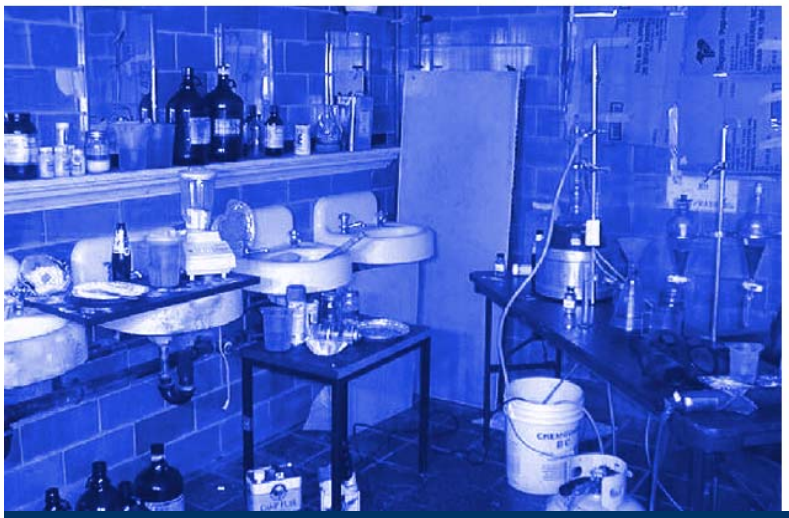

(U//FOUO) Identifying and Differentiating among Clandestine Biological, Chemical, Explosives, and Methamphetamine Laboratories

Joint Special Assessment

14 February 2008

Homeland Security
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(U//FOUO) Prepared by the DHS/I&A Chemical, Biological, Radiological, Nuclear Branch/Borders and CBRN Division and the Los Angeles Joint Regional Intelligence Center.

(U) Scope

(U//FOUO) The purpose of this assessment is to assist members of the law enforcement and public safety communities in differentiating among four types of clandestine laboratories: biological, chemical, explosives, and methamphetamine. It provides descriptions, distinguishing features, and hazards of each type of laboratory and includes four reference guides for distribution to public safety personnel. This assessment expands on a related product—*Distinguishing a Biological Agent Production Laboratory from a Methamphetamine Laboratory*, Lawrence Livermore National Laboratory, 22 January 2008—by including indicators and warning signs associated with clandestine chemical and explosives laboratories.

(U) Introduction

(U//FOUO) Terrorists can use clandestine laboratories to produce biological weapons, chemical weapons, and explosives. Because of their initial similarities, law enforcement and first responders could misidentify a terrorist lab as a clandestine methamphetamine lab, with potentially dangerous consequences. Each type of lab poses unique risks to law enforcement and public safety personnel because of the chemicals used in production, the resultant material, and the security that often is in place. Therefore, it is important to recognize the indicators and prepare for the hazards of each type of laboratory.

(U) External Indicators of Possible Clandestine Laboratory Activity

- ***(U) Bars or covers on windows.***
- ***(U) Chemical smells or vapor clouds.***
- ***(U) Dead animals or birds nearby.***
- ***(U) Security: extra locks, fortified doors, guards, and surveillance cameras.***
- ***(U) People coming and going at odd hours.***
- ***(U) Precursor chemicals in trash.***
- ***(U) Occupants regularly smoking outside.***
- ***(U) Discoloration of pavement, soil, or structure.***
- ***(U) Renters who pay in cash.***
- ***(U) Electricity being run into a seemingly abandoned building.***

(U//FOUO) Four Types of Clandestine Laboratories

(U) Methamphetamine Laboratories

(U//FOUO) User methamphetamine lab.

(U//FOUO) Clandestine methamphetamine laboratories exist nationwide; authorities seized more than 5,000 in 2005. California is a primary location for methamphetamine labs; 55 labs were seized in the nine-county Central Valley High Intensity Drug Trafficking Area alone between January and November 2007. Labs typically are distinguished by the quantity of methamphetamine they can produce per production

cycle: “superlabs” are capable of producing 10 pounds of methamphetamine or more per cycle, whereas the more common “user labs” produce 1 pound or less per cycle. Each pound of methamphetamine produced generates approximately six pounds of potentially hazardous waste; thus, large dump sites are good indicators of clandestine methamphetamine production.

(U) Prominent Methamphetamine Production Methods

(U) These method descriptions do not include chemicals used in the separation and crystallization stages.

- ***(U) Hydriodic acid/red phosphorous. The principal chemicals are ephedrine or pseudoephedrine, hydroiodic acid, and red phosphorous. This method can yield multi-pound quantities of high quality methamphetamine and is the preferred method of synthesis among Mexican methamphetamine-trafficking organizations.***
- ***(U) Iodine/red phosphorous. The principal chemicals are ephedrine or pseudoephedrine, iodine, and red phosphorous. This method yields high quality methamphetamine and typically is used by producers when hydriodic acid supplies are limited.***
- ***(U) Iodine/hypophosphorous acid. The principal chemicals are ephedrine or pseudoephedrine, iodine, and hypophosphorous acid. Known as the “hypo method,” this method results in a high yield of methamphetamine and usually is used only when red phosphorous or hydriodic acid are in limited supply. This method is particularly dangerous, often resulting in explosions and fires because of the phosphine gas produced.***
- ***(U) Birch Reduction/Nazi Method. The principal chemicals are ephedrine or pseudoephedrine, anhydrous ammonia, and sodium or lithium metal. This method typically yields ounce-quantities of high quality methamphetamine and is typically used by independent producers.***

(U//FOUO) The size of the labs varies depending on the scale of production. Smaller labs operate out of abandoned buildings, apartments, barns, cars, garages, hotels, private homes, travel trailers, trucks, vans, and even outdoor camps for quick assembly and disassembly. Superlabs require more space, and are often located in remote areas. Equipment found at superlabs can include commercial laboratory glassware and heating mantles as well as improvised equipment such as trashcans and large buckets. Household glass and plastic storage containers are more likely tools at user labs.

(U//FOUO) Methamphetamine production comprises three stages: cooking, separating, and crystallization. In the cooking stage, manufacturers heat the ephedrine or pseudoephedrine in the presence of other chemicals, which results in methamphetamine (see text box above). Manufacturers may use a commercial heating mantle, deep-fat fryer, hot plate, or camp stove for cooking. In the separation stage, the cooked mixture is combined with other chemicals to create liquid, or “free base” methamphetamine. The liquid is separated from unwanted solids using a drain or filter. The liquid methamphetamine is converted to a solid in the crystallization stage by reacting the free base with hydrochloric acid. The resulting wet solid is then dried, a process that can include literally wringing the wet methamphetamine in a mop bucket or drug press.

Some labs include a fourth stage during which the methamphetamine powder is exposed to acetone or other solvent to create crystal methamphetamine, or "ice."

(U) Explosives Laboratories

(U//FOUO) Clandestine explosives laboratories are the second most common type of lab and can be mistaken for methamphetamine labs since household chemicals are found in both. Moreover, certain explosives can be mistaken for drugs, specifically the hydrogen peroxide-based explosives triacetone triperoxide (TATP) and hexamethylene triperoxide diamine (HMTD), which are crystalline, odorless, white powders.

(U) HMTD (left) and TATP (right).

(U//FOUO) Homemade explosives can be manufactured almost anywhere since they typically require little specialized equipment. Recipes are widely available on the Internet and in anarchist literature and tend to use chemicals readily available at drugstores and hardware stores. Basic ingredients are fuel and an oxidizer (see Appendix B, Table 1). These are either physically mixed or chemically reacted to create an explosive. All explosives are sensitive to electrostatic charge, friction, heat, and shock; therefore, bombmakers sometimes manufacture the more sensitive ones in a cold environment, such as an ice bath, to prevent explosion. Binders such as grease, motor oil, petroleum jelly, and wax desensitize explosives hold mixtures together.

(U//FOUO) Once manufactured, bombmakers can incorporate homemade explosives into improvised explosive devices (IEDs). Electrically initiated IEDs require a power source, such as a battery, an initiator, at least one switch, and wires. Non-electrically initiated IEDs require a non-electric source of initiation such as a percussion primer or a time fuse. In either case, fragmentation and shrapnel can be added to increase lethality.

(U//FOUO) According to the FBI's Bomb Data Center, approximately 70 percent of all terrorist incidents involve explosives and incendiary agents, often incorporated in homemade, non-conventional, IEDs.

(U) Biological and Chemical Clandestine Laboratories

(U) Ricin toxin extraction lab.

(U//FOUO) Biological and chemical warfare agent laboratories are the least prevalent type of lab; however, because of the potential for mass casualties and panic and the continued interest in these agents by terror groups, they are of great concern.* The sophistication of the warfare

* (U) The Centers for Disease Control and Prevention website provides a ready reference for further information on specific biological and chemical warfare agents: emergency.cdc.gov/agent/.

agent lab depends on the agent being made, with simple agents like cyanide gas and ricin requiring far less equipment and skill to produce than complex agents like *Yersinia pestis*, the causative agent of plague, or sarin nerve gas. Sophisticated biological and chemical laboratories often are characterized by commercial laboratory equipment, reactor vessels, and ventilation and sterilization systems. Attempts to produce warfare agents in less sophisticated laboratories may lead to accidental release of an agent, explosion, or fire.

(U) Biological Laboratories

(U//FOUO) The two broad categories of biological agents are pathogens and toxins. Pathogens are disease-causing microorganisms, which include bacteria, rickettsia, and viruses (see Appendix B, Table 2). Infectious human strains of pathogens are commercially available and can be found in academic and medical research facilities. Pathogens also can be isolated from the environment; for example, *Bacillus anthracis*, the causative agent for anthrax, is found in soil.

(U//FOUO) Toxins are harmful substances produced by animals, living organisms, microbes, or plants. Toxins differ from chemical agents because they are naturally occurring, non-volatile, usually do not affect the skin, and may be much more toxic than chemical agents. One of the more widely available toxins is ricin, which can be extracted from the ubiquitous castor bean.

(U//FOUO) Castor beans and plant.

(U//FOUO) Agent acquisition can be a major hurdle to developing a biological agent. After acquisition, pathogens or toxin-generating organisms must be grown to create sufficient quantities of agent for dispersal. Initial growth, or culturing, typically occurs on agar plates for bacteria and in flat-bottomed flasks for viruses. This creates the seed culture for a larger production process that involves vessels such as bioreactors, eggs, and fermenters. Further processing to weaponize an agent is not required, but could lead to a more refined and easier to disperse product.

(U//FOUO) Biological agents can be disseminated in a number of ways, either via a liquid or dried agent. Liquid agents can be aerosolized using commercial sprayers, crop dusters, and modified fire extinguishers. Agents also can be dried and milled for more effective dissemination. ***Dried powder that rapidly disperses or disappears at the slightest touch or contact with moving air may indicate a weapons grade agent and should be regarded as extremely dangerous.***

(U) Domestic incidents involving biological agents include the following:

— (U) In 1984 a religious cult led by Bhagwan Shree Rajneesh sickened more than 700 people in Oregon by contaminating salad bars with *Salmonella typhimurium*.

— (U//FOUO) Between 1993 and 2007, at least 14 confirmed ricin incidents occurred in the United States involving domestic individuals or groups that adhere, affiliate, or sympathize with a radical extremist ideology.

— (U) In 2001 an unidentified individual or group caused 22 cases of anthrax, with five fatalities, by mailing letters containing *Bacillus anthracis*.

(U) Chemical Laboratories

(U//FOUO) Chemical warfare agents fall into five categories: blister, blood, choking, incapacitating, and nerve. These agents sometimes can be identified by their color or smell (see Appendix B, Table 3). Some agents are commercially available toxic industrial chemicals, such as chlorine and phosgene. Most chemical warfare agents, however, are not commercially available and require production.

(U//FOUO) Chemical reaction set-up.

(U//FOUO) The first of three general steps in the production cycle is chemical reaction, or synthesis. Synthesis requires a reaction vessel, often glass or metal, that is sometimes connected to other equipment such as a heat source, mixer, pressurized gas container, or water source. The next step is purification through distillation, evaporation, physical separation, or washing. This may require filtration equipment, glass containers connected to hoses, and a heat source. The final step is analysis to confirm the identity and lethality of the isolated compound, often accomplished by using chemical agent detection kits or live animals. Depending on the agent, purification and analysis are optional steps.

(U//FOUO) As with biological agents, chemical agents can be weaponized in a number of ways, including via aerosolized release. Chemicals also can be mixed with creams and solvents, such as dimethyl sulfoxide, to create contact poisons.

(U//FOUO) Attempts to use homemade chemical weapons domestically have to date been small-scale, typically perpetrated by individuals or small groups. A cell of Islamic extremist terrorists in Bahrain in 2003 reportedly developed a cyanide gas dispersion device they called a “mubtakar” that they intended to use against New York City’s subway system. Globally, the largest terrorist attack using a manufactured chemical agent was the March 1995 sarin nerve gas release on the Tokyo subway system by the Japanese cult Aum Shinrikyo, which resulted in 12 deaths.

(U//FOUO) Comparison of Biological, Chemical, Explosives, and Methamphetamine Laboratory Indicators

(U//FOUO) All four types of clandestine laboratories have distinguishing features, but differentiation may be complicated if the owners are involved in multiple illicit activities. The following table summarizes some indicators that are unique to each type of laboratory:[†]

Methamphetamine	Explosives	Biological	Chemical
Large quantity of empty cold medicine packages	Blasting caps	Agent samples: soil, blood, or organs; vials from commercial vendors	Chemical agent detection kits
Large number of matches	Fuses, wires, detonation cord	Agar plates, petri dishes, liquid growth medium	Auto injector antidotes for nerve agents
Red phosphorous	Switches	Castor beans or plants	Cyanide salts
Hydriodic acid	Tubes, pipes, shrapnel	Fermenters	Phosgene
Propane tanks with blue fittings	Hexamine fuel tablets	Drying and milling equipment	Live or dead animals in cages
Lithium	Ammonium nitrate	Sterilization equipment	Thiodiglycol
	Fuel oil	Incubator	Thionyl chloride
	Urea nitrate	Live or dead animals in cages	Phosphorous trichloride

(U//FOUO) Comparison of laboratory indicators.

(U) Hazards

(U//FOUO) The hazards to law enforcement and public safety personnel at clandestine labs generally fall into four categories: explosion, fire, firearms, and exposure. Explosions are the immediate danger. They can occur with little warning as the result of improper handling of chemicals or inadvertent ignition of chemical vapors or homemade explosives. Lighting a cigarette or turning on a light switch may ignite an explosion. ***If mishandled, the chemicals used in explosives production can pose unique dangers. For example, TATP and HMTD can react violently with field drug test kits. It is imperative to call an explosives ordinance disposal team if an explosive hazard is suspected.***

(U) Fires are another danger because of heating equipment in presence of chemicals. Approximately 20 percent of clandestine drug labs in the United States are detected because of explosions or fires. Smaller, less sophisticated labs are particularly susceptible because operators may be unaware of or unconcerned with safety precautions.

[†] (U) See reference guides in Appendix A for a complete listing of indicators.

(U//FOUO) Firearms are the third hazard facing first responders. Lab operators or their security force may be armed. Drug users, in particular, develop paranoia and may be unpredictable and violent. Discharge of a firearm in a laboratory is particularly dangerous because it may ignite chemical vapors and cause an explosion. According to the U.S. Drug Enforcement Agency, approximately 10 percent of clandestine labs are booby-trapped with explosives, firearms, or other devices. In Ventura County, California, a shed was rigged with a shotgun designed to fire at the front door when opened. Other types of booby traps found at clandestine labs include the following:

- (U) Light switches wired to IEDs and booby-trapped light bulbs.
- (U) Refrigerator doors wired to detonate an IED when opened.
- (U) Videotape cassettes altered to detonate an internal IED when placed into a video player.
- (U) Monofilament trip lines connected to chemical or explosive booby traps or fishing hooks.
- (U) Attack dogs and poisonous snakes.
- (U) Pipe bombs and weapons.

(U) What Not to Do if You Suspect You Have Entered a Clandestine Lab

- ***(U) Do not smoke or allow anyone in the area to smoke.***
- ***(U) Do not open or move any chemical containers.***
- ***(U) Do not touch any unknown substances with your bare skin.***
- ***(U) Do not smell the contents of ANY container.***
- ***(U) Do not put anything in your mouth.***
- ***(U) Do not use your firearm inside if at all possible.***
- ***(U) Do not plug-in any electric devices.***
- ***(U) Do not flip light switches.***
- ***(U) Do not open a refrigerator without first unplugging it.***
- ***(U) Do not use standard flashbulbs when photographing evidence; use special photographic strobe equipment instead.***
- ***(U) Do not stay in an unventilated area, especially if you begin to feel dizzy, short of breath, or a burning sensation of your lungs or skin.***

(U) The final hazard associated with clandestine labs is exposure by first responders to toxic chemicals or substances. Exposure to hazardous chemicals may have acute, immediate effects or a chronic, delayed manifestation. Officers may be unaware of their exposure because some toxic chemicals are odorless. In addition, chemicals including drugs may be on the clothing or skin of people at the scene, potentially contaminating officers arresting or processing subjects. Responders suspecting that they have encountered a clandestine lab should consider wearing breathing apparatuses or taking frequent breaks in fresh air.

(U) If a member of the law enforcement or public safety community discovers a clandestine lab, he or she should immediately exit the facility, secure the area, and call for assistance. Report any indicators as to the type of lab encountered.

(U) **JRIC Reporting Notice:**

(U) JRIC advises regional public safety agencies to report suspicious activities to leads@lajric.org. For comments or questions related to the content or dissemination of this document please contact the JRIC at 562-345-1100.

(U) **DHS Reporting Notice:**

(U) DHS encourages recipients of this document to report information concerning suspicious or criminal activity to DHS and/or the FBI. The DHS National Operation Center (NOC) can be reached by telephone at 202-282-9685 or by e-mail at NOC.Fusion@dhs.gov. For information affecting the private sector and critical infrastructure, contact the National Infrastructure Coordinating Center (NICC), a sub-element of the NOC. The NICC can be reached by telephone at 202-282-9201 or by e-mail at NICC@dhs.gov. The FBI regional phone numbers can be found online at fbi.gov/contact/fo/fo.htm. When available, each report submitted should include the date, time, location, type of activity, number of people and type of equipment used for the activity, the name of the submitting company or organization, and a designated point of contact.

(U) For comments or questions related to the content or dissemination of this document please contact the DHS/I&A Production Management staff at IA.PM@hq.dhs.gov.

(U) **Tracked by:** HSEC-060100-01-05, TERR-060400-01-05, TERR-060900-01-05, WMDB-020000-01-05, WMDC-020100-01-05

(U) Appendix A: Reference Guides

(U) Methamphetamine Clandestine Lab Characteristics

(U) Physical Indicators (not an exhaustive list):

- (U) Strong odors of acetone, ammonia, ether, or fuel.
- (U) Large numbers of matches.
- (U) Large quantities of empty cold medicine packages.
- (U) Jars containing clear liquid with white or red solids on the bottom.
- (U) Coffee filters with a white pasty substance, a dark red sludge, or small amounts of shiny, white crystals.
- (U) Propane tanks with fittings that have turned blue (used to store anhydrous ammonia).
- (U) Persons with indications of methamphetamine exposure: heightened paranoia, anxiety, restlessness, rapid speech, or dilated pupils.

(U) Empty cold medicine packages.

(U) Propane tanks with blue fittings, modified to hold anhydrous ammonia.

(U) Equipment Indicators (not an exhaustive list):

- (U) Canning jars, glassware, or pyrex-type dishes.
- (U) 22-liter round bottom flasks.
- (U) Heating devices: camp stoves, deep fryer, hot plates, or mantles.
- (U) Generator.
- (U) Rubber tubing.
- (U) Aquarium pumps or swamp cooler pumps.
- (U) Blender or coffee grinder.
- (U) Filters: coffee filters, sheets, silk underwear.
- (U) Large buckets or trash cans.
- (U) Personal protective equipment: gloves, goggles, or masks.
- (U) Compressed gas tanks.
- (U) Wringer: mop bucket or laundry press.

(U) Improvised heating and condensing apparatus.

(U) Heating mantle with 22L flask.

(U) Chemicals commonly found at methamphetamine labs.

(U) Chemical Indicators (not an exhaustive list):

Chemical	Common Use	Chemical	Common Use
Ephedrine/ pseudoephedrine	Nasal decongestant, bronchodilators, veterinary decongestant/bladder control agent	Hydrochloric acid or hydrogen chloride gas	Pool chemical, metal cleaner, acidifier, disinfectant
Hydriodic acid	Pharmaceuticals, disinfectant	Sulfuric acid	Battery acid, drain cleaner, fertilizer, explosives
Red phosphorous	Matches, pyrotechnics, fertilizers, pesticides	Acetone	Solvent found in paint thinner, nail polish remover
Lithium	batteries	Iodine	Germicide, antiseptic
Sodium hydroxide	Caustic soda beads, Red Devil Lye®, drain cleaner	Methanol (methyl alcohol)	Solvent, antifreeze, camp fuel
Anhydrous ammonia	Fertilizer	Sodium metal	Sodium vapor lamps. Stored under mineral spirits or kerosene

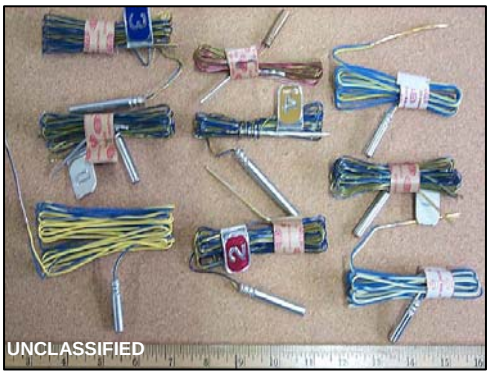
(U//FOUO) Explosives Clandestine Lab Characteristics

(U) Physical Indicators (not an exhaustive list):

— (U) Rusty doorknobs and metal fixtures.
— (U) Paint discoloration on walls, ceilings.
— (U) Delivery of chemicals to a storage unit, residential address, or rural location.
— (U) Theft of explosives, blasting caps, fuses, or precursor chemicals in region.
— (U) Chemical burns or missing hands or fingers.
— (U) Chemical fires.
— (U) Brightly colored stains on carpet, clothing from chemical activity.
— (U) Small test explosions observed in area.
— (U) Discoloration of sidewalk, pavement.
— (U) Dead vegetation in surrounding area.
— (U) Anarchist guides.
— (U) Unusual, chemical-like odors.

(U) Equipment Indicators (not an exhaustive list):

— (U) Refrigerator, cooler, or ice bath.
— (U) Glassware: beakers or flasks.
— (U) Thermometer.
— (U) Filter paper, strainers, funnel.
— (U) Commercial coffee grinder or grist mill.
— (U) Blender.
— (U) Odd job or concrete mixer.
— (U) Batteries.
— (U) Blasting caps.
— (U) Fuses.
— (U) Switches.
— (U) Tubes, pipes.



(U) Electric blasting caps.

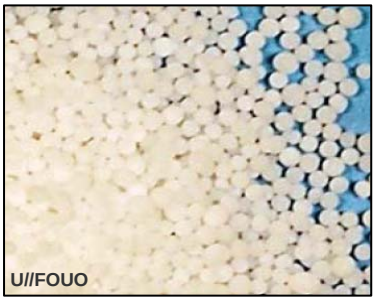
— (U) Flash bulbs.
— (U) Shrapnel.

(U//FOUO) Chemical Indicators **(not an exhaustive list)**

Chemical	Common Use	Chemical	Common Use
Hydrogen peroxide	Bleaching agent, pool chemical, disinfectant	Fuel oils; diesel, nitromethane	Home heating; automotive fuel
Ammonium nitrate	Fertilizer, matches, pyrotechnics, explosives, cold packs	Hexamine fuel tablets	Solid fuel for camp stoves, Esbit®
Potassium nitrate	Tempering steel, tobacco curing, glass manufacture, explosives	Sulfuric acid	Battery acid, drain cleaner, fertilizer, explosives
Aluminum powder	Paint additive, pyrotechnics, metal alloys, explosives	Nitric acid	Manufacture of fertilizers, dyes, explosives
Urea nitrate	Fertilizer, de-icer	Hydrochloric acid	Pool chemical, metal cleaner
Acetone	Solvent found in paint thinner, nail polish remover	Citric acid	Food additive, water softener, powdered drinks

(U) Concentrated hydrogen peroxide.

(U) Hexamine fuel tablets.



(U) Ammonium nitrate and fuel oil.

Urea **Sulfur** **Ammonium nitrate**

U//FOUO

(U//FOUO) Biological Clandestine Lab Characteristics

(U) Physical Indicators (not an exhaustive list):

- (U//FOUO) Noxious odors similar to rotting meat or fermented grain.
- (U//FOUO) Straw, brownish, or white colored liquids or powders.
- (U//FOUO) Live or dead animals in cages.
- (U//FOUO) Biology or lab textbooks.
- (U//FOUO) Anarchist guides or jihadist literature.
- (U//FOUO) Castor beans or plants.
- (U//FOUO) Rotting food in jars.
- (U//FOUO) Agent samples: soil, blood or organs, animals, vials from American Type Culture Collection.
- (U//FOUO) Improvised shower or eye wash.
- (U//FOUO) HAZMAT warning signs on containers.

(U) Modern lab.

(U) Growth media containers.

(U) Agar plates.

(U) Equipment Indicators (not an exhaustive list):

- (U//FOUO) Freezer, ice bath, or refrigerator.
- (U//FOUO) Incubator.
- (U//FOUO) Liquid growth medium, agar plates, or Petri dishes.
- (U//FOUO) Ventilation systems (fume hood).
- (U//FOUO) Microscope.
- (U//FOUO) Compressed gas tanks.
- (U//FOUO) Pipette.
- (U//FOUO) Filtration system: filter paper, coffee filter, or cheesecloth.
- (U//FOUO) Centrifuge (for spinning tubes at high speed).
- (U//FOUO) Drying and milling equipment: mortar and pestle, pan dryer, freeze dryer, or rock tumbler.
- (U//FOUO) Glassware: flasks, beakers, test tubes, or canning jars.
- (U//FOUO) Fermenter: "home brewing" kit, improvised fermenter, yogurt makers, commercial bioreactor.
- (U//FOUO) Sterilization equipment: pressure cooker, autoclave.
- (U//FOUO) Personal protective equipment: gloves, goggles, masks.

(U) Milling device (rock tumbler).

(U) Improvised Fermenter.

(U) Centrifuge.

(U) Micro pipette.

— (U//FOUO) Glove box (for handling substances inside an enclosed container).
— (U//FOUO) Nebulizers, crop sprayers, garden sprayers, modified fire extinguishers (for dispersion).

(U//FOUO) Chemical Indicators (not an exhaustive list):

Chemical	Common Use	Chemical	Common Use
Acetone	Solvent	Glycerol	Food, pharmaceuticals, skin care, munitions
Glucose or sucrose	Sugar, growth media	Bleach	Disinfectant
Peptone	Growth media	Ethanol	Disinfectant
Dimethyl sulfoxide (DMSO)	Solvent, paint stripper, cosmetics	Antibiotics	Pharmaceutical, kills bacteria
Agar	Gelatinous culture media	Yeast extract	Food additive, plant fertilizer
Sodium chloride	Table salt	Sterile water	Medical

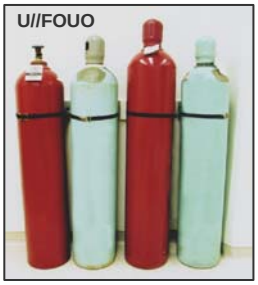
(U//FOUO) Chemical Clandestine Lab Characteristics

(U) Physical Indicators (not an exhaustive list):

— (U//FOUO) Chemical residues in soil samples.
— (U//FOUO) Live or dead animals in cages.
— (U//FOUO) Lack of insect life.
— (U//FOUO) Chemistry text books.
— (U//FOUO) Numerous people experiencing unexplained blisters, rashes, or welts.
— (U//FOUO) Dead, discolored, or withered vegetation for no apparent reason.
— (U//FOUO) Odors completely out of character for the surroundings.
— (U//FOUO) Anarchist guides or jihadist literature.

(U) Equipment Indicators (not an exhaustive list):

— (U//FOUO) Glassware: flasks, beakers, graduated cylinders.
— (U//FOUO) Large reaction vessels (glass or metal).
— (U//FOUO) Ventilation systems (fume hood).
— (U//FOUO) Condensers, tubing, vacuum pumps.
— (U//FOUO) Chemical agent detection kits.
— (U//FOUO) Compressed gas tanks.
— (U//FOUO) Refrigerator, ice bath.
— (U//FOUO) Pressurized reaction vessel.



(U) Compressed gas tanks.

(U) Commercial chemical containers.

(U) Personal protection equipment.

(U) Glassware.

— (U//FOUO) Pressurized spray bottles (for dissemination).
— (U//FOUO) Antidotes (autoinjectors for nerve agents).
— (U//FOUO) Personal protection equipment: goggles, gloves, SCBA, respirator, gas mask, rubber/neoprene aprons or suits, sealed waster containers.

(U) Agent detection.

(U) Nerve agent antidote.

— (U//FOUO) Filtration system: filter paper, coffee filter, cheesecloth, industrial systems.
— (U//FOUO) Heating devices: hot plates, Bunsen burners, mantles, oil baths, ovens, blow torch.

(U//FOUO) Chemical Indicators (not an exhaustive list):

Chemical	Common Uses	Chemical	Common Uses
Chlorine	Bleaching agent, disinfectant, pool cleaner	Anhydrous ammonia	Fertilizer
Phosgene	Plastics, pesticides	Phosphorus trichloride	Dye, gasoline, medicine, pesticide
Sulfur	Fertilizer, gunpowder, matches, insecticide, fungicide	Thionyl chloride	Chlorinate, plastics, pesticide
Sodium or potassium cyanide	Steel, electroplating, extracting precious metals	Sodium fluoride	Dental, disinfectant, insecticide, welding, wood
Ethylene	Petrochemical industry, food ripener	Hydrofluoric acid solutions	Rust remover, glass etching, semiconductor industry
Dimethyl sulfoxide (DMSO)	Solvent, paint stripper, cosmetics	Arsenic trichloride	Ceramics, insecticides, pharmaceuticals
Thiodiglycol	Dye, pesticide, plasticizers	Triethanolamine	Cosmetic products

(U) Appendix B: Reference Tables

Oxidizers	Fuels
Ammonium nitrate	Alcohols
Hydrogen peroxide	Cellulose (sawdust, cotton)
Nitric acid	Coal
Potassium chlorate	Flake/powder metals (aluminum, magnesium, iron)
Potassium nitrate (saltpeter)	Sugars
Urea nitrate	Solvents (acetone)
Potassium permanganate	Fuel oils
Sodium chlorate	

(U) Table 1: Examples of chemical precursors for homemade explosives.

Agent	Disease
Bacteria	
Bacillus anthracis	Anthrax
Brucella melitensis, abortus, suis, and *canis*	Brucellosis
Vibrio cholerae	Cholera
Francisella tularensis	Tularemia, or rabbit fever
Burkholderia pseudomallei	Melioidosis
Yersinia pestis	Plague
Burkholderia mallei	Glanders
Salmonella typhi	Typhoid fever
Coxiella burnetii	Q Fever
Viruses	
Dengue virus (flavivirus)	Dengue fever
West Nile virus (flavivirus)	West Nile
Marburg virus (filovirus)	Marburg
Ebola virus (filovirus)	Ebola
Variola major	Smallpox
Venezuelan Equine Encephalitis virus	Venezuelan Equine Encephalitis
Yellow Fever virus (flavivirus)	Yellow Fever
Rift Valley Fever virus	Rift Valley Fever
Rickettsia	
Rickettsia typhi	Murine (Endemic) Typhus
Rickettsia prowazkeii, Bartonella quintanta	Epidemic Typhus
Toxins	
Clostridium botulinum	Botulinum toxins – Botulism
Castor Beans	Ricin
Dinoflagellate	Saxitoxin
Staphylococcus aureus	Staphylococcus Enterotoxin B
Fungi	Trichothecene mycotoxins

(U) Table 2: Biological warfare agents.

Agent	Color	Smell
Nerve agents		
Tabun (GA)	Colorless to brown	Fruity
Sarin (GB)	Colorless	No odor
Soman (GD)	Colorless	Fruity; oil of camphor
VX	Colorless to straw color	No odor
Vesicants (Blister agents)		
Sulfur mustard (H or HD)	Pale yellow to dark brown	Garlic or mustard
Lewisite (L)	Pure: colorless Agent: amber to dark brown	Geranium
Pulmonary agents (Choking agents)		
Perfluoroisobutylene (PFIB)	Colorless	No odor
Phosgene (CG)	Colorless to light yellow	Newly mown hay
Chlorine	Yellow-green	Pungent, irritating odor like bleach
Blood agents		
Hydrogen cyanide (AC)	Colorless	Bitter almonds or peach kernels
Cyanogen chloride (CK)	Colorless	Pungent, biting odor
Incapacitating agents		
BZ	White crystalline powder	No odor
o-Chlorobenzylidenemalononitrile (CS) powder	White crystalline	Pepper
Chloroacetophenone (CN)	Solid	Apple blossom
Adamsite (DM)	Yellow-green crystalline solid	No odor

(U) Table 3: Chemical warfare agents.