, bathtubs, plumbing traps and floor drains, vents, vent fans, chimney flues. Outdoor areas contaminated by burning or dumping on soil, surface water, groundwater, sewer, septic and cesspools.*
 - o Chemical storage areas contaminated by leaks, spills*

- Secondary areas include:*
 - o Location where contamination may have migrated, e.g. hallways, high traffic areas*
 - o Common areas in multiple dwellings and adjacent apts or rooms including floors, walls, ceilings, furniture, carpet, lights, blinds, draperies*
 - o Common ventilation or plumbing systems in hotels and multiple dwellings*

– Sampling protocols, analytical methods and labs used with relevant accreditations

– Description of areas and items that will be remediated in lieu of sampling, if any

- 25400.37
 - *After PSA completed, a PSA Report shall be prepared and submitted to LHO. PSA Report shall include:*
 - *Location of the site, street add and mailing address of property, owner of record and mailing address, legal description and clear directions for locating the property*
 - *Site map w/diagram of contaminated property, including*
 - *Floor plan of affected buildings*
 - *Local drinking water wells and nearby streams or surface water potentially affected*
 - *Location of damage and contamination*
 - *Location of sampling points used in PSA, keyed to sampling results and remediation recommendations*

- *Description of the sampling and analytical protocols used*
- *Description of sampling results*
- *Info regarding the background samples and results obtained*
- *Specific recommendations, including methods of remedial actions to meet human occupancy std*
- *Plan for post remediation site assessment, including specific sampling requirements and methodologies an locations at which samples are to be obtained*

- 25400.38
 - *PSA WP and PSA Report shall be signed, notarized by contactor responsible for completion of the PSA and by a CIH for sufficiency and completeness*
- 25400.40
 - *A person shall not perform PSA or remediation work until person has completed:*
 - 5192 40-hr training
 - annual refresher
 - additional requirements by LHO
 - training shall be certified by paragraph 6 of 5192e
 - *instructor certifies they completed the training*

Other States Training Requirements

- Arizona
 - ***In addition to 40 hr, and 8 hr training***
 - *AHERA and Lead certificate (Supervisor)*
 - *Attend two 8 hr courses on clan lab cleanup within 1st year*
 - *Attend 2 hr Refresher course on clan lab cleanup every year thereafter*
- Oregon
 - ***Sampling personnel***
 - *CIH or BS in Science working under OSHA, EPA or Industrial Hygiene firm*
 - ***Contractors and personnel***
 - *State mandated training (pass test w/70% or greater)*
 - *Annual refresher course*
- Washington
 - *2 day course for workers, additional day course for supervisors*
 - *Annual refresher*

Article 7. Enforcement and Liability

- 25400.45
 - *PO who does not provide a notice or disclosure subject to \$5K civil penalty AND full cost of all harm to public health or environment*
 - *Person who violates this chapter prohibiting occupancy is subject to \$5K civil penalty.*

- 25400.46
 - *PO shall pay all the following if property found contaminated:*
 - *cost of testing*
 - *cost of maintaining records regarding the property*
 - *cost of remediating the property*
 - *actual cost incurred by LHO from enforcement of this chapter and oversight of the implementation of the PSA WP and PSA report*
 - *A person who conducts meth activity on the property and who is not the owner of that property is liable for and shall reimburse the owner of the property for any cost the PO incurs above*

HEALTH AND SAFETY CODE

SECTION 25400.10-25400.12

25400.10. (a) The Legislature finds and declares all of the following:

(1) Methamphetamine use and production are growing throughout the state. Properties may be contaminated by hazardous chemicals used or produced in the manufacture of methamphetamine where those chemicals remain and where the contamination has not been remediated.

(2) Initial cleanup actions may be limited to the removal of bulk hazardous materials and associated glassware that pose an immediate threat to public health and the environment. Where methamphetamine production has occurred, significant levels of contamination may be found throughout residential properties if the contamination is not remediated.

(3) Once methamphetamine laboratories have been closed, the public may be harmed by the materials and residues that remain.

(4) There is no statewide standardization of standards for determining when a site of a closed methamphetamine laboratory has been successfully remediated.

(b) This chapter shall be known, and may be cited as, the "Methamphetamine Contaminated Property Cleanup Act of 2005."

25400.11. For purposes of this chapter, the following definitions shall apply:

(a) "Authorized contractor" means a person who has been trained or received other qualifications pursuant to Section 25400.40.

(b) "Contaminated" or "contamination" means property polluted by a hazardous chemical related to methamphetamine laboratory activities.

(c) "Controlled substance" has the same meaning as defined in Section 11007.

(d) "Decontamination" means the process of reducing the level of a known contaminant to a level that is deemed safe for human reoccupancy, as established pursuant to Section 25400.16 using currently available methods and processes.

(e) "Department" means the Department of Toxic Substances Control.

(f) "Designated local agency" means a city, county, or city and county agency designated by the local health officer to carry out all, or any portion of, responsibilities assigned to the local health officer as specified by this chapter. The local health officer may authorize any of the following to serve as a designated local agency:

(1) The Certified Unified Program Agency or CUPA as certified pursuant to Chapter 6.11 (commencing with Section 25404), except in a jurisdiction where the state is acting as the CUPA pursuant to subdivision (f) of Section 25404.3.

(2) The fire department or environmental health department.

(3) The local agency responsible for enforcement of the State Housing Law (Part 1.5 (commencing with Section 17910) of Division 13).

(g) "Disposal of contaminated property" means the disposal of property that is a hazardous waste in accordance with Chapter 6.5

(commencing with Section 25100).

(h) "Hazardous chemical" means a chemical that is determined by the local health officer to be toxic, carcinogenic, explosive, corrosive, or flammable that was used in the manufacture or storage of methamphetamine that is prohibited by Section 11383.

(i) "Illegal methamphetamine manufacturing or storage site" or "site" means property where a person manufactures methamphetamine or stores methamphetamine or a hazardous chemical used in connection with the manufacturing or storage and in violation of Section 11383.

(j) "Local health officer" means a county health officer, a city health officer, or an authorized representative of that local health officer.

(k) "Methamphetamine laboratory activity" means the illegal manufacturing or storage of methamphetamine.

(l) "Office" means the Office of Environmental Health Hazard Assessment.

(m) "Posting" means attaching a written or printed announcement conspicuously on property that is determined to be contaminated by a methamphetamine laboratory activity or the storage of methamphetamine or a hazardous chemical.

(n) "Preliminary site assessment work plan" or "PSA work plan" means a plan to conduct activities to determine the extent and level of contamination of an illegal methamphetamine manufacturing or storage site and that is prepared in accordance with the requirements of Section 25400.36.

(o) "Preliminary site assessment" or "PSA" means the activities taken to determine the extent and level of contamination of an illegal methamphetamine manufacturing or storage site that are conducted in accordance with an approved PSA work plan.

(p) "Preliminary site assessment report" or "PSA report" means a determination that the levels of contamination at an illegal methamphetamine manufacturing or storage site require remediation, including a recommendation for the remedial actions required for the site to meet human occupancy standards, and that is prepared in accordance with Section 25400.37.

(q) (1) "Property" means any parcel of land, structure, or part of a structure where the manufacture of methamphetamine or storage of methamphetamine or a hazardous chemical that is prohibited by Section 11383, occurred, including, manufactured housing and mobilehomes.

(2) Notwithstanding paragraph (1), "property" does not include any of the following:

(A) A mobilehome park or manufactured housing park, as defined, respectively, in Section 798.4 or 798.6 of the Civil Code.

(B) A manufactured housing community, as defined in Section 18801.

(C) A mobilehome park or park, as defined, respectively, in Section 18214 or 18214.5.

(D) A mobilehome or manufactured housing located in a mobilehome park, manufactured housing park, or manufactured housing community, or park, as defined in this paragraph.

(3) Paragraph (2) shall become inoperative on January 1, 2008, unless a later enacted statute that is enacted before January 1, 2008, deletes or extends that date.

(r) (1) "Property owner" means a person owning property by reason of obtaining it by purchase, exchange, gift, lease, inheritance, or legal action.

(2) Notwithstanding paragraph (1), "property owner" does not include any of the following:

(A) The manager or owner of a mobilehome park, manufactured

housing park, manufactured housing community, or park, as defined in paragraph (2) of subdivision (q).

(B) An agent or representative authorized to act on behalf of a manager or owner specified in subparagraph (A).

(C) A person who owns a mobilehome located in a mobilehome park, manufactured housing park, manufactured housing community, or park.

(3) Paragraph (2) shall become inoperative on January 1, 2008, unless a later enacted statute that is enacted before January 1, 2008, deletes or extends that date.

(s) "Storage site" means any property used for the storage of a hazardous chemical or methamphetamine that is prohibited by Section 11383.

(t) "Warning" means a sign posted by the local health officer conspicuously on property where methamphetamine was manufactured or stored, informing occupants that hazardous chemicals exist on the premises and that entry is unsafe.

25400.12. Any term not defined expressly by this article shall have the same meaning as defined in Chapter 6.8 (commencing with Section 25300).

HEALTH AND SAFETY CODE

SECTION 25400.16

25400.16. (a) Except as provided in subdivision (c), property contaminated by methamphetamine laboratory activity is safe for human occupancy for purposes of this chapter only if the level of methamphetamine on any indoor surface is less than, or equal to, 0.1 micrograms per 100 square centimeters.

(b) Except as provided in subdivision (c), if property is contaminated by methamphetamine laboratory activity that included the use of lead or mercury compounds, in addition to the requirements of subdivision (a), property is safe for human occupancy for purposes of this chapter only if both of the following standards are met with regard to that property:

(1) The total level of lead is less than, or equal to, 20 micrograms per square foot.

(2) The level of mercury is less than, or equal to, 50 nanograms per cubic meter in air.

(c) Subdivisions (a) and (b) shall become inoperative on the effective date that the department, in consultation with the office, adopts a health-based target remediation standard for methamphetamine to determine when a property contaminated by methamphetamine laboratory activity only is safe for human occupancy, in which case any reference in this chapter to a human-occupancy standard specified in this section shall mean only the health-based target remediation standard for methamphetamine adopted by the department.

(d) The department shall conduct two public workshops, one in northern California and one in southern California, for the purpose of discussing with affected stakeholders the actions needed to further implement the goals of this chapter. The department may include, as topics for discussion, possible funding sources for local governments for the purposes of implementing this chapter, whether this chapter should be revised to address the contamination of properties by the illegal manufacturing of other controlled substances, and the results of the Illegal Drug Lab Risk Reduction Project conducted by the California Environmental Protection Agency pursuant to its adopted environmental justice action plan.

HEALTH AND SAFETY CODE

SECTION 25400.17-25400.22

25400.17. (a) Notwithstanding any other provision of law, a city, county, or city and county shall comply with the uniform regulations and standards established pursuant to this chapter.

(b) A local health officer may delegate all or part of the duties specified in this chapter to a designated local agency.

(c) If a methamphetamine laboratory activity has taken place at a property, the local health officer shall assume that the methamphetamine manufacturing process has led to some degree of chemical contamination and shall take action pursuant to this chapter.

25400.18. Within 48 hours after receiving notification from a law enforcement agency of potential contamination of property by a methamphetamine laboratory activity, the local health officer shall post a written notice in a prominent location on the premises of the property. At a minimum, the notice shall include all of the following information:

(a) The word "WARNING" in large bold type at the top and bottom of the notice.

(b) A statement that a methamphetamine laboratory was seized on or inside the property.

(c) The date of the seizure.

(d) The address or location of the property including the identification of any dwelling unit, room number, apartment number, or mobilehome or manufactured home identification number.

(e) The name and contact telephone number of the agency posting the property.

(f) A statement specifying that hazardous substances, toxic chemicals, or other hazardous waste products may have been present and may remain on or inside the property.

(g) A statement that it is unlawful for an unauthorized person to enter the contaminated portion of the property until advised that it is safe to do so by the local health officer or designated local agency.

(h) A statement that a person disturbing or destroying the posted notice is subject to a civil penalty in an amount of up to five thousand dollars (\$5,000).

(i) A statement that a person violating the posted notice is subject to a civil penalty in an amount of up to five thousand dollars (\$5,000).

25400.19. Within five working days after receiving a notification from a law enforcement agency of known or suspected contamination of a property by a methamphetamine laboratory activity, or upon notification from the property owner, the local health officer shall inspect the property pursuant to this section.

(a) The property inspection shall include, but not be limited to, obtaining evidence of hazardous chemical use or storage and documentation of evidence of any chemical stains, cooking activity

and release or spillage of hazardous chemicals used to manufacture methamphetamine.

(b) In conducting an inspection pursuant to this section, the local health officer may request copies of any law enforcement reports, forensic chemist reports, and any hazardous waste manifests, to evaluate all of the following:

(1) The length of time the property was used as an illegal methamphetamine manufacturing or storage site.

(2) The extent of the property actually used and contaminated in the manufacture of methamphetamine or the storage of methamphetamine or a hazardous chemical.

(3) The chemical process that was involved in the illegal methamphetamine manufacturing.

(4) The chemicals that were removed from the scene.

(5) The location of the illegal methamphetamine manufacturing or storage site in relation to the habitable areas of the property.

25400.20. (a) Upon completing an inspection pursuant to Section 25400.19, the local health officer shall immediately determine whether the property is contaminated.

(b) If the local health officer determines the property is contaminated, the local health officer shall take the actions specified in Section 25400.22.

(c) If the local health officer determines that the property is not contaminated, within three working days after making that determination, the local health officer shall remove all notices posted pursuant to Section 25400.18 and prepare a written documentation of this determination, which shall include all of the following:

(1) Findings and conclusions.

(2) Name of the property owner, and, if applicable, mailing and street address of the property, or vehicle identification number, if applicable.

(3) Parcel identification number, if applicable.

(d) Within 10 working days after preparing a written documentation of the determination made pursuant to subdivision (c) that the property is not contaminated, the local health officer shall send a copy of the documentation to the property owner, and to the local agency responsible for enforcement of the State Housing Law (Part 1.5 (commencing with Section 17910) of Division 13).

25400.22. (a) No later than 10 working days after the date when a local health officer determines that property is contaminated pursuant to subdivision (b) of Section 25400.20, the local health officer shall do both of the following:

(1) If the property is real property, record with the county recorder a lien on the property. The lien shall specify all of the following:

(A) The name of the agency on whose behalf the lien is imposed.

(B) The date on which the property is determined to be contaminated.

(C) The legal description and the assessor's parcel number.

(D) The record owner of the property.

(E) The amount of the lien, which shall be the greater of two hundred dollars (\$200) or the costs incurred by the local health

officer in compliance with this chapter, including, but not limited to, the cost of inspection performed pursuant to Section 25400.20 and the county recorder's fee.

(2) Issue to persons specified in subdivisions (d), (e), and (f) an order prohibiting the use or occupancy of the property.

(b) The county recorder's fees for recording and indexing documents provided for in this subdivision shall be in the amount specified in Article 5 (commencing with Section 27360) of Chapter 6 of Part 3 of Title 3 of the Government Code.

(c) The lien recorded pursuant to subdivision (a) shall have the force, effect, and priority of a judgment lien. The local health officer shall not release the lien until either of the following occurs:

(1) The property owner satisfies the lien and the local health officer issues a release pursuant to Section 25400.27.

(2) The lien is otherwise released under applicable law.

(d) Except as otherwise specified in this section, an order issued pursuant to this section shall be served, either personally or by certified mail, return receipt requested, to all known occupants of the property and to all persons who have an interest in the property, as contained in the records of the recorder's office of the county in which the property is located.

(e) If the whereabouts of the person described in subdivision (d) are unknown and cannot be ascertained by the local health officer, in the exercise of reasonable diligence, and the local health officer makes an affidavit to that effect, the local health officer shall serve the order by personal service or by mailing a copy of the order by certified mail, postage prepaid, return receipt requested, as follows:

(1) The order shall be served to each person at the address appearing on the last equalized tax assessment roll of the county where the property is located, and to all occupants of the affected unit.

(2) The order shall be served at the address contained in the record of the county recorder.

(f) The local health officer shall also mail a copy of the order required by this section to the address of each person or party having a recorded right, title, estate, lien, or interest in the property and to the association of a common interest development, as defined in Section 1351 of the Civil Code.

(g) The order issued pursuant to this section shall include all of the following information:

(1) A description of the property.

(2) The parcel identification number, if applicable.

(3) The vehicle identification number, if applicable.

(4) A description of the local health officer's intended course of action.

(5) A specification of the penalties for noncompliance with the order.

(6) A prohibition on the use of all or portions of the property that are contaminated.

(7) A description of the measures the property owner is required to take to decontaminate the property.

(8) An indication of the potential health hazards involved.

(9) A statement that a property owner who fails to provide a notice or disclosure that is required by this chapter is subject to a civil penalty of up to five thousand dollars (\$5,000).

(h) The local health officer shall provide a copy of the order to the local building or code enforcement agency or other appropriate agency responsible for the enforcement of the State Housing Law (Part

1.5 (commencing with Section 17910) of Division 13).

(i) The local health officer shall post the order in a conspicuous place on the property within one working day of the date that the order is issued.

HEALTH AND SAFETY CODE

SECTION 25400.25-25400.28

25400.25. (a) A property owner who receives an order issued pursuant to Section 25400.22 that property owned by that person is contaminated by a methamphetamine laboratory activity, a property owner who owns property that is the subject of an order posted pursuant to subdivision(i) of Section 25400.22, and a person occupying property that is the subject of the order, shall immediately vacate the affected unit that is determined to be in a hazardous zone by the local health officer.

(b) No later than 30 days after receipt of an order issued pursuant to Section 25400.22, the property owner shall demonstrate to the local health officer that the property owner has retained a methamphetamine laboratory site remediation firm that is an authorized contractor to remediate the contamination caused by the methamphetamine laboratory activity.

25400.26. (a) A property owner who receives an order issued pursuant to Section 25400.22 that property owned by that person is contaminated by a methamphetamine laboratory activity, or a property owner who owns property that is the subject of an order posted pursuant to subdivision (i) of Section 25400.22, shall utilize the services of an authorized contractor to remediate the contamination caused by the methamphetamine laboratory activity, in accordance with the procedures specified in this section.

(b) The property owner and the local health officer shall keep all required records documenting decontamination procedures for three years following certification that the property is habitable.

(c) The property owner or the property owner's authorized contractor shall submit a preliminary site assessment work plan to the local health officer for review no later than 30 days after demonstrating to the local health officer that an authorized contractor has been retained to remediate the contamination caused by the methamphetamine laboratory activity.

(d) (1) No later than 10 working days after the date the PSA work plan is submitted by the property owner, the local health officer shall review the PSA work plan to determine whether the PSA work plan complies with this chapter, including the procedures established pursuant to Section 25400.35.

(2) If there are any deficiencies in a submitted PSA work plan, the local health officer shall inform the property owner and authorized contractor, in writing, of those deficiencies no later than 15 days of the date that the PSA work plan was submitted to the local health officer.

(3) If the local health officer approves the plan, the local health officer shall inform in writing, the property owner and authorized contractor no later than 15 days of the date that the PSA work plan was submitted to the local health officer.

(e) (1) After a PSA is completed in accordance with the PSA work plan, the property owner and authorized contractor shall prepare a PSA report in accordance with Section 25400.37 and submit the PSA report to the local health officer.

(2) If after a PSA is completed in accordance with a PSA work

plan, and the local health officer, upon review of the PSA report, determines there is no level of contamination at a site that requires remediation, the local health officer shall take the actions specified in Section 25400.27.

(f) The property owner shall complete remediation of all applicable portions of the contaminated property in accordance with this chapter no later than 90 days after the date that the PSA work plan has been approved by the local health officer. The local health officer may extend the date for completion of the remediation, in writing.

25400.27. (a) If a local health officer determines that property that has been the subject of a PSA report has been remediated in accordance with this chapter, or if the local health officer makes the determination specified in paragraph (2) of subdivision (e) of Section 25400.26, the local health officer shall issue a no further action determination.

(b) For real property, within 10 working days of the date of making the determination or of receiving payment for the amount of the lien recorded pursuant to paragraph (1) of subdivision (a) of Section 25400.22, whichever is later, the local officer shall do both of the following:

(1) Release the lien recorded with the county recorder. The release shall specify all of the following:

- (A) The name of the agency on whose behalf the lien is imposed.
- (B) The recording date of the lien being released.
- (C) The legal description and the assessor's parcel number.
- (D) The record owner of the property.

(E) The recording instrument, or book and page, of the lien being released.

(2) Send a copy of the release stating that the property was remediated in accordance with this chapter, does not violate the standard for human occupancy established pursuant to this chapter, and is habitable, to the property owner, local agency responsible for the enforcement of the State Housing Law (Part 1.5 (commencing with Section 17910) of Division 13), and all recipients pursuant to this section and Section 25400.22.

25400.28. Until a property owner subject to Section 25400.25 receives a notice from a local health officer pursuant to Section 25400.27 that the property identified in an order requires no further action, all of the following shall apply to that property:

(a) Except as otherwise required in Section 1102.3 or 1102.3a of the Civil Code, the property owner shall notify the prospective buyer in writing of the pending order, and provide the prospective buyer with a copy of the pending order. The prospective buyer shall acknowledge, in writing, the receipt of a copy of the pending order.

(b) The property owner shall provide written notice to all prospective tenants that have completed an application to rent an affected dwelling unit or other property of the remediation order, and shall provide the prospective tenant with a copy of the order. The prospective tenant shall acknowledge, in writing, the receipt of the notice and pending order before signing a rental agreement. The notice shall be attached to the rental agreement. If the property owner does not comply with this subdivision, the prospective tenant may void the rental agreement.

HEALTH AND SAFETY CODE

SECTION 25400.30

25400.30. (a) If a property owner does not initiate or complete the remediation of property in compliance with an order issued by a local health officer pursuant to this chapter, the city, county, or city and county in which the property is located may, at its discretion, take action to remediate the residually contaminated portion of the property pursuant to this chapter or may seek a court order to require the property owner to remediate the property in compliance with this chapter.

(b) If a local health officer is unable to locate a property owner within 10 days after the date the local health officer issues an order pursuant to Section 25400.22, the city, county, or city and county in which the property is located may remediate the property in accordance with this article. The city or county or its contractors may remove contaminated property as part of this remediation activity.

(c) If a city, county, or city and county elects to remediate contaminated property pursuant to this article, the property owner is liable for, and shall pay the city or county for, all actual costs related to the remediation, including, but not limited to, all of the following:

(1) Posting and physical security of the contaminated site.

(2) Notification of affected people, businesses or any other entity.

(3) Actual expenses related to the recovery of cost, laboratory fees, cleanup services, removal costs, and administrative and filing fees.

(d) If a property owner does not pay the city, county, or city and county for the costs of remediation specified in subdivision (c), the city, county, or city and county may record a nuisance abatement lien pursuant to Section 38773.1 of the Government Code against the property for the actual costs related to the remediation or bring an action against the property owner for the remediation costs. The nuisance abatement lien shall have the effect, priority, and enforceability of a judgment lien from the date of its recordation.

HEALTH AND SAFETY CODE

SECTION 25400.35-25400.40

25400.35. A local health officer shall establish a written plan consistent with this chapter outlining the procedures to be followed for conducting the remediation to property for purposes of this chapter. The procedures shall comply with this article and any regulations adopted pursuant to this chapter, and shall include, but not be limited to, procedures for the preparation of a preliminary site assessment work plan, the conduct of a preliminary site assessment to determine the extent and level of contamination, in accordance with that PSA work plan, and the preparation of a PSA report containing the results of the preliminary site assessment and recommendations for remediation to meet the occupancy standards specified in Section 25400.16.

25400.36. The PSA work plan shall include, but is not limited to, all of the following:

(a) The physical location of the property.

(b) A summary of the information obtained from law enforcement, the local health officer, and other involved local agencies. The summary shall include a discussion of the information's relevance to the contamination, including areas suspected of being contaminated, and may include all of the following information:

(1) Duration of laboratory operation and number of batches cooked or processed.

(2) Hazardous chemicals known to have been manufactured.

(3) Recipes and methods used.

(4) Chemicals and equipment found, by location, used in connection with the manufacture or storage of the hazardous chemicals.

(5) Location of contaminated cooking and storage areas.

(6) Visual assessment of the severity of contamination inside and outside of the structure where the laboratory was located.

(7) Assessment of contamination of adjacent rooms, units, apartments, or structures.

(8) Disposal methods observed at or near the site, including dumping, burning, burial, venting, or drain disposal.

(9) A comparison of the chemicals on the manifest with known methods of manufacture in order to identify other potential contaminants.

(10) A determination as to whether the methamphetamine manufacturing method included the use of chemicals containing mercury or lead, including lead acetate, mercuric chloride, mercuric nitrate.

(c) A description of the areas to be sampled and the basis for the selection of the areas. This element of the PSA work plan shall also document the decision process used in determining not to sample particular areas. The PSA work plan shall consider both primary and secondary areas of concern.

(1) The primary areas of concern included in the work plan shall include all the following areas:

(A) Any area that has obvious staining caused by the use or manufacture of hazardous chemicals.

(B) Any processing or cooking area, with contamination caused by spills, boilovers, explosions, or by chemical fumes and gases created during cooking. The area may include floors, walls, ceilings, glassware, and containers, working surfaces, furniture, carpeting, draperies and other textile products, plumbing fixtures and drains, heating and air-conditioning vents.

(C) Any disposal area, including such indoor areas as sinks, toilets, bathtubs, plumbing traps and floor drains, vents, vent fans, and chimney flues and such outdoor areas that may be contaminated by dumping or burning on or near soil, surface water, groundwater, sewer or storm systems, septic systems, and cesspools.

(D) Chemical storage areas that may be contaminated by spills, leaks, or open containers.

(2) The secondary areas of concern shall include all of the following:

(A) Any location where contamination may have migrated, including hallways or other high traffic areas.

(B) Common areas in multiple dwellings, and adjacent apartments or rooms, including floors, walls, ceilings, furniture, carpeting, light fixtures, blinds, draperies and other textile products.

(C) Common ventilation or plumbing systems in hotels and multiple dwellings.

(d) Sampling protocols, analytical methods and laboratories to use and their relevant certifications or accreditations.

(e) A description of areas and items that will be remediated in lieu of sampling, if any.

25400.37. After a preliminary site assessment is completed in accordance with the PSA work plan, a PSA report shall be prepared and submitted to the local health officer. The PSA report shall be thorough and specific in reporting findings and recommendations and shall include all of the following:

(a) The location of the site, including the street address and mailing address of the contaminated property, the owner of record and mailing address, legal description, and clear directions for locating the property.

(b) A site map, including a diagram of the contaminated property. The diagram shall include floor plans of affected buildings and local drinking water wells and nearby streams or other surface waters, if potentially impacted, and shall show the location of damage and contamination and the location of sampling points used in the preliminary site assessment. All sampling point locations shall be keyed to the sampling results and remediation recommendations.

(c) A description of the sampling methods and analytical protocols used in the preliminary site assessment.

(d) A description of the sampling results.

(e) Information regarding the background samples and results obtained.

(f) Specific recommendations, including methods, for remedial actions required to meet the human occupancy standards specified in Section 25400.16, including, but not limited to, any required decontamination, demolition, or disposal.

(g) A plan for postremediation site assessment, including specific sampling requirements and methodologies, and locations at which samples are to be obtained.

25400.38. The PSA work plan and PSA report shall be signed and

notarized by the contractor responsible for the completion of the preliminary site assessment and by a certified industrial hygienist for sufficiency and completeness.

25400.40. (a) A person shall not perform a preliminary site assessment or any remediation work pursuant to this chapter, including a decontamination, demolition, or disposal, unless the person has completed all of the following:

(1) Initial training pursuant to subparagraph (A) of paragraph (3) of, or paragraph (4) of, subdivision (e) of Section 5192 of Title 8 of the California Code of Regulations, as applicable. That training shall include elements listed pursuant to subparagraphs (A) to (G), inclusive, of paragraph (2) of subdivision (e) of Section 5192 of Title 8 of the California Code of Regulations.

(2) Annual refresher training pursuant to paragraph (8) of subdivision (e) of Section 5192 of Title 8 of the California Code of Regulations.

(3) Additional requirements as determined by the local health officer, or other applicable law.

(b) Training specified in paragraphs (1) and (2) of subdivision (a) shall be certified pursuant to paragraph (6) of subdivision (e) of Section 5192 of Title 8 of the California Code of Regulations.

HEALTH AND SAFETY CODE

SECTION 25400.45-25400.46

25400.45. (a) A property owner who does not provide a notice or disclosure required by this chapter is subject to a civil penalty in an amount of up to five thousand dollars (\$5,000). A property owner shall also be assessed the full cost of all harm to public health or to the environment resulting from the property owner's failure to comply with this chapter.

(b) A person who violates an order issued by a local health officer pursuant to this chapter prohibiting the use or occupancy of a property contaminated by a methamphetamine laboratory activity is subject to a civil penalty in an amount of up to five thousand dollars (\$5,000).

25400.46. (a) A property owner who receives an order issued by a local health officer pursuant to Section 25400.22, or a property owner who owns property that is the subject of a notice posted pursuant to subdivision (i) of Section 25400.22, is liable for, and shall pay all of the following costs if it is determined that the property is contaminated:

(1) The cost of any testing.

(2) Any cost related to maintaining records with regard to the property.

(3) The cost of remediating the property, including any decontamination or disposal expenses.

(4) Any actual cost incurred by the local health officer or any other local or state agency resulting from the enforcement of this chapter and oversight of the implementation of the PSA work plan and the PSA report, with regard to that property.

(b) A person who conducts a methamphetamine laboratory activity on or at property, and who is not the owner of that property, is liable for, and shall reimburse the owner of the property for, any cost the property owner may incur pursuant to subdivision (a).

**Sacramento County
Environmental Management Department**

**PLAN FOR THE ASSESSMENT AND
REMEDIATION OF PROPERTIES
CONTAMINATED BY METHAMPHETAMINE
LABORATORY ACTIVITIES**



Hazardous Materials Division
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JANUARY 2006

**COUNTY OF SACRAMENTO
ENVIRONMENTAL MANAGEMENT DEPARTMENT**

**PLAN FOR THE ASSESSMENT AND REMEDIATION
OF PROPERTIES CONTAMINATED BY METHAMPHETAMINE
LABORATORY ACTIVITIES**

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1.0 INTRODUCTION

1.1 Clandestine laboratories which illegally manufacture methamphetamine (Clan Labs) are periodically discovered in Sacramento County and subsequently seized by law enforcement personnel. While officials arrange for the removal of chemicals and process equipment for evidence, portions of, or the entire property may be highly contaminated with both precursor chemicals and the final drug products.

1.2 As required by Section 25400.35 of Chapter 6.9.1 of the California Health and Safety Code (H&SC), this Plan has been developed to establish procedures for the assessment and remediation of clandestine methamphetamine manufacturing sites within Sacramento County. These procedures are to be followed by property owners and authorized contractors to develop and implement an appropriate remediation strategy, and by County authorities to evaluate workplans and assessments in a manner consistent with best available practices.

1.3 This Plan has been peer-reviewed by other County health and environmental agencies within the State of California, as well as technical experts in the Clan Lab remediation industry and is consistent with Chapter 6.9.1, Article 6 of the H&SC.

2.0 AUTHORITY

Pursuant to Chapter 6.9.1, Section 25400.17(b) of the California Health and Safety Code (H&SC), the Sacramento County Health Officer has delegated authority for the regulatory oversight of these contaminated properties to the Sacramento County Environmental Management Department (EMD).

3.0 DETERMINATION OF CONTAMINATION AND NOTIFICATION PROCEDURES

3.1 Upon notification from law enforcement or other sources that a Clan Lab has been discovered, EMD will:

3.1.1 Respond and post the property in a conspicuous location within 48 hours after notification. EMD may not limit posting to the room where the cooking occurred (e.g., bedroom, kitchen) within the occupancy; experience has indicated that contamination is rarely limited to the specific area of the cooking process. Depending upon the apparent extent of contamination, EMD may post adjacent units of apartments, hotels, and other proximal building units. If the clan lab activity has been limited to outbuildings such as sheds and garages, these may be posted without impacting the residence. Anyone disturbing or destroying the posted notice is subject to a civil penalty in an amount of up to five thousand dollars (\$5,000).

3.1.2 Perform an inspection of the property and surrounding area within five (5) days after notification. The inspection will include, but not be limited to: obtaining evidence of hazardous chemical use or storage and documentation of evidence of any chemical stains, cooking activity and release or spillage of hazardous chemicals used in the production of methamphetamine.

3.2 If EMD determines that the property is not contaminated, EMD will complete the following actions:

3.2.1 Within three (3) working days of making the determination, remove all notices posted to the property and prepare written documentation that includes findings and conclusions.

3.2.2 Within ten (10) working days after preparing written documentation that the property is not contaminated, send a copy of this document to the property owner and to the local code enforcement agency that has jurisdiction.

3.3 If EMD determines that the property is contaminated, EMD will complete the following actions within ten (10) working days after making the determination.

3.3.1 If the property is real property, record with the Sacramento County Clerk Recorder's office a lien on the property.

3.3.2 Issue an Order to all known occupants of the property and to all persons who have a recorded right, title, estate, lien, or interest in the property prohibiting use or occupancy of the property.

3.3.2(a). Provide a copy of the Order to local code enforcement that has jurisdiction.

3.3.2(b). Within one working day of the issuance of the Order, post a copy in a conspicuous place on the property.

4.0 PROPERTY RESTRICTIONS

4.1 Properties used as Clan Labs will typically be found with a lab-like setting, including containers of chemicals and manufacturing equipment. While this material will be removed by a law enforcement sponsored contractor, EMD experience indicates that, until proven otherwise, contamination from the drug manufacturing process remains. Typical areas of contamination include sinks, toilets, bathtubs, floor, walls, ceilings, carpets, drapes, furniture and ventilation (heating and air conditioning) systems.

4.2 Entry into the posted area(s) of the property is prohibited unless specifically approved in writing by EMD.

4.3 No personal belongings, furniture, or other items will be removed from the tagged property until released by EMD. Such release is not likely to occur until the Preliminary Site Assessment (PSA) has been reviewed and approved by EMD.

4.4 Anyone completing an unauthorized entry or removal is subject to a civil penalty in an amount of up to five thousand dollars (\$5,000).

5.0 PROPERTY OWNER RESPONSIBILITIES

5.1 A property owner and any person(s) occupying the property that is the subject of an Order issued per paragraph 3.2.1 above, shall immediately vacate the affected unit described in the Order (H&SC Section 25400.25(a)).

5.2 The property owner shall utilize the services of an “authorized contractor” (H&SC Section 25400.26(a)) to remediate the contamination and shall, within 30 days after receipt of an Order, demonstrate to EMD that such an authorized contractor has been retained for this work. An “authorized contractor” means a person who has been trained or received other qualifications pursuant to Section 25400.40 of the H&SC.

5.3 The property owner or the property owner’s authorized contractor shall submit a preliminary site assessment (PSA) Work plan to EMD for review. This shall be submitted no later than 30 days after demonstrating to EMD that an authorized contractor has been retained by the property owner.

5.4 The property owner shall complete remediation of all applicable portions of the contaminated property in accordance with H&SC Chapter 6.9.1 no later than 90 days after the date that the PSA Work Plan has been approved by EMD.

5.5 Until the property owner receives a determination from EMD that no further action is required to remediate the affected units or site, the following must be complied with:

5.5.1 All prospective buyers of the property shall be provided with a copy of the Order and must indicate receipt in writing.

5.5.2 All prospective tenants that have completed an application to rent an affected unit or other property described on the Order shall be provided with a copy of the Order and must indicate receipt in writing.

6.0 REMEDIATION PROCESS – Preliminary Site Assessment (PSA)

6.1 PSA Work Plan. A written PSA Work Plan shall be developed and submitted to EMD within 30 days after demonstrating to EMD that an authorized contractor has been retained by the property owner. The PSA Work Plan shall include, but not be limited to:

6.1.1 A description of the physical location of the property.

6.1.2 A summary of the information obtained from law enforcement, EMD, and any

other involved agency. The summary shall include a discussion of the information's relevance to the contamination, including areas suspected of being contaminated and may include all of the following:

- 6.1.2(a) Duration of lab operation and number of batches cooked and processed.
- 6.1.2(b) Hazardous chemicals known to have been manufactured at the site.
- 6.1.2(c) Recipes and methods use for methamphetamine production. Each type of methamphetamine manufacturing process involves chemicals specific to the process. The Red Phosphorus Method is the most common method found in Sacramento County. However, some clan labs have been discovered that used the Ammonia Method (also known as the Birch or Nazi method). Information regarding process-specific chemicals is provided in Attachment II.
- 6.1.2(d) Chemicals and equipment and their location(s).
- 6.1.2(e) Location of contaminated cooking and storage areas.
- 6.1.2(f) Visual assessment of the severity of contamination inside and outside of the structure where the clan lab was discovered.
- 6.1.2(g) Assessment of any contamination in adjacent rooms, units, apartments or structures.
- 6.1.2(h) Disposal methods observed at or near the property (e.g. dumping, burning, burial, venting, and/or drain disposal).
- 6.1.2(i) A comparison of the chemicals on the manifest with known methods of manufacture in order to identify other potential contaminants.
- 6.1.2(j) A determination as to whether the manufacturing method included the use of chemicals containing mercury or lead (e.g., lead acetate, mercuric chloride, mercuric nitrate).
- 6.1.3 A description of the areas to be sampled and the basis for the selection of the areas. This element of the work plan should also document the decision process used in determining not to sample particular areas. When identifying potential sample areas, consideration should be given to:
 - 6.1.3(a) Obviously stained areas.
 - 6.1.3(b) Areas in the immediate vicinity of the manufacturing (cooking) location.
 - 6.1.3(c) Areas where chemicals were found.
 - 6.1.3(d) Adjacent rooms.
 - 6.1.3(e) Locations typically accessible for contact by occupants, particularly children.
 - 6.1.3(f) High traffic areas outside of the cooking area.
 - 6.1.3(g) Ventilation systems.
 - 6.1.3(h) Hard and soft surfaces, walls, floors, ceilings and appliances.
 - 6.1.3(i) Areas of potential waste disposal such as sinks, floor drains, bathtubs, showers, and toilets.
 - 6.1.3(j) Septic systems (see Section 17.0).
- 6.1.4 Primary areas of potential contamination.
 - 6.1.4(a) Manufacturing or cooking areas. Contamination in these areas can be caused by spills, boil-over, explosions, or by chemical fumes and gases created during cooking. Affected areas include: floors, walls, ceilings, glassware, containers, working surfaces, furniture, carpeting, draperies and other textile products, plumbing fixtures and drains, heating and air conditioning vents.

- 6.1.4(b) Disposal areas. Indoor areas include sinks, toilets, bathtubs, plumbing traps and floor drains, vents and vent fans, and chimney flues. Outdoor contamination may be caused by dumping or burning on or near soil, surface water, groundwater, sewer or storm systems, septic systems, and cesspools.
- 6.1.5 Secondary areas of potential contamination.
 - 6.1.5(a) Locations where contamination may have migrated, such as hallways or high-traffic areas.
 - 6.1.5(b) Common areas in multiple dwellings, and adjacent apartments or rooms, including floors, walls ceilings, furniture, carpeting, light fixtures, blinds, draperies and other textile products.
 - 6.1.5(c) Common ventilation and plumbing systems in hotels and multiple dwellings.
- 6.1.6 Sampling protocols (Section 7.0), analytical methods (Section 14.0), laboratories to be used and their relevant certifications/accreditations. During each phase of sample collection, identical methods must be used to provide a common basis for comparing results.
- 6.1.7 A description of areas and items that will be remediated in lieu of sampling, if any. In the case of surfaces that are obviously or highly suspected to be contaminated, EMD will waive sampling requirements for those items or materials that will be removed and properly disposed. For example, if cooking was conducted in a kitchen and staining is evident, the property owner may decide that it is more cost-effective to remove and dispose of sheet rock, cabinets, appliances and linoleum rather than to spend money on sampling only to affirm that the materials are in fact contaminated. It may also be decided to surface wash (Section 9.4) and encapsulate (Section 9.5) all surfaces in a room that appear to have been impacted; assessment sampling would not be required for these surfaces, but post-remediation sampling would be. Note that the disposal facility may require sampling of these items or materials, an action over which EMD has no control.
- 6.1.8 The PSA work plan shall be signed and notarized by the contractor responsible for the completion of the PSA and by a Certified Industrial Hygienist (CIH).

6.2 PSA Report. After the PSA is completed, a PSA Report shall be prepared and submitted to EMD.

- 6.2.1 The PSA Report must be thorough and specific in reporting findings and recommendations. If areas or items are contaminated, the report must clearly specify all required remediation actions. Therefore, a recommendation such as "The stove and all adjacent impacted areas must be cleaned" is insufficient, for it begs the question of what constitutes an "adjacent impacted area." It is important that the PSA sampling program is designed to provide sufficient data to make specific, rather than vague, recommendations.
- 6.2.2 Components of the PSA Report shall include:
 - 6.2.2(a) Location which should include street address, mailing address, unit or room number of the contaminated property. Also include the legal description, and clear directions for locating the property.
 - 6.2.2(b) Owner of record, his/her mailing address,
 - 6.2.2(c) Site map of the contaminated property, including floor plans of affected buildings, local drinking water wells and nearby streams (if potentially

impacted) drawn to a scale of 1/4" to 1' unless otherwise directed by EMD. The diagram shall show the location of damage and contamination and the location of sampling points used in the PSA; the sampling point locations shall be keyed to the sampling results and remediation recommendations.

6.2.2(d) A description of the sampling methods and analytical protocols used in the assessment.

6.2.2(e) A description of the sampling results. If providing a narrative, group results by location rather than by analyte. Also include information regarding the background samples and results obtained.

6.2.2(f) Specific recommendations, including methods, for remedial actions required to meet State Re-occupancy Criteria (Section 13.0).

6.2.2(g) A plan for the Post Remediation Site Assessment, including specific sampling requirements and methodologies, and locations at which samples are to be obtained.

6.2.3 The PSA Report shall be signed and notarized by the authorized contractor responsible for the remediation work and by a Certified Industrial Hygienist (CIH).

6.2.4 If EMD upon review of the PSA Report determines that there is no level of contamination at the site that requires remediation, then EMD shall take actions specified in Section 12.0 of this Plan.

7.0 SAMPLING PROTOCOL

EMD has reviewed a several sampling methods from a variety of sources, and has determined that a standard method based on the "Proposed Surrogate Method" devised by Bruce Lazarus, CIH, will be the benchmark for evaluating sampling protocols. Lazarus' paper describing this method was published in the Journal of Clandestine Laboratory Investigating Chemists, Volume 10, Number 2. A brief review of Lazarus' perspective, taken from the article, as well as the "Surrogate Method" sampling protocol required by EMD is at Attachment I.

7.1 WIPE SAMPLES AND RESULT REPORTING

7.1.1 Wipe samples are, at best, an imprecise sampling technique for which there is little agreement on the "best" method. It is noted that the literature indicates that wipe samples do not collect anywhere near all of the contaminant from a specific sampling area, and that it takes at least three wipes to collect the majority of the surface contamination. To control variables, the Consultant shall use a consistent wipe sample technique throughout the project, and describe the specific wipe sample process in the reports. EMD expects Consultants to follow the sample collection methodology described in Attachment I.

7.1.2 Recent work by the Washington Department of Ecology suggests that deionized water is not effective in lifting methamphetamine from sampled surfaces. Samples obtained using methanol as a solvent have shown much better recovery. Therefore, all wipe samples shall use methanol as the wetting/collecting solvent. Consultants are cautioned to use appropriate personal protective equipment when using methanol.

7.1.3 EMD will not accept sample results for which the area of the sample is not recorded. All methamphetamine wipe sample results shall be reported as weight/surface area, in mass/100cm² (mass/ft² for lead). A common investigation

practice is to take several swipes of unknown and inconsistent surface areas for a composite sample; such practices will not be accepted, even if only to substantiate that contamination exists in a particular area.

7.1.4 Lazarus recommends a one square foot surface area sample be obtained (see Attachment I). For general wipe sampling, literature and regulatory agencies typically recommend surface areas of either 100 cm² or 1 ft². EMD requires a surface sample area of 100 cm², as this is consistent with other regulatory agencies for Clan Lab investigations.

7.1.5 Sample containers shall be bottles, as described in Attachment I. The use of plastic bags presents a greater opportunity for the contaminant to transfer from the wipe to the bag than would be the case with a bottle. In most instances, the laboratory will prepare the samples for analysis in the sample containers, allowing any sample transferred to the container wall to be collected.

7.2 COMPOSITE SAMPLES

7.2.1 Compositing of samples is a popular means of minimizing analytical costs. However, appropriate sampling and result reporting methods must be followed. In addition, care must be taken when deciding to composite, for a positive lab result may require individual re-sampling of all surfaces represented by that composite sample. Therefore, it is highly recommended that composite samples be reserved for those areas, in the authorized contractor's judgment, are anticipated not to be contaminated.

7.2.2 Each sample area composited must be 100 cm². For example, to composite wipe samples of four discrete wall areas in a kitchen, there must be four-100 cm² wipes. Each wipe sample will be done with a #40 Whatman Filter Paper or similar (see Note to Attachment I), with compositing accomplished by the lab in the extraction process. **The maximum number of wipe samples that may be composited is four.**

7.2.3 Do not use composite sampling combining an area or item that is likely to be contaminated (e.g., obvious staining) with areas unlikely to show contamination (e.g., remote from known cooking areas). EMD will assume an attempt to dilute the sample from the likely contaminated areas to below instrument detection limits. Composite sampling should be limited to similar surfaces (i.e. walls with walls, etc.).

7.2.4 There should be no between-appliance compositing (e.g., stove AND refrigerator AND microwave). The authorized contractor may consider compositing samples within an appliance (e.g., in a stove: burners, oven, handles, knobs, surface, etc.), but defining 100 cm² sample areas will be difficult.

8.0 GROSS REMEDIATION

Materials associated with the operating Clan Lab, such as containers of chemicals and lab equipment, should have been removed by the law enforcement sponsored contractor at the time the lab was seized. If the authorized contractor finds any such materials during the site assessment process, the material should be left in place and the EMD shall be notified immediately.

9.0 RESIDUAL REMEDIATION

A number of processes can be successfully used to make the property suitable for re-occupancy. Note that the degree to which areas adjoining a space used for cooking activities are significantly contaminated is difficult to predict; long-term or high volume activities are likely to have impacted adjoining areas. As a result, it is generally most cost effective to assume low-level contamination by non-volatile materials and rid these and other areas of all potentially contaminated porous materials or items. Such decisions are to be reflected in the PSA Report. All material disposal associated with the site remediation process shall be in accordance with Section 16.0 "Waste Disposal."

9.1 "AIRING-OUT"/VENTING. "Airing-out" is typically conducted by law enforcement personnel during lab processing. Several agencies have advocated the airing-out of a structure during the remediation process as a means to reduce the concentration of volatile solvents and similar materials by volatilization; some have suggesting increasing the air temperature within the structure to 85°F while increasing the ventilation rate for several days prior to remediation. While this practice may well reduce the airborne concentration of solvents and minimize the risk to remediation personnel, EMD does not accept it as a substitute for removing and disposing those items such as porous furnishings and wallboard that have been soaked or otherwise degraded/impacted by solvents.

9.2 AIR MONITORING. Several references and jurisdictions suggest the use of air monitoring for both evaluation of a property and for final clearance. EMD neither supports nor encourages the use of air monitoring, for the following reasons:

9.2.1 For many precursor and waste materials, validated analytical methods do not exist. For materials which have appropriate analytical methods, industrial hygiene sampling methods may not yield a low enough detection limit for evaluation against suggested exposure limits, requiring the use of expensive ambient air monitoring equipment. Direct reading instruments are generally non-specific and have relatively high detection limits.

9.2.2 Exposure limits for residential occupancies are problematic. Exposure limits established for occupational settings (e.g., PELs, TLVs, RELs) are inappropriate, as they are designed to protect, to some limited extent, the working population, not the more sensitive members of the population.

9.2.3 Exposure limits for ambient air, such as California OEHHA's Toxic Hot Spot limits and the draft Clan Lab clearance limits developed by other states, are based on assumptions that make them far too low for practical use. For example, Colorado assumes occupancy 350 days a year, 24 hours a day, for 30 years. Implicit here is the assumption that the vapor source is steady-state, which would require it to be renewed. The lab is gone, chemicals removed, so a steady-state assumption fails.

9.2.4 The materials that air monitoring would detect are mostly volatile solvents, and most with vapor pressures above 10 torr. As long as the building has reasonable

ventilation, the concentrations should decrease to negligible in a fairly short period of time.

9.2.5 Air monitoring may suggest that there is a problem, but provides no idea where to look for it. The effort may be better placed in additional wipe and bulk samples.

9.3 REMOVAL

9.3.1 Visibly contaminated (etched or stained) sinks, bathtubs, toilets and similar fixtures are to be removed and properly disposed.

9.3.2 Porous materials (e.g., carpeting, suspended ceiling panels, wallpaper, etc.) that can absorb dust, powder, aerosols and vapors from the cooking process shall be removed and properly disposed. In most cases, the cost of analytical testing, cleaning and post-testing exceeds the cost of replacement of these articles. While EMD strongly recommends that this apply to furniture and clothing, EMD has no authority to require that property contents be disposed.

9.3.3 "Popcorn" spray-on ceiling coatings may contain asbestos and should not be disturbed unless there is gross staining; any such work must be directed by a Cal/OSHA Certified Asbestos Consultant. A sealant, of the type typically used for asbestos-containing spray-on finishes, should be applied to the ceiling if low concentrations of contaminants are detected.

9.3.4 Some nonporous and semi-porous surfaces (e.g., floors, countertops, tiles, walls and ceilings) can hold contamination from the cooking process, particularly in those areas where cooking and preparation was performed and chemicals were stored. If a surface has visible contamination or staining, complete removal and replacement of that surface is required. This could include removal and replacement of wallboard, floor coverings, concrete slabs, and countertops. If this is not possible, intensive cleaning (see below) could be attempted. Circumstances that prohibit removal and replacement should be described in the Remediation Workplan.

9.3.5 Appliances that were in the room in which cooking was conducted must be disposed (too many surfaces to show sufficiently clean for food preparation or storage). All other appliances associated with food preparation or storage located outside the cooking area must be sampled for analytical testing.

9.4 SURFACE WASHING. Surface washing takes many forms, including pressure washing, detergent-washer washing, solvent (alcohol) washing, steam cleaning, and others. The objective is to remove contaminants to below criteria specified in Section 25400.16 of the H&SC by an efficient and cost-effective method that generates a minimal waste stream. Note that all wash solutions and rinsate must be effectively collected for disposal (see Paragraph 15.0).

9.5 ENCAPSULATION. In cases where porous or semi-porous surfaces (e.g., walls, wood flooring, panels, ceiling, concrete) have had levels of contamination that permitted in-situ cleaning instead of removal and replacement, such surfaces shall be encapsulated with an oil-based paint, varnish, or similar sealant. Water-based latex paints appear to have a greater tendency to permit "bleed-through" than oil-based coatings. The sealant is to be applied after surface washing has been completed. After the sealant has cured in accordance with the

manufacturer's instruction, sampling and analysis must be conducted to assure that any remaining contamination is below criteria specified in Section 25400.16 of the H&SC.

9.6 VENTILATION SYSTEM

9.6.1 Ventilation systems tend to collect fumes, vapors and dust, and redistribute them throughout a structure. The vents, stove hoods, ductwork, filters and even the walls and ceilings near the ventilation ducts can become contaminated. Absence evidence to the contrary, all air filters in the system shall be replaced, ventilation registers removed and cleaned, and surfaces near inlets and outlets cleaned. Cleaning of system ductwork should be considered, although the efficacy of duct cleaning is subject to debate; US EPA's article on duct cleaning is at the following link:
<http://www.epa.gov/iaq/pubs/airduct.html>.

9.6.2 In motels, apartments, row-houses or other multiple-family dwellings, a ventilation system may serve more than one unit or structure. These connections must be considered when evaluating remediation and testing procedures. One strategy is to take samples from adjacent or connected areas/rooms/units, working outward from the lab site until samples show results below criteria specified in Section 25400.16 of the H&SC.

9.6.3 Anecdotal evidence indicates that rooms adjacent to the cooking area may be impacted by active or passive ventilation (distributing fumes and vapors) or by poor chemical handling and hygiene practices. As is the case with other jurisdictions, EMD will require evaluation and possible decontamination of areas adjacent to the cooking area. Such areas may include hallways and other high traffic areas, as well as adjacent rooms. The Consultant shall consider this in the PSA Workplan.

9.7 IMPACTED SOIL AND GROUNDWATER

9.7.1 Impacted soil or groundwater will be investigated and remediated under normal regulatory criteria for hazardous waste sites. Oversight for hazardous waste site remediation will be conducted by the California Department of Toxic Substances Control; if groundwater may be impacted, oversight may be shared with the Regional Water Quality Control Board. These agencies may, under certain circumstances, transfer oversight responsibility to the Site Assessment/Mitigation (SA/M) Unit of EMD. Responsible parties may have the option of requesting the SA/M Unit to provide oversight of the voluntary remediation of the hazardous waste site component of the property; such oversight would be provided on a fee-for-service basis.

9.7.2 The variables associated with hazardous waste site remediation are numerous, and will not be discussed in this document. In the event that the PSA Report identifies potential impacts to soil and/or groundwater, EMD will work with the Property Owner and Consultant to determine the appropriate path for further assessment and mitigation activities and associated regulatory oversight.

10.0 POST REMEDIATION ASSESSMENT

The purpose of the post remediation assessment is to establish that the property has been cleaned up to a level below criteria specified in Section 25400.16 of the H&SC. This assessment should be conducted by the authorized contractor after remediation has been completed and/or the encapsulant has cured. Sampling protocols for the post-remediation assessment will have been defined in the approved PSA Work Plan. In general, those areas of the property for which the PSA sampling indicate levels above criteria specified in Section 25400.16 of the H&SC and were not removed and replaced (e.g. were cleaned, or cleaned and encapsulated) are sampled in the same manner used for the PSA. If all sampling results fall below criteria specified in Section 25400.16 of the H&SC, then the remediation work is completed and the authorized contractor can prepare the Final Report. Any areas that fail the post-remediation sampling are to be further remediated and then re-sampled.

11.0 FINAL REPORT

11.1 TWO OPTIONS FOR COMPLETION. There are two options for the completion of the Final Report.

11.1.1 If the remedial action consisted solely of removal of contaminated surfaces, such as cabinets, floor coverings, sheetrock and similar materials, and post-remediation sampling and assessment is not required by EMD, then the authorized contractor must provide to EMD a Final Report following procedures in paragraph 11.2 certifying the remedial activities have been completed in accordance to the PSA Report. This documentation shall include proof of proper disposal of contaminated items and building materials that have been removed from the property as part of the remediation process.

Note that any remediation activity other than removal of contaminated surfaces requires post-remediation sampling and assessment.

11.1.2 If the PSA Report includes actions other than removal of contaminated surfaces (e.g., removal of some surfaces, cleaning of others), the authorized contractor must provide a Final Report establishing in detail that the remediation work has been completed in accordance with the approved PSA Report. This documentation shall include proof of proper disposal of contaminated items and building materials that have been removed from the property as part of the remediation process.

11.2 REPORT COMPONENTS. The Final Report is a technical document, summarizing the work performed as outlined in the approved PSA Work Plan and PSA Report and data collected during the Post Remediation Assessment. The Final Report must be signed and notarized by the authorized contractor responsible for the completion of the PSA and by a Certified Industrial Hygienist (CIH). Components of the Final Report shall include:

- 11.2.1 Case Narrative.
- 11.2.2 Site Description
- 11.2.3 Summary of PSA findings and recommendations
- 11.2.4 Summary and documentation of remedial actions
- 11.2.5 Post-remediation assessment with detailed description and documentation, including lab reports and scaled site map keyed to sample locations
- 11.2.6 Post-remediation assessment results, with Consultant's analysis and recommendation.

12.0 NO FURTHER ACTION (NFA) DETERMINATION

If EMD determines that the property that has been the subject of a PSA Report does not require remediation or has remediated in accordance with this Plan and Chapter 6.9.1 of the H&SC, EMD shall issue a NFA determination and complete all required actions in accordance with Section 25400.27 of the H&SC.

13.0 REOCCUPANCY CRITERIA

13.1 METHAMPHETAMINE. Pursuant to Section 25400.16 of the H&SC, property contaminated by Clan Lab activity is safe for human occupancy only if the methamphetamine level is less than, or equal to 0.1 microgram per 100 square centimeters ($0.1 \mu\text{g}/100\text{cm}^2$).

13.2 LEAD AND MERCURY. When it is suspected that the Clan Lab activity had included the use of lead or mercury, a property will be considered safe for human occupancy when the following standards:

- 13.2.1 The total level of lead is less than, or equal to, 20 micrograms per square foot ($20 \mu\text{g}/\text{ft}^2$).
- 13.2.2 The total level of mercury is less than, or equal to, 50 nanograms per cubic meter of air ($50 \text{ ng}/\text{m}^3$).

14.0 ANALYTICAL AND SAMPLING METHODS

14.1 Analytical methods are driven by the analyte, and sampling methods are frequently driven by the analytical method. Analytical methods for wipe and bulk samples are expected to be from US EPA SW-846, OSHA Sampling and Analytical Methods, NIOSH Analytical Methods, and, in the case of lead, HUD guidelines.

14.2 Methamphetamine samples shall be analyzed by modified Method 8270. According to Washington Department of Ecology-accredited labs, modified Method 8015 is prone to false

positives. Wipe samples are to be obtained with 11 cm #40 Whatman Filter Paper (p/n 1440-110) or similar wetted with methanol, stored and shipped in appropriate sampling jars.

14.3 EMD will not accept field analyses for clearance samples. This includes the use of colorimetric detector tubes, real-time direct reading instruments such as flame ionization and photo ionization detectors, any type of Hazardous Category evaluation, and Marquis/Methamphetamine reagents, pH paper, or similar.

15.0 LABORATORY REQUIREMENTS

All analyses are to be conducted by analytical laboratories which are accredited (Fields of Testing E114-E117) by the California Dept. of Health Service Environmental Laboratory Accreditation Program. Note that this list is not limited to labs in California, as California has ELAP reciprocity with several states.

16.0 WASTE DISPOSAL

16.1 All materials removed from a Clan Lab property as a result of having been impacted/contaminated by Clan Lab activities (operation, storage, spills, disposal) must receive special handling at the disposal or recycling facility. Examples of such materials are kitchen appliances, drapes, carpets, and building materials. Items such as appliances and furniture must be rendered unusable prior to disposal.

16.2 For any disposed items, EMD will require an inventory, as well as a waste disposal receipt, to be submitted with the Final Report. For items that are required to be disposed as hazardous waste, a copy of the Uniform Hazardous Waste Manifest is required.

16.3 EMD does not regulate the types of wastes accepted by any landfill as each facility has its own permit requirements to meet, and will likely review Clan Lab debris on a case by case basis. It is up to the Contractor to contact the landfill to determine if a specific material removed from a Clan Lab property will be accepted, and the conditions under which it will be accepted.

17.0 SEPTIC SYSTEMS

17.1 If there is evidence that waste were dumped down a drain, the Consultant will need to work through a process to determine whether a septic system was impacted.

17.1.1 Evaluate tubs, sinks, toilets and similar for evidence of waste disposal. Staining from hydroiodic acid (red/orange) would be a good visual indicator.

17.1.1(a) If there is no evidence of disposal, the task is complete.

17.1.1(b) If there is evidence of disposal, continue to 16.1.2.

17.1.2 Assuming evidence of disposal, determine whether the property is on septic or sewer system. Local water quality agencies, such as City of Sacramento Public Works or the County Sanitation District can assist in this determination. Contact numbers, current in January 2006, include:

Sacramento County Sanitation District: (916) 875-6100

City of Sacramento: (916) 264-5371

City of Folsom: (916) 355-7200

17.1.2(a) If the property is on a sewer system, the task is complete.

17.1.2(b) If the property is on a septic system, continue to 16.1.3.

17.1.3 Obtain a representative sample of the material in the septic tank. Have the sample analyzed for hazardous waste characteristics. Use an ELAP-accredited laboratory appropriate for the analysis.

17.1.3(a) If analysis indicates that the sample is non-hazardous, the task is complete.

17.1.3(b) If analysis indicates that the sample is hazardous, continue to 16.1.4.

17.1.4 Using resources such as the SWRCB tables of disposal facilities (Attachment IV), determine which facility will accept the mixed septic/hazardous waste. Use an appropriately-permitted hazardous waste transporter to pump the tank and transport the contents to the accepting facility.

17.1.5 Information regarding the positive analysis for hazardous waste characteristics shall be provided to the EMD Site Assessment/Mitigation Section, which will evaluate whether remediation action will be required for the leachfield.

ATTACHMENT I

The Surrogate Method

EMD has reviewed a number of sampling methods from a variety of sources, and has determined that a standard method based on the “Proposed Surrogate Method” devised by Bruce Lazarus, CIH, will be the benchmark for evaluating sampling protocols. Lazarus’ paper describing this method was published in the Journal of Clandestine Laboratory Investigating Chemists, Volume 10, Number 2. Most of the material in this Attachment is taken from this article.

It should be noted that few individuals outside of the law enforcement community have Lazarus’ experience in Clandestine Laboratory health risks and assessments. His background as a Certified Industrial Hygienist in the environmental remediation and emergency response industry, as well as his extensive work with Clan Lab investigation and remediation, provide him with a unique perspective for designing a cost-effective investigation process.

In the Surrogate Method, a limited number of laboratory samples are taken from judgmentally-selected locations throughout the clandestine laboratory site and analyzed for the target analytes. This design method attempts to balance the necessary cost burden of assessment activities against the public health need to ensure that no significant residual contamination is unknowingly allowed to persist uncorrected. The surrogate approach is based on the following concepts:

- A. There is a lack of test methods and reference standards for many of the substances, and especially some of the organic drug compounds, which are associated with clandestine lab activities. In short, one can’t feasibly test for all hazardous materials associated with the cooking process, and even if test methods were available, it would be prohibitively expensive to do so.
- B. Some target chemicals tend to be more persistent in the environment, both in porous media and on non-porous surfaces, allowing for latent detection.
- C. The presence and concentration variability of target chemicals assessed at laboratory sites is assumed to be representative of similar conditions for the remaining clan lab chemicals not specially analyzed for owing to the reasons outlined above. The premise assumes that if the target analytes are detected in significant concentration, then other clan lab method specific chemicals not analyzed for are also present in concentrations of public health interest. Conversely, if the target analytes are not detected, or detected in very low concentrations, it may be inferred, following this presumption, that chemical not analyzed for are also likely to be not present, or present in concentrations low enough not to be of public health concern.

It is understood that these assumptions define a data gap suitable for future study. However, absent an alternative method that concurrently minimizes the cost of investigation while providing adequate information to indicate potential public health risk, the Surrogate Method is the minimum level of site investigation acceptable to EMD.

EMD Criteria under the Surrogate Method follow.

- A. Sample Types. A combination of wipe and bulk samples should be taken utilizing this protocol. Wipe samples should be taken of non-porous surfaces, whereas bulk samples should be taken of porous materials.
1. Wipe samples should be taken of sealed concrete (garage floors), vinyl flooring, sealed wood surfaces, tile, Formica, bathroom fixtures, appliance surfaces, painted surface of good condition, etc.
 2. Bulk samples should be taken of unsealed or poor condition concrete and wood surfaces, dry wall, painted surfaces of poor condition, carpeting, carpet padding, upholstery, septic waste, and soils.

NOTE: In some cases, particularly with painted surfaces, a decision must be made if a wipe sample or bulk sample would be more appropriate to recover and identify potential contamination. To address error associated with mass loading of bulk samples, particularly from painted surface and drywall, it may be appropriate to obtain bulk samples using a surface scraping technique.

B. Sample Locations and Quantities

Take one bulk or wipe sample from the following as associated with each major area of the location suspected by history and/or visual observations as being potentially affected by contamination:

1. Each major floor surface.
2. Each major wall surface.
3. Each major ceiling surface.
4. Each major home appliance (e.g., refrigerator, oven, microwave, dishwasher, washing machine, dryer, etc.).
5. Each major cabinet, counter, and/or built-in feature (e.g., kitchen cabinets, counters, vanities, etc.).
6. Each bathroom and/or kitchen fixture or grouping of fixtures.
7. Each major furniture grouping.

NOTE: In establishing the number and location of samples at individual property sites, sampling of some locations or items may not be necessary if the need for remediation is apparent by observation or agreement of parties. Examples include fire-damaged surfaces, apparent direct chemical staining or damage, and/or obvious physical damage of an item or feature necessitating removal.

C. Collection Procedures

1. Wipe Samples. Wipe samples should be obtained using the following protocol unless otherwise instructed by the analytical laboratory. Note that these instructions differ from Lazarus' paper, as lab requirements have been refined.
 - a. Use eight-ounce, wide mouth, borosilicate glass jars having phenolic screw top lids with Teflon liners.

- b. Prepare each sample by placing a 11 cm #40 Whatman Filter Paper (p/n 1440-110) or similar (see Note) into each sample jar. Add 5 ml of methanol to each pad and close the jar. Use appropriate personal protective equipment when using methanol.
- c. Select the surface location to be sampled.
- d. Squeeze excess methanol from the pad (back into the open jar) before wiping the sample area.
- e. Wipe a one hundred square centimeter (100 cm²) surface area, using a consistent wipe or blot pattern technique (i.e., concentric circle pattern starting in the upper left corner and ending in the center of the area). Use a 10-by-10 cm square template (usually made of Teflon or other material that will not contaminate the sample and is resistant to the solvent).
- f. Without allowing the filter to contact any other surfaces, fold the filter with the exposed side in, the fold it again. Return the filter to the glass jar and replace the lid.
- g. Wear disposable Nitrile or PVC gloves for each sample taken. Change gloves between samples.
- h. Obtain separate wipe samples (separate jar and pads) for each individual analyte, including pH, to be analyzed by the laboratory unless the laboratory explicitly states that multiple analytes can be tested from one pad. Otherwise, if multiple analytes are to be tested, then all wipe samples from a selected location should be of adjacent, contiguous surfaces. Do not re-wipe the same surface.
- i. Preservation of the samples for inorganic analysis is not normally required unless otherwise specified by the analytical laboratory.
- j. When appropriate, submit a sample blank consisting of a prepared sample jar taken to the field and returned to the laboratory for analysis.
- k. Label the jar, attach custody seal, and prepare sample for transport to the laboratory.
- l. See Section 4.6.2 for information on compositing samples.

NOTE: In some cases, specific to the surface being sampled, it may be preferable to use sterile gauze pads.

2. Bulk Samples. Bulk samples should be obtained using the following protocol unless otherwise instructed by the analytical laboratory:
 - a. Use four- or eight-ounce, wide mouth, borosilicate glass jars having phenolic screw top lids with Teflon liners.
 - b. Select the media to be bulk sampled.
 - c. Using an appropriate sampling tool/device, obtain a minimum of 30 grams for each bulk sample unless the analytical laboratory specifies a different quantity of sample.
 - d. Wear disposable Nitrile or PVC gloves for each sample taken. Change gloves between samples.
 - e. Unless otherwise specified by the analytical laboratory, multiple analytes, including pH, may be analyzed from single bulk sample representing each medium to be evaluated.

- f. Sampling tools/device should be cleaned and triple-rinsed with deionized water between each bulk sample or otherwise cleaned following a laboratory-recommended protocol between samples.
- g. For scrape samples of paint, etc., a polyethylene tray (or similar capture device) may be taped to the wall surface below the surface area to be scraped. Collect the sample in the tray and then transfer it to the sample container.
- h. Preservation of the samples for inorganic analysis is not normally required unless otherwise specified by the analytical laboratory.
- i. Bulk samples for organic analysis should be preserved at 4°C (usually applies to septic waste and subsurface soil samples recovered for volatile and semi-volatile hydrocarbon analysis).

D. Target Analytes

Analytes specified for analysis should be selected based on individual association with specific Clan Lab manufacturing processes, expected persistence in the environment, usefulness of data interpretation, application of available testing methods, laboratory capabilities, and cost of analysis. The table below provides selected target analytes and test methods appropriate for the most common methamphetamine synthesis routes typically encountered in the United States. This table should be used as a guide only, as it may not be necessary nor appropriate to sample and analyze for every analyte listed.

**Target Analytes for Common
Methamphetamine Manufacturing Methods**

Manufacturing Method	Methamphetamine ¹	Precursor	Hydrochloric Acid (Chloride)	Essential Chemicals (or by-products) ²
Red Phosphorous	Modified EPA Method 8270	Ephedrine by Modified EPA Method 8270	EPA Method 300	Total Phosphorous by EPA Method 6010 ³ Iodide by EPA Method 300
Ammonia	Modified EPA Method 8270	Ephedrine by Modified EPA Method 8270	EPA Method 300	Total Lithium or Total Sodium by EPA Method 6010 ³ Total Ammonia by EPA Method 350
Mercuric Chloride	Modified EPA Method 8270	Phenyl-2-Propanone by Modified EPA Method 8270	EPA Method 300	Mercury by EPA Method 7471A Total Lead by EPA Method 6010

NOTE: approved labs (e.g., ELAP labs) may select methods other than those listed in this table.

¹ Results for Modified EPA Method 8270 may be semi-quantitative depending on analytical laboratory capabilities.

² Select one or more analytes for sampling and analysis, based on property data and assessment needs.

³ Metals analysis may also be performed by EPA Method 6020.

ATTACHMENT II

Chemicals of Concern

Taken from the CSTI Clandestine Drug Laboratory Chemical Identification training manual, the following is a less than exhaustive list of typical lab chemicals.

Methamphetamine Methods of Production and Chemicals Typically Used

- Hydriodic Acid Method (Ephedrine)
 - Ephedrine
 - Hydriodic acid
 - Red phosphorous
 - Sodium hydroxide
 - Hydrochloric acid
 - Freon
- Phenyl-2-Propanone Method (P-2-P)
 - Phenyl-2-Propanone
 - Methylamine
 - Methyl Alcohol
 - Mercuric chloride
 - Aluminum
 - Ether
 - Sodium hydroxide
- Sodium Metal Method (Nazi or Birch)
 - Ephedrine
 - Pseudoephedrine
 - Anhydrous ammonia
 - Sodium (metal)
 - Lithium (metal)
 - Hydrochloric acid

ATTACHMENT III

Resources

Materials used the development of this criteria document include:

Guidelines for Cleaning Up Former Methamphetamine Labs

Missouri Department of Health and Senior Services
<http://www.health.state.mo.us/ResourceMaterial/meth.pdf>

Guidelines for Contamination Reduction and Sampling at Illegal Drug Manufacturing Sites

Washington State Department of Health, Office of Toxic Substances
<http://www.doh.wa.gov/ehp/ts/CDL.HTM>

Clandestine Laboratory Contaminated Properties: Assessment and Remediation Strategies,

Bruce Lazarus, CIH
Journal of Clandestine Laboratory Investigating Chemists, V. 10, No.2, April 2000

Illegal Methamphetamine Laboratories

University of Arizona College of Public Health
<http://www.publichealth.arizona.edu/organization/divisions/division3/methlab/index.html>

Clandestine Drug Lab Cleanup Program

Oregon Public Health Services, Environmental Services and Consultation
<http://www.ohd.hr.state.or.us/esc/druglab/welcome.htm>

Cleanup of Clandestine Methamphetamine Labs (draft)

Colorado Department of Public Health and the Environment
<http://www.gcglc.com/LEPCHandbook/methlabcleanup.pdf>

Meth and Clandestine Drug Labs

Minnesota Department of Health
<http://www.health.state.mn.us/divs/eh/meth/index.html>

Surface and Dermal Monitoring for Toxic Exposures

Ness, Shirley A. 1994. Van Nostrand Reinhold, New York.

CLANDESTINE LABORATORY FIELD WORKSHEET

EMD INFORMATION	Responder:	Time:	Date:	Incident #:
LAW ENFORCEMENT CONTACT	Officer:	Phone #:	Agency:	Report #:
SITE INFORMATION	Incident Location:	City:	Zip Code:	Parcel #:
	Name of Property Owner:		Phone #:	Contacted at time of incident?
	Address:		City:	Zip Code:
	Name of Occupant(s):		Phone #:	Contacted at time of incident?
	Name of Occupant(s):		Phone #:	Contacted at time of incident?
PROPERTY DESCRIPTION	Type of Property: <input type="checkbox"/> Single Family <input type="checkbox"/> Duplex <input type="checkbox"/> Apartment <input type="checkbox"/> Mobile Home <input type="checkbox"/> Hotel/Motel <input type="checkbox"/> Other:			
	Description: <input type="checkbox"/> Single Story <input type="checkbox"/> Multi-Story # of Bedrooms:_____ # of Bathrooms:_____ Garage: <input type="checkbox"/> 1 Car <input type="checkbox"/> 2 Car <input type="checkbox"/> Other			
	Status at Time of Incident: <input type="checkbox"/> Owner Occupied <input type="checkbox"/> Rental <input type="checkbox"/> Vacant			
CLAN LAB INFORMATION	Type of Process Used:	Entrance Posted <input type="checkbox"/> Yes <input type="checkbox"/> No		Photos Taken <input type="checkbox"/> Yes <input type="checkbox"/> No
	Cooking Location(s):	Proximity to Living Area (physical description):		
	Relative Size of Lab/Complexity:	Length of Cook Time & Source of Information:		
	CHEMICALS FOUND	LOCATION	AMOUNT	
RECOMMENDED SAMPLING/REMEDiation LOCATIONS (USE ADDITIONAL SHEET IF NECESSARY)	1. _____			
	2. _____			
	3. _____			
	4. _____			
	5. _____			
	6. _____			
ADDITIONAL INFORMATION/ COMMENTS (USE ADDITIONAL SHEET IF NECESSARY)				

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!WARNING!

Posted per California Health & Safety Code Section 25400.18(a) - (i)

Materials have been seized at this location that are consistent with the manufacturing and/or use of methamphetamine. Hazardous substances, toxic chemicals, or hazardous waste products may have been present and remain on or inside this property.

Address: _____

Date of Posting: _____

For Further Information Contact:

Sacramento County Environmental Management Department
Hazardous Materials Division
Phone #: (916) 875-8550

It is unlawful for any unauthorized person to enter the contaminated portion of this property until the local health officer or designated local agency has advised it is safe to do so.

Any person caught disturbing, destroying, or violating this posted Notice is subject to a civil penalty of up to \$5,000.

!WARNING!

EMD CLAN LAB CLEAN-UP CHECKLIST

DATE OF SITE DISCOVERY: _____

IR #: _____

ADDRESS: _____

REQUIREMENT	COMPLETED	
	DATE	TIME
IMMEDIATELY:		
<input type="checkbox"/> On-Call Incident Response Team Member responds to location of alleged methamphetamine laboratory activity.		
<input type="checkbox"/> If the site location is in the City of Sacramento, contact the on-call Code Enforcement person.		
<input type="checkbox"/> In addition to all materials found and removed from the site, photograph all areas and items that are indicative of methamphetamine production and associated contamination		
<input type="checkbox"/> Complete Clan Lab Field Worksheet (within 5 days of notification)		
<input type="checkbox"/> Post house if cooking has occurred and/or contamination is observed (within 48 hours of notification). Location of Posting: _____		
<input type="checkbox"/> Obtain the Law Enforcement Report and any associated documentation		
WITHIN 10 WORKING DAYS (ONCE CONTAMINATION HAS BEEN DETERMINED):		
<input type="checkbox"/> Record lien with County Recorder's Office. Complete form and go to County Clerk's Recorder's office located 600 8 th Street, Sacramento, CA. Public counter hours for document recording are M-F, from 8:00 am to 3:00 pm. File lien and research all known persons and/or parties who have an interest in the property.		
<input type="checkbox"/> Complete and send Order by certified mail to all known occupants of property and all persons and/or parties who have interest in the property as listed in the Recorder's office records.		
<input type="checkbox"/> Send copy of Order to the local code enforcement agency.		
WITHIN 1 WORKING DAY OF DATE OF ORDER:		
<input type="checkbox"/> Post Order in a conspicuous place on the property. Location: _____ <ul style="list-style-type: none"> ▪ Responsible Party has <u>30-days</u> after receipt of the Order to hire a remediation firm. ▪ Responsible Party has <u>30-days</u> to submit <u>the Preliminary Site Assessment (PSA) Work Plan</u> after hiring the remediation firm. 		
WITHIN 10 WORKING DAYS OF PSA WORKPLAN SUBMITTAL:		
<input type="checkbox"/> Review PSA Work Plan submitted by property owner to determine compliance with H&SC Chapter 6.9.1.		
WITHIN 15 WORKING DAYS OF PSA WORKPLAN SUBMITTAL:		
<input type="checkbox"/> Send form letter notifying owner of deficiencies or approval of PSA Workplan Responsible Party has <u>90-days</u> to complete remediation work after the PSA Workplan has been approved		
AFTER PSA WORK PLAN REMEDIATION COMPLETED:		
<ul style="list-style-type: none"> ▪ Responsible Party must submit <u>PSA Report</u> after PSA remediation is completed in accordance with the <u>PSA Work Plan</u> <input type="checkbox"/> Review <u>PSA Report</u> to determine compliance with H&SC Chapter 6.9.1.		
WITHIN 10 WORKING DAYS OF PROPERTY REMEDIATION:		
<input type="checkbox"/> Confirm that the payment has been paid on the lien to EMD.		
<input type="checkbox"/> Release the Lien on the property by completing the form and filing it (via fax) with the County Clerk Recorder's office.		
<input type="checkbox"/> Send No Further Action (NFA) Letter to the property owner and all persons and/or parties who have received the original notification of Order.		
<input type="checkbox"/> Send a copy of the NFA letter to the local code enforcement agency.		

Certified Mail Number:

PROPERTY OWNER:

1.1. Parties. This ORDER is issued by the Sacramento County Environmental Management Department, Hazardous Materials Division ("EMD") to _____ ("Respondent").

1.2. Site. Respondent is the owner of record for the residence at _____ **Sacramento, CA** _____. The property is described as a single family dwelling.

1.3. Jurisdiction. Pursuant to the California Health & Safety Code (H&SC) Chapter 6.9.1, Article 4, and with authority granted by the Sacramento County Health Officer, EMD is responsible for the regulatory oversight of the remediation of properties and areas contaminated as the result of methamphetamine production.

1.4 Pursuant to H&SC Section 25400.22(a), a lien will be attached to the property. This lien will be released when the respondent makes payment to EMD for costs accrued. Site remediation has been completed.

DETERMINATION

2.1 Due to the discovery of chemicals that are commonly used in the production of methamphetamine on _____, EMD performed a complete inspection of the property and/or area described in paragraph 1.2.

2.2 This inspection was completed on _____, and it has been determined that all or portions of the inspected areas are contaminated as the result of methamphetamine drug laboratory activity. This contamination poses a hazard to human health and the environment and may affect personal effects and furniture within the described property or area.

ORDER

3.1 Use or occupancy of any contaminated areas of the described property and/or area is PROHIBITED (H&SC Section 25400.00(g)(6)). This prohibition includes any activities that removes or alters any portion of the contaminated area.

3.2 The Respondent must comply with all sections of H&SC Chapter 6.9.1 Article 4.

3.3 The Respondent, through an authorized contractor, must prepare a Preliminary Site Assessment (PSA) Work Plan and a PSA Report in accordance with EMD's "Plan for the Assessment and Remediation of Properties Contaminated by Methamphetamine Laboratory Activities" and H&SC Section 6.9.1. Approval by EMD is required prior to the initiation of any remediation, removal, or demolition work.

3.4 All contaminated items or debris must be disposed in accordance with state and federal regulations. Disposal of these materials at any unauthorized location may be considered felony disposal of hazardous waste (H&SC Section 25189.5).

3.5 Until the Respondent receives a determination from EMD that the property requires no further action, the Respondent shall notify any prospective buyer in writing of this Order and comply with other requirements pursuant to H&SC Section 25400.28 (a).

3.6 Until the Respondent receives a determination from EMD that the property requires no further action, the Respondent shall notify all prospective tenants that have completed an application to rent an affected dwelling unit or other property of the Order and comply with other requirements pursuant to H&SC Section 25400.28 (b).

PENALTIES

4.1 Pursuant to H&SC Section 25400.45(b), failure to comply with all provisions of this Order is punishable by civil penalty of up to five thousand dollars (\$5,000).

For more information, contact EMD at (916) 875-8550.

Dated: _____ 2006

County of Sacramento
Environmental Management

DG: _____

Dennis Green
Chief, Hazardous Materials Division

DRUG LAB INDUSTRIAL HYGIENISTS AND CLEANUP COMPANIES

The following list of contractors is a partial listing and is supplied as a convenience. This is neither an endorsement nor a certification by the County of Sacramento for any business listed. The information listed below may have changed since printing. The County assumes no responsibility or liability for the services provided by the companies on this list.

IH/PE COMPANIES

Bio Max Environmental	510	724-3100
Kwest Engineering	530	671-1947
Network Environmental Systems	916	353-2360

CLEANUP COMPANIES

Nor Cal Environmental	916	525-1006
PARC Environmental	916	992-5405
RAH Environmental	800	234-7241
Ramos Environmental	916	371-5747
Safety Kleen	916	375-2611

Recording Requested By:

And When Recorded Mail to:

Name
Street Address
City State, Zip

Space above this line for Recorder's use only

NOTICE OF LIEN - METHAMPHETAMINE CONTAMINATED PROPERTY

Notice is hereby given by the Environmental Management Department of Sacramento County

that _____ (name of owner(s) of record)

owners of the subject real property located in the County of Sacramento, State of California, and more specifically described as follows:

Assessor parcel numbers affected _____

Also known as (site address): _____

Are liable for all costs and damages incurred in the removal and remedial actions to abate contamination resulting from the actual or potential production of methamphetamine on the aforementioned site. Said site was determined to be contaminated on _____ (date of determination).

This lien for recovery of costs, in the amount of _____ is recorded pursuant to Health and Safety Code Section 25400.22 and shall have the full force, effect and priority of a judgment lien.

Date _____
Local agency official

On _____, before me, _____ Notary Public, personally appeared Dennis Green, Hazardous Materials Program Chief, personally known to me to be the person whose name is subscribed to the within instrument and acknowledged to me that he executed the same in his authorized capacity, and that by his signature on the instrument the person, or the entity upon behalf of which the person or the entity upon behalf of which the person acted, executed the instrument.

Witness my hand and official seal

Signature _____

Recording Requested By:

And When Recorded Mail to:

Name
Street Address
City State, Zip

Space above this line for Recorder's use only

RELEASE OF LIEN - CONTAMINATED PROPERTY: METHAMPHETAMINE

I hereby certify that the Notice of Lien – Methamphetamine Contaminated Property given by the Program Chief of the Hazardous Materials Division of the Environmental Management Department of the County of Sacramento, and recorded in the office of the County Recorder of Sacramento County on ____date____ is no longer in force or effect.

Said notice was filed against the property described as follows:

Assessor parcel numbers affected _____

Also known as: <Case Address>

Owner:
Address:

County of Sacramento
Dennis Green
Hazardous Materials Program Chief

Date _____

On _____, before me, _____ Notary Public, personally appeared Dennis Green, Hazardous Materials Program Chief personally known to me to be the person whose name is subscribed to the within instrument and acknowledged to me that he executed the same in his authorized capacity, and that by his signature on the instrument the person, or the entity upon behalf of which the person or the entity upon behalf of which the person acted, executed the instrument.

Witness my hand and official seal

Signature _____

Local agency official

Countywide Services Agency

Environmental Management
Department

Hazardous Materials Division
Dennis Green, Chief



County of Sacramento

Terry Schutten, County Executive
Penelope Clarke, Agency Administrator
Mel Knight, Department Director

January 1, 2006

Mr. and Ms. Property Owner
1234 Main Street
Sacramento, CA 9XXXX

CERTIFIED NO: XXXX XXXX XXXX XXXX

Dear Mr. and Ms. Property Owner:

SUBJECT: NO FURTHER ACTION DETERMINATION
SITE: 1234 FIRST STREET DRIVE
SACRAMENTO, CA 9XXXX
INCIDENT NUMBER: XXXXXX

This notice confirms the completion of site investigation and remedial action for contamination resulting from methamphetamine laboratory activities at the above address.

Based upon the submitted Preliminary Site Assessment (PSA) Report, and with the provision that the information provided to this agency is accurate and representative of site conditions, no further remedial action related to this property is required.

Please be advised that this determination does not relieve you of any liability under the California Health and Safety Code regarding present or future clandestine drug laboratory activities at this site. This determination also does not relieve you of the responsibility to correct other existing, additional, or previously unidentified conditions at the site that have been documented by (appropriate code enforcement agency) or any other local agency.

If you have any questions regarding this matter, please contact me at (916) 875-8473.

Sincerely,

Elise Rothschild
Environmental Specialist IV

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Countywide Services Agency

Environmental Management
Department

Hazardous Materials Division
Dennis Green, Chief



County of Sacramento

Terry Schutten, County Executive
Penelope Clarke, Agency Administrator
Mel Knight, Department Director

DATE FOR MAILING

2006

CIH Contractor

CERTIFIED MAIL:

Dear _____:

SUBJECT: PRELIMINARY ASSESSMENT (PSA) WORK PLAN APPROVAL

SITE ADDRESS: _____

INCIDENT NUMBER: _____

We have completed our review of your Preliminary Site Assessment (PSA) Work Plan, dated _____ 2006, for the site located at _____, CA _____. This Work Plan is approved and site assessment work can be initiated pursuant to Chapter 6.9.1, Section 25400.36 of the California Health and Safety Code and the Sacramento County "Plan for the Assessment and Remediation of Properties Contaminated by Methamphetamine Laboratory Activities".

Any changes to the above mentioned PSA Work Plan must be documented and submitted for approval by EMD prior to implementation. If you have any questions, please contact me directly at (916) 875-____.

Sincerely,

Environmental Specialist

ER:RA:_____

C: _____

Specialist: print this form/write info on it/give to clerical
TYPIST: open letter template at:
W:/DATA/FORMSARCHIVE/HMD/IR/DRUG LAB
CLAN LAB PSA WORKPLAN APPROVAL LETTER.DOC

- Type in information specialist writes on this form.
- **Resave** to Specialist's directory:
 - Example: W:/DATA/ARTZ/10498 DILLARD RD PSA APPROVAL LETTER

Property Owner
And address

W:/Data/FORMSARCHIVE/HMD/IR/DRUG LAB/CLAN LAB PSA WORKPLAN APPROVAL LETTER.doc

Countywide Services Agency

Environmental Management
Department

Hazardous Materials Division
Dennis Green, Chief



County of Sacramento

Terry Schutten, County Executive
Penelope Clarke, Agency Administrator
Mel Knight, Department Director

DATE FOR MAILING

2006

CIH Contractor

CERTIFIED MAIL:

Dear _____:

SUBJECT: PRELIMINARY ASSESSMENT (PSA) WORK PLAN DENIAL
SITE ADDRESS: _____

INCIDENT NUMBER: _____

We have completed our review of your proposed Preliminary Site Assessment (PSA) Work Plan, dated _____ 2006, for the site located at 5151 Myrtle Ave., #10, Sacramento, CA 95841. The PSA Work Plan, as submitted, is missing several important elements required under Chapter 6.9.1, Section 25400.36 of the California Health and Safety Code. An amended version of this document containing the required corrections must be resubmitted to our office for follow-up review and approval prior to the initiation of any assessment or remediation work at the affected site.

We strongly encourage you to refer to our website www.emd.saccounty.net and review the Sacramento County "Plan for the Assessment and Remediation of Properties Contaminated by Methamphetamine Laboratory Activities" for specific guidance regarding the required elements of a PSA Work Plan.

Please contact me at (916) 875-_____ if you have any questions regarding this correspondence or the requirements of the PSA Work Plan.

Sincerely,

Environmental Specialist

ER:RA:_____

C: _____

Specialist: print this form/write info on it/give to clerical

TYPIST: open letter template at:

W:/DATA/FORMSARCHIVE/HMD/IR/DRUG LAB

CLAN LAB PSA WORKPLAN APPROVAL LETTER.DOC

- Type in information specialist writes on this form.
- **Resave** to Specialist's directory:
 - Example: W:/DATA/ARTZ/10498 DILLARD RD PSA DENIAL LETTER

Property Owner
And address

W:/Data/FORMSARCHIVE/HMD/IR/DRUG LAB/CLAN LAB PSA DENIAL LETTER.doc

Methamphetamine
Contaminated Property



Methamphetamine Contaminated Property Cleanup Act of 2005

Elise Rothschild, Supervising Environmental Specialist

Mark Trask, Environmental Specialist



Methamphetamine Contaminated Property Cleanup Act of 2005

- ☠ Requires local **Health Officer** to take specified actions after receiving notification from law enforcement of methamphetamine lab activity.
- ☠ Authorizes **Health Officer** to delegate duties to local environmental agency, i.e. **CUPA**.



Local Agency Responsibilities

Within **48 hours** of Notification from Law Enforcement:

- ☒ The property must be posted with a "warning" sign.
- ☒ If possible, obtain names of occupants.



Local Agency Responsibilities

Within **5 Working** Days of Notification by Law Enforcement:

- ☒ Conduct an on-site inspection.
- ☒ Complete field worksheet.
- ☒ Make contamination determination.
- ☒ Obtain law enforcement report.



Local Agency Responsibilities

Within **10 Working** Days of Determining Contamination:

- ☒ Record lien with County Recorder.
- ☒ Obtain information on all known persons who have an interest in the property.
- ☒ Prepare and Send Remediation Order (Order).



Remediation Order

Order goes to:

- ☒ Property owner, all known occupants, any persons who have interest in the property, as per County Recorder's records.
- ☒ Local code enforcement agency.

Order must be:

- ☒ Posted in a conspicuous place on the property.



Property Owner Responsibilities

- ☒ Must hire contractor within 30 days from receipt of Order.
- ☒ Owner/Contractor must submit **Preliminary Site Assessment (PSA) Work Plan** within 30 days after hiring contractor.
- ☒ Owner/Contractor must complete remediation work within 90 days after **PSA Work Plan** has been approved.
- ☒ **PSA Report** must be submitted after remediation work has been completed.



Local Agency Response to the PSA

Within 10 Working Days of PSA Work Plan Submittal:

- ☒ **PSA Work Plan** must be reviewed to determine compliance with H&SC 6.9.1.

Within 15 Working Days of PSA Work Plan Submittal:

- ☒ Owner must be notified of deficiencies or approval of **PSA Work Plan**.
- ☒ After remediation is complete, **PSA Report** must be reviewed to determine compliance with H&SC Chapter 6.9.1.



Methamphetamine Contaminated Property Cleanup Act of 2005 – Other Issues

Established Interim Re-Occupancy Criteria:

Methamphetamine:

- ☒ 0.1 microgram per 100 square centimeters.

Lead and Mercury:

- ☒ 20 micrograms per square foot.
- ☒ 50 nanograms per cubic meter of air.



Methamphetamine Contaminated Property Cleanup Act of 2005 – Other Issues

- ☒ Property Owner may not clean or remediate themselves.
- ☒ PSA Work Plan and PSA Report must be signed and notarized by contractor and by a Certified Industrial Hygienist.
- ☒ If property owner does not initiate or complete remediation, the City or County may remediate property.
- ☒ Property owner is liable for the remediation costs to the City or County.



Tieing Up Loose Ends

Within 10 Working Days of Property Remediation:

- ☒ Payment due on lien to local agency.
- ☒ Once costs are recovered, local agency must release lien.
- ☒ Local agency must send No Further Action letter to all parties who received Remediation Order.



Enforcement

Maximum \$5,000 Civil Penalty for the Following:

- ☒ Person disturbing or destroying "Warning" posting.
- ☒ Person violating "Warning" posting.
- ☒ Property owner who does not provide a notice or disclosure to potential buyers or renters.
- ☒ Person who violates an Order prohibiting use or occupancy of contaminated property.



CONTACT INFORMATION:

Elise Rothschild, Supervising Environmental Specialist

rothschilde@saccounty.net

(916) 875-8473

Mark Trask, Environmental Specialist

traskm@saccounty.net

(916) 875-8472