CLANDESTINE DRUG OPERATIONS

AWARENESS AND SAFETY

ALBERTA FIRE COMMISSIONER'S OFFICE

Alberta MUNICIPAL AFFAIRS

CONTRIBUTORS

This safety and awareness manual is a collaborative effort involving Alberta Municipal Affairs Fire Commissioner's Office and the Calgary Fire Department. The project was endorsed and supported by the Alberta Fire Services Advisory Committee.

The scope of this manual is to provide a basic understanding of the potential hazards a first response crew may encounter at a clandestine drug operation. The scene is primarily a police investigation but when treated like a hazardous materials call from the outset, the fire department can be a valuable resource to the entry teams and investigators. A combined or joint services task force approach to mitigating a clandestine drug operation will ensure that appropriately trained personnel are there, with the ultimate goal of keeping everyone safe while performing their duties.

The information presented in this manual may also be of interest to law enforcement agencies, public health care workers, Children's Services personnel, public works personnel and Social Services providers.

Stay Safe.

Thank you to the following contributors for their contributions, input and editing skills.

Alberta Fire Services Advisory Committee

Alberta Municipal Affairs, Fire Commissioner's Office

Calgary Fire Department, Hazardous Materials Division

Calgary Fire Department, Training Division

Calgary Health Region, Environmental Health

Calgary Police Service, Drug Unit

Edmonton Emergency Response Department, Dangerous Goods Division

Alberta Human Resources & Employment, Workplace Policy & Standards

Alberta Children's Services

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Notes
The photographs of personal protective equipment and portable air monitoring instruments are included for illustrations and reference purposes only. Any reference to any particular manufacturer's equipment is not an endorsement and shall not be deemed as such.

INTRODUCTION

A dramatic increase in the number of Marihuana Grow Operations and related Clandestine Drug Manufacturing Operations found within domestic dwellings throughout Western Canada - including Alberta - has identified an urgent need to better prepare firefighters and other first responders for the handling of such occurrences. This manual is intended to provide a basic level of awareness and safety for first-arriving fire crews at illegal Marihuana grow operations and/or clandestine drug manufacturing laboratory sites.

Today's illicit drug manufacturing and processing operations pose serious hazards to emergency response personnel and residents in the community as well as the potential to cause significant environmental contamination. Any drug operation should be treated as a Hazardous Materials incident from discovery to conclusion. Appropriate precautions must be taken at all times to prevent serious injury or death.

This module is by no means all-inclusive. Its goal is to create awareness for the potential dangers encountered by first responders by discussing the more obvious physical signs of:

- Marihuana grow and clandestine drug operation sites,
- Environmental hazards,
- Potential chemical injury,
- Chemical wastes in and around the premises; and
- Protective steps to prevent any unwanted chemical contamination.

Any person using this manual must remember that local standard operating guidelines and other legislated practices and requirements must be adhered to.

OBJECTIVES

After becoming thoroughly familiar with the contents of this manual, the first responder should be able to:

1. Recognize the impact of Marihuana as a health-altering drug.

2. Describe the basic definition of a Confined Space and recognize the possible relationship with regards to **synthetic drug manufacturing operations**.

3. Recognize and distinguish between the Basic Grow Operations:
    - Organic
    - Hydroponic
    - Weed Oil Extraction processes

4. Demonstrate and describe site safety measures to protect responders from exposure and prevent injury or death.

5. Describe and demonstrate necessary atmospheric monitoring.

6. Describe and identify dangers associated with clandestine drug operations.

7. Describe the personal decontamination process to be implemented following entry into a grow operation.

8. Describe common exterior indicators of a clandestine drug manufacturing operation.

9. Describe dangers associated with storing Anhydrous Ammonia in propane cylinders.

10. Describe the chemical exposure risks associated with synthetic drug manufacture.

11. Describe and demonstrate basic site safety management techniques to prevent cross contamination.

12. Describe the limitations of structural firefighting clothing in preventing chemical exposure.

13. Recognize associated booby traps with clandestine drug operations.

14. Develop an appreciation for the gravity of responding to clandestine drug operations.

MARIHUANA GROW OPERATIONS

BACKGROUND / WHAT IS MARIHUANA?

Marihuana is one of the most commonly used illicit drugs in Canada. The dry, shredded green/brown mix of flowers, stems, seeds, and leaves of the hemp plant **Cannabis Sativa,** is usually smoked as a cigarette (joint or nail), or in a pipe (bong). Often in combination with another drug, it also is smoked in blunts, which are cigars that have been emptied of tobacco and refilled with marihuana. It might also be mixed into food or brewed as a tea.

In its more concentrated "sap-like" form it is called hashish. Both hashish and marihuana smoke have a pungent and distinctive sweet-and-sour odour. Street terms for marihuana are endless, including pot, herb, weed, grass, widow, ganja, and hash. The main active chemical in marihuana is THC (Tetrahydrocannabinol). THC binds itself to nerve cells in the brain. Here it kicks off a series of cellular reactions that ultimately lead to the high that users experience when they smoke marihuana.

BASIC MARIHUANA GROW OPERATIONS

Organic Grow

An organic grow operation means the marihuana plants are grown in containers filled with a soil-based media. This can be a simple operation consisting of a few potted plants or a large-scale venture of hundreds of plants in various stages of growth tended throughout the residential dwelling under an arrangement of commercial grow lamps.

Components of the marihuana organic grow operation include:

- high intensity grow lamps and ballasts (fluorescent lamp systems)
- sophisticated wiring systems and timers
- watering systems
- humidifiers and swamp coolers (large water baths)
- air handling systems, possibly with filters and scrubbers
- tanks containing chemical fertilizer blends, pumps and hoses
- pesticides and applicators
- carbon dioxide generator systems or furnace bypass systems
- fuel systems for carbon dioxide generators

Hydroponic Grow

Hydroponic grow operations refer to plants rooted in some type of a non-soil inert media: like lava rock or sawdust. The water, fertilizer and nutrients are cycled through a network of small diameter hoses from a central mix tank.

Components of the marihuana hydroponic grow operation include:

- high intensity grow lamps and ballasts
- sophisticated wiring systems and timers
- individual plant watering and drainage systems return lines to/from a mixing tank
- humidifiers and swamp coolers
- air handling systems, possibly with filters and scrubbers
- chemical fertilizer blends
- pesticides and applicators
- carbon dioxide generation systems or furnace bypass
- fuel systems for carbon dioxide generators

Weed Oil Extraction

The weed oil extraction procedure is utilized to remove the chemical THC (Tetrahydrocannabinol) from the Marihuana leaves using a common and easily obtained solvent and then concentrating the resulting mixture by evaporating off most of the initial solvent. This extraction procedure begins by transferring a quantity of Marihuana leaves and buds into a suitable container along with a common volatile solvent (butane, naphtha or ethanol). The plant matter is then soaked, filtered, pressed and concentrated through the evaporation process. The remaining dark oily liquid contains a high concentration of the chemical THC (Tetrahydrocannabinol).

Obvious dangers include the presence of a container of highly flammable solvent and an electrical unit that applies heat to drive off the volatile solvent. The weed oil extraction process may be completed in a matter of hours. Only very basic equipment is required and is easily portable.

FIRST RESPONDER AWARENESS & SAFETY PRECAUTIONS

DANGERS ASSOCIATED WITH GROW OPERATIONS

Reduced Oxygen Atmosphere and Restricted Access

There may be an occasion where the oxygen content is reduced below 19.5% and a restricted access to the grow area is encountered. A thorough site evaluation, including atmospheric monitoring, should be conducted by the police investigators and incident command to determine if the premises meets the definitions of a confined space. *See O.H.&S. regulations on page 23.*

Water Stains and Mold Spores

The extensive air handling systems often found inside grow rooms results in the accumulation of untreated moist air in the walls of the rooms and the attic. This is an ideal bed for the germination of harmful mold spores. The air is also laden with pollen from the mature plants. The presence of sprayed pesticide vapours could also be an issue. These factors pose a respiratory and skin absorption risk to unprotected persons and personal exposure symptoms may range from minor irritation to an anaphylactic-type allergic reaction.

Unusual watermarks and dark brown staining originate from under the eaves or soffits of this residence. These stains were present on all four sides of the premises indicating extreme moisture build-up in the attic space. ***(Photo 4)***

An example of extreme moisture on the interior walls of a house where a grow operation was discovered in the basement. The ceiling in the kitchen is sagging from the moisture build-up. Notice the water in the light fixture.
(Photo 43)

This photo clearly shows extreme mould growth on the interior walls. Look carefully in the corner just right of the drape; notice the cascade of mould moving outward along the carpet.
(Photo 44)

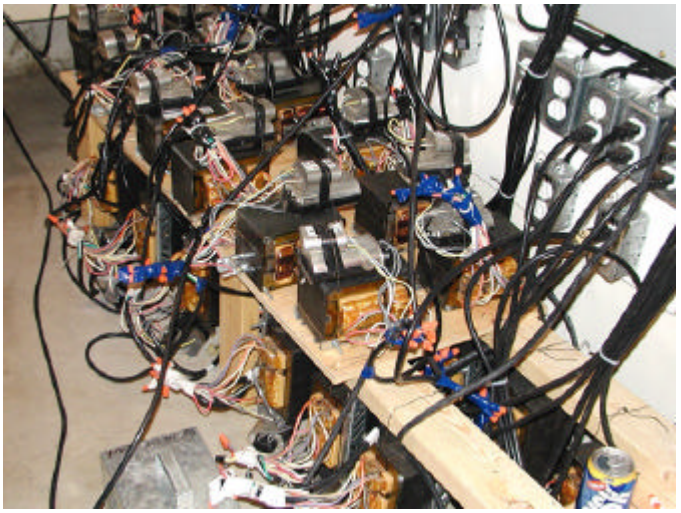
Closer inspection of the attic space of the home pictured in Photo 4 reveals extensive mould spore growth on the sheathing and roof trusses. ***(Photo 5)***

Electrical Bypass, Power Lines, Secondary Distribution Panels and Transformers

In most situations the electrical feed is routed through an illegal and often dangerous bypass at the electrical junction within the house. The incoming current load is usually not protected by fuses or breakers. The lights, humidifiers, air conditioning and cooling systems require as much as three to ten times the electrical demands of an average home. Electrocutions of 'growers' and injuries to first responders are not uncommon. Often the substandard wiring creates an obvious fire hazard. Beside the main panel of circuit breakers, there may be additional panels hidden in the dwelling still feeding power to equipment.

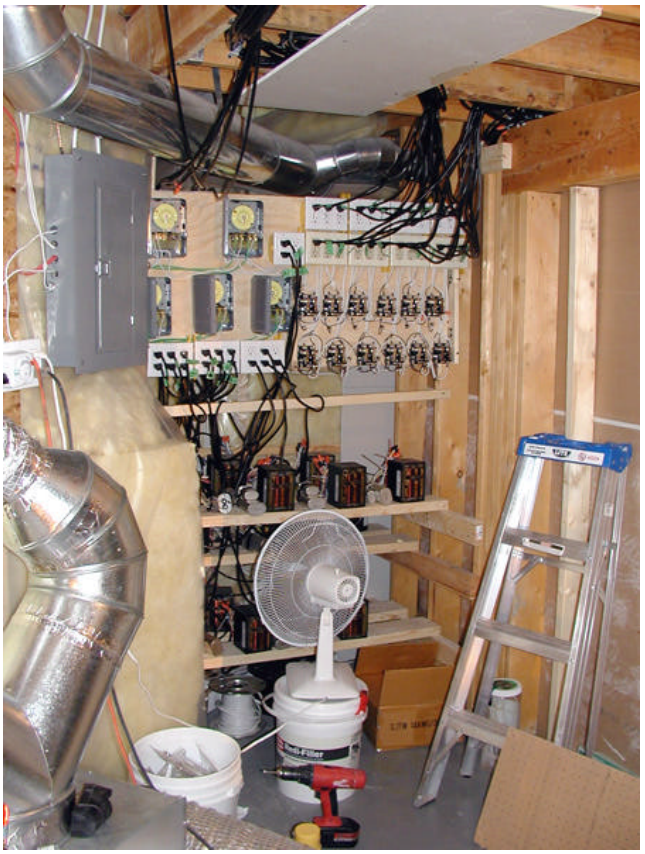
Often the transformers used to power the grow lamps are placed on a wooden base, and the heat generated can cause the base to ignite – an obvious fire risk.

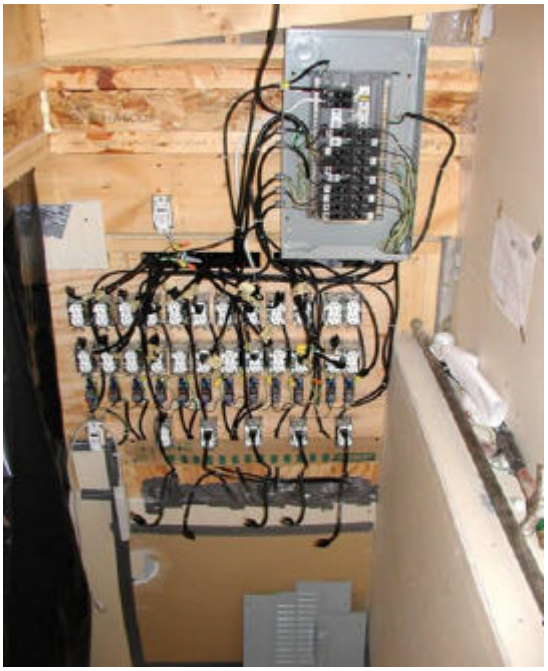
A concrete core cutter was used to gain access to the main domestic power into the home where the by-pass wire can be seen in the left side. Shutting off the main power bar on the electrical panel will not stop electrical power to the other lighting, cool and fan circuits used in the operation. ***(Photo 6)***



Maze of 220VAC supply lines to the transformers used to power the high intensity grow lamps. ***(Photo 7)***

Secondary electrical panel running on the bypass and transformers on the lower shelving. Note the fan used to cool the transformers. ***(Photo 10)***





Another secondary electrical panel running from the bypass. Exposed wires in a narrow stairwell present an electrocution hazard. ***(Photo 11)***

Hanging Hazards and Entrapment

In order to save time during the installation process the electrical power, gas, and water lines are often suspended together in the same bundle. In many cases this bundle of lines can be found almost anywhere:

- close to the floor,
- running across a hallway,
- in a staircase; or
- some other common travel area in the dwelling.

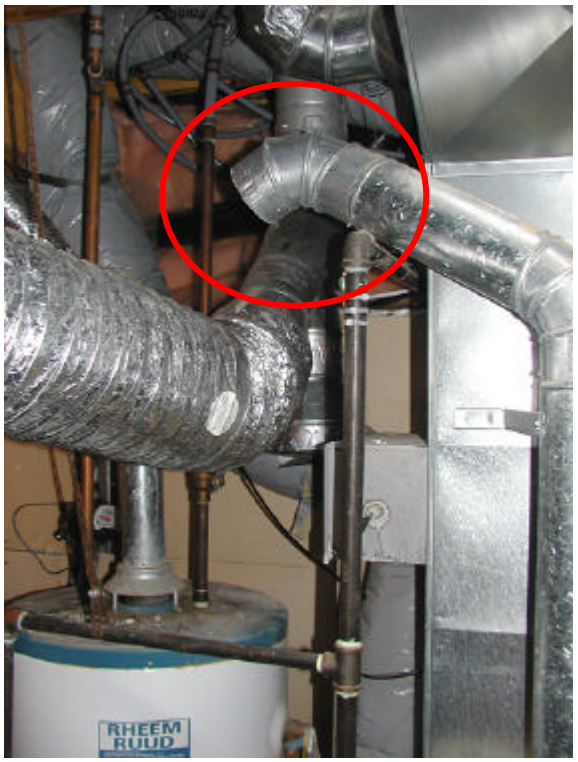
This set-up poses a severe entanglement and entrapment hazard, not only to the investigators, but also to any fire suppression crews that may be responding to a house fire and conducting a primary search or suppression activities in reduced visibility.

Hanging electrical hazards, 220VAC lines intermixed with water lines running to the swamp coolers. This bundle of wires is an obvious severe entrapment hazard in the event a pump crew had to execute a primary search in visibility-obscured conditions. ***(Photo 8)***

Common entrapment hazards include water lines on the floor or suspended from the ceiling, electrical lines suspended from the ceiling and strung along the walls. A propane fuel line is also suspended here and connected to a CO_2 generator hidden behind the swamp cooler. ***(Photo 9)***

Disconnected Flues

The furnace and hot water tank flues are often disconnected to allow the collection of the waste CO_2 to be absorbed by the plant. Unfortunately an additional hazard, carbon monoxide, also tends to build up in these closed spaces.



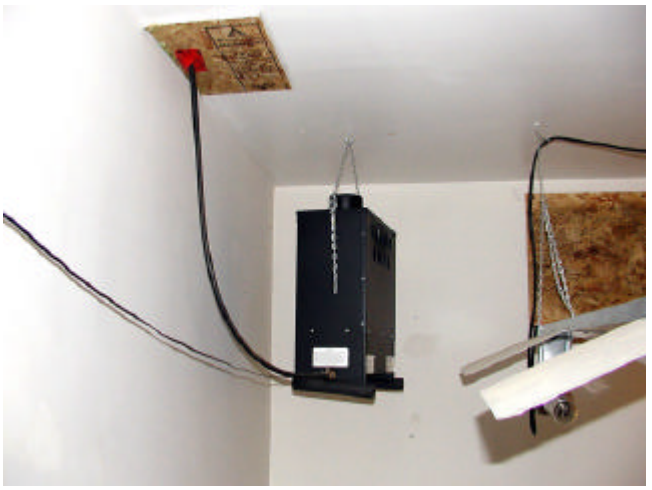
A common practice is to disconnect the furnace and hot water tank exhaust flue to allow combustion gases to free flow into the dwelling. This creates an obvious environmental hazard to unprepared first responders and investigators. ***(Photo 13)***

Propane and Natural Gas

Propane tanks may be concealed or stored inside the premises to fuel the CO_2 generators. Often, makeshift connections are made to the existing domestic natural gas supply creating another host of potential hazards and explosion risks.

Unsupported flexible gas lines used to fuel $C0_2$ generators. ***(Photo 12)***

Carbon dioxide generator hanging from the ceiling. This is simply a burner in a protective housing. Note the flexible gas line running through the ceiling to the left. ***(Photo 14)***

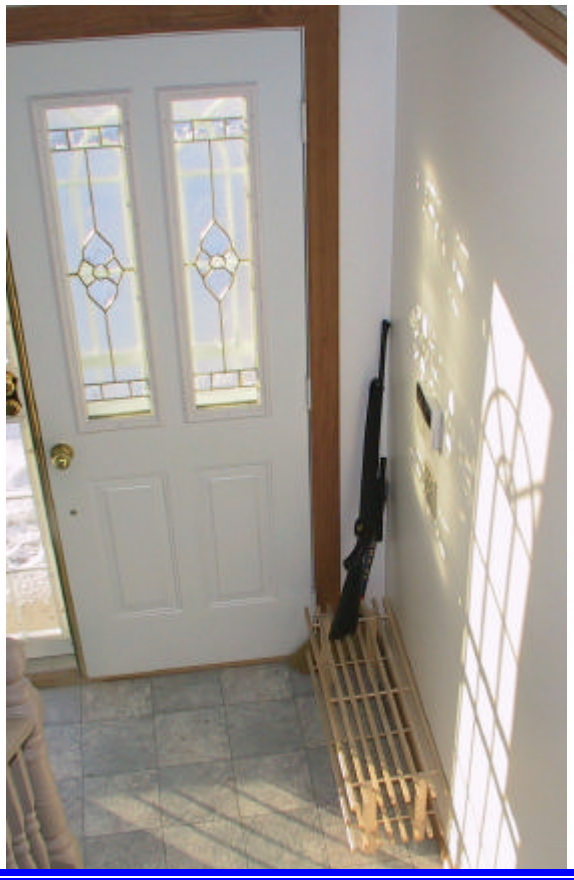


A 30 lb propane cylinder lying on its side, found concealed underneath a bench seat in the kitchen. The gas line ran through the floor to a CO_2 generator below. ***(Photo 15)***

Booby traps and Weapons

There is always a risk the first entry crews will encounter one or more **antipersonnel devices**. These booby traps may be set intentionally for police investigators or they may be attempts to deter crop theft.

Weapons inside the premises or stored at the front door. ***(Photo 16 above, photo 17 right)***



SUGGESTED MINIMUM EQUIPMENT REQUIREMENTS FOR GROW OPERATIONS

Because of the potentially toxic environment and the corresponding chemical hazards associated with grow operations, first responders must ensure that they are adequately equipped with the appropriate safety equipment to ensure safety throughout the incident duration. The following safety equipment list is by no means all-inclusive, and does not supplant any requirements set forth by the authority having jurisdiction in any particular area. In all cases local guidelines and procedures, as well as Provincial and Federal regulations, should be consulted before procuring a stock of equipment. Appropriate training for any instrument should also be considered prior to placement in service:

- Basic air monitoring instrument, three-or four-gas capability such as carbon monoxide, oxygen and combustible gas concentrations.
- Cartridge respirator, N-95 minimum, P-100 with organic vapour barrier
- Tyvek® style protective coveralls with attached hood
- Ultraviolet (UV) protective sunglasses and/or chemical protective goggles if wearing a half-mask respirator
- Nitrile rubber gloves
- Disposable boot covers
- Plastic bag for containment and disposal of personal protective equipment (PPE) after leaving premises
- Disinfectant solution in a spray bottle applicator for decontamination

Basic Air Monitoring

First entry crews and any crews conducting operations inside a marihuana grow operation must be equipped with some basic ambient air monitoring equipment. The most basic is a ***three-gas*** handheld monitor with oxygen, carbon monoxide and combustible gas sensor capabilities. A ***four-gas*** detector usually incorporates the detection of hydrogen sulphide (H_2S) as well. There are more complex versions that can be configured for five- and six-gas detection depending on the requirement. More details regarding gas monitoring can be found under the methamphetamine section of this manual.

The decreased oxygen atmosphere resulting from the on-site production of carbon dioxide (CO_2) is of primary concern in a marihuana grow operation. If there are no CO_2 generators running in the premises, be aware of disconnected furnace or hot water tank flue stacks. If the flue is removed or otherwise redirected into the air handling, then carbon monoxide (CO) is also a danger. The decreased oxygen content will be a strong clue that high levels of CO_2 are present.

NOTE: Most portable three/four gas detectors do not have CO_2 capability.

Propane and/or natural gas can be used to fuel the CO_2 generators. It is not uncommon to find a concealed propane cylinder inside the dwelling. An unattended leaking cylinder is a potential risk for fire or an explosion. **A *combustible gas detector* is absolutely essential for the initial environmental assessment.** Many other manufacturers and configurations of portable monitors are available. Always consult with a reputable dealer and chose an instrument with a good service history**.**

Example of Three- and Four-Gas Handheld Detectors.
Left; Industrial Scientific Instruments, LTX-310 (CO_2, O_2, LEL)
Middle; Industrial Scientific Instruments ITX (CO_2, O_2, H_2S, LEL)
Right; B.W. Technologies, Gas Alert Micro (CO_2, O_2, H_2S, LEL) ***(Photo 3)***

Note: The photographs of various portable gas detection instruments and personal protective equipment included in this section are included as an illustration and for reference only. They are not an endorsement of any specific manufacturer.

PERSONAL PROTECTIVE EQUIPMENT (PPE) AND DECONTAMINATION

Until atmospheric monitoring has been completed and determined the air is suitable to use a respirator, the best short term protection available to firefighters is the SCBA and full Bunker gear. The external and internal appearance of the dwelling may determine the choice of PPE. Look for obvious indicators such as staining, water marks under the eaves, dripping water from odd places and evidence of external and internal mold growth on the walls.

REMEMBER, IN MARIHUANA GROW OPERATIONS:

1. Inadequate air circulation to handle the moisture load results in water accumulation in the attic and interior walls, causing long term damage and mold growth.

2. Mold spores are almost always present when the warm moist air is vented directly to the attic

Protective clothing should include a **minimum** of a Tyvek® style disposable protective suit, respiratory protection, gloves (like Nitrile rubber medical gloves), enclosed eye protection (chemical protective goggles), and disposable boot covers or rubber boots. A **minimum choice** for the respiratory protection is the N-95 cartridge. The P-100 cartridges, however, are more efficient. These cartridges may be combined with general purpose Organic Vapour protection that removes pesticide or residual chemical vapours present in an enclosed area.

Always consult with a local Health & Safety Advisor or Regional Health Authority before purchasing respirators.

A full-face respirator will provide the necessary eye and respiratory protection with one convenient application. Several SCBA manufacturers offer an adapter that allows the mask to be worn while using air-purifying cartridges. The same mask can be worn as a standard SCBA when connected to a docking valve. Aside from the deployment flexibility, a great advantage is the mask can be fit- tested so the wearer is assured of getting a good seal regardless of the breathing air source.

A half-face respirator must be worn with UV protective glasses to provide protection from the high intensity grow lamps used in the operation. At all times, avoid working in proximity to the grow lamps, as these are a source of damaging ultra-violet radiation. **Although a respirator offers increased manoeuvrability, an SCBA will provide the highest level of respiratory protection available. If in doubt, wear an SCBA.**

In the event a decreased Oxygen environment (≤19.5%) is detected, then full SCBA is necessary. Review your Department's Standard Operating Procedures (SOP's) for when to wear SCBA.

Full-face respirator with P-100/organic vapour cartridges attached. ***(Photo 1)***

Full-face respirator, component view. The SCBA face mask doubles as a full-face respirator when equipped with the cartridge adapter (centre) and the two P-100 organic vapour combination cartridges. ***(Photo 2)***

SUGGESTED DECONTAMINATION PROCEDURES
MARIHUANA GROW OPERATIONS

Each responder working in the grow operation will require thorough decontamination after exiting the premises. A minimum procedure would include the removal and placement of the protective suit, gloves and boot covers into a sealed bag for disposal.

The respirator or SCBA is the last item removed. The mask must be cleaned with a suitable disinfectant-style cleaner. The work boots should be cleaned even when worn with disposable boot covers. A boot tray with cleaning/disinfecting solution will function nicely.

The goal is to reduce the transmission of the mold spores from the contaminated premises to the fire pump, fire station and ultimately home at the end of the shift. A clean uniform should be donned afterwards. **In all cases, clothing worn under the protective suit should be changed before returning home at the end of the work day**.

MINIMUM SUGGESTED PROTOCOLS FOR MARIHUANA GROW OPERATION SUPPORT

The following is a suggested ***starting point*** for operational protocols when assisting the Police with Marihuana grow operation investigation. In no way should these suggested protocols supersede or replace existing procedures without a thorough evaluation. **All local, regional and provincial Occupational Health & Safety protocols and regulations must be maintained.**

- Police agency serves a search warrant, secures the scene and deals with persons present in the premises.
- If possible, provide a portable air monitor to the first entry team to alert them of dangerous atmospheres. Observe and record 'peaks' upon exit.
- Don protective clothing and equipment as necessary.
- Establish a personnel accountability system as required.
- Proceed to monitor the interior atmosphere. Note changes in oxygen concentration between the ambient air outside and the interior.
- Never touch any equipment, light switches, or move objects until the scene is completely secured by police investigators.
- Observe for running CO_2 generators and furnace/hot water tank flue disconnects and fuel sources, investigate fuel source and consult with police investigators before shutting anything off.
- Observe for air handling systems, moisture build-up in walls and attic spaces and mold growth on interior walls and attic surfaces.
- Provide an assessment of the air quality inside the structure to the police investigators. Advise if ventilation is required before work inside may begin.
- Advise the police investigators of the necessary PPE (clothing and respiratory) required to safely conduct operations inside the premises.
- Complete Decontamination procedures on all personnel exiting the premises as necessary.
- Decontaminate all equipment, shower and change to a clean uniform back at the station as required.

SYNTHETIC DRUG MANUFACTURING OPERATIONS

BACKGROUND

There are literally hundreds of synthetic drugs on the market that are either locally made or imported from the USA and Mexico. The manufacture of illicit chemical or designer drugs, specifically **methamphetamine,** has extended well beyond the realms of well-funded organized criminal organizations into the local community through unorganized drug manufacturing labs. The dramatic increase of such labs in the U.S.A. has spilled over into Canada especially into the lower mainland of British Columbia and now South, Central and Northern Alberta. The latest trend at the time of publication is the movement of clan labs out of the cities and into more rural regions.

In 2002, there were 80,000 drug labs discovered in the United States. Washington State alone accounted for 1,470 drug labs, a huge increase from the 50 that were found in 1997. The Vancouver Sun newspaper published an article reporting 40 clan labs were discovered in the Greater Vancouver area in 2002, while there were no known sites just four years prior! [3]

This manual will focus primarily on the drug called methamphetamine, also known as meth, speed, crank, chalk, or zip. The process of manufacturing this drug is now easier and more accessible than ever and can be easily 'cooked-up' by anyone in a makeshift hidden lab virtually anywhere. There are literally thousands of recipes available over the Internet.

It is important to remember that in many labs, particularly those in residences, children reside on the premises. Although the scene is a crime scene and the children will be under the authority of the police, there are things that must be done by first responders. These children require special care and consideration. Please refer to Appendix B, at the rear of this package for Alberta Children's Services recommended procedures.

The drug can be made with inexpensive over the counter medications and chemicals to produce thousands of dollars worth of methamphetamine. Over the counter cold and asthma medications, ephedrine or pseudoephedrine, red phosphorous, hydrochloric acid, drain cleaner, battery acid, lantern fuel and antifreeze are the most commonly used chemicals to produce it. The drug is most commonly used by:

- teenagers and young people in their 20's-30's,
- individuals with either blue or white collared backgrounds, and
- the unemployed.

Numerous additional drugs can also be synthesized. Some examples include:

- Cocaine base (Crack, rock)
- Crystal methamphetamine or Ice (a central nervous system stimulant chemically processed from methamphetamine). [4]

- Ecstasy or MDMA (Methylenedioxymethamphetamine), a hallucinogen class drug , more toxic than Amphetamines. [5]
- GHB (Gamma-hydroxybutyrate) a central nervous system depressant. [4]
- MPPP (synthetic Heroin), an opiate class drug that may contain a toxic impurity

DEFINITION

The very nature of clandestine synthetic drug manufacturing operations should lead the incident commander to determine that the incident be treated as a significant hazardous materials event. The on-scene incident commander must conduct a thorough size-up to determine if the scene also meets the criteria defining a confined space. The *Alberta Occupational Health and Safety Act,* Occupational Health and Safety Code, Part 5, Confined Spaces, carefully outlines the requirements that must be followed if the incident meets the definition of a confined space.

> "Confined space" means an enclosed or partially enclosed space that is not designed or intended for continuous human occupancy with a restricted means of entry or exit ***and*** may become hazardous to a worker entering it because
> (a) of its design, construction, location or atmosphere,
> (b) of the work activities, materials or substances in it,
> (c) the provision of first aid, evacuation, rescue or other emergency response service is compromised, or
> (d) of other hazards relating to it;
> ***from Alberta Occupational Health and Safety Act, Occupational Health and Safety Code, Part 1, Definitions, October 2003.***

ASSOCIATED REQUIREMENTS

1. Occupational Health and Safety (OH&S) Regulations pertaining to a confined space incident require the incident Commander to prepare an emergency evacuation and response plan including steps to potentially rescue a worker inside the confined space.

2. OH&S Regulations also require the testing of the atmosphere prior to entering the confined space:
   "Before entering a confined space that may contain a hazardous atmosphere e.g. Oxygen deficient or containing toxic or explosive substances, pre-entry atmospheric testing must be done to ensure that levels of oxygen are adequate and that any hazardous substance is identified… Competent workers must conduct the testing with suitable test equipment that has been properly calibrated and is used in accordance with the manufacturer's specifications."

Information regarding the use of on-site multi-gas, hand-held monitors has been provided in the Air Monitoring sections of this manual.

Current Alberta regulations require the implementation of a site safety permit to track persons entering the confined space. The permit is to be completed by a Company Officer at the scene and a copy of the record maintained on file. A sample of a 'confined space entry permit' follows in appendix A.

In the event a member is exposed to a chemical, injured or contaminated during the course of duties, the Department's administration must ensure all applicable regulations as set forth by the codes are followed.

For more detailed analysis of what a confined space may be and the considerations that must be followed, as well as other OH&S requirements, please refer to the Alberta Human Resources and Employment website at http://www3.gov.ab.ca/hre/index.asp.

PHYSIOLOGICAL EFFECTS OF METHAMPHETAMINE

Methamphetamine is a very addictive stimulant drug that works directly on the brain and spinal cord (central nervous system) by interfering with normal nerve transmission.

It can be taken orally, snorted, smoked or injected. Users experience an intense sensation called a **'rush'** or a **'flash'** lasting several minutes that can be described as extremely pleasurable. An increase in energy and alertness, heart rate, blood pressure, body temperature and rate of breathing may persist for over six hours. Pupils may become dilated and frequently users experience hyperactivity, euphoria, tremors, and violent behaviour. [5]

Chronic abuse leads to anxiety, insomnia, hallucinations, schizophrenia characterized as paranoia and delusions. The methamphetamine affects the release of dopamine in the brain and its effects may last twelve hours or more. Complications of use may include convulsions, stroke, cardiac arrhythmia (irregular heart rhythms), stomach cramps and shaking. [6]

Chronic users are characterized as having poor hygiene, a pale complexion, and often exhibit open sores from scratching at "crank bugs" (A frequent delusion is that bugs are crawling under the surface of the skin).

EXTERNAL INDICATORS OF A CLANDESTINE DRUG LAB

The presence of a clandestine drug lab can quickly be identified by the presence of strong chemical odours like ether, vinegar, urine and ammonia, or the presence of laboratory equipment (beakers, flasks, funnels), makeshift ventilation pipes protruding from the structure, fortification bars and discarded and usually improperly labelled chemical containers.

Ammonia-like Odour
A sharp irritating odour associated with glass cleaners, cattle feed lots and fertilizers. Eye and nasal irritation may result.

Ether-like Odour
Aromatic sweet odour often accompanied by a sweet taste, often described as a "hospital" type of odour. Nasal irritation may result.

Solvent-like Odour
Sweet odour from common solvents like paint thinner, paint strippers, adhesives, and cleaning fluids; type of odour found in an auto body or furniture finishing shop.

Vinegar-like Odour
Typically pungent, acrid, or sour odour associated with vinegar. Eye irritation may result.

Coffee Filters

The presence of coffee filters with a purple or burgundy stain is a strong indicator of a lab site. These may have enough Red Phosphorous trapped in the filter media that slight friction will ignite the material.

Plastic Garbage Bags Piled Around the House And On The Premises
Most "cooks" do not want to dispose of the chemical wastes in the regular domestic garbage pick-up system for fear of being discovered.

Chemicals and Waste
Dumped in back alleys, dumpsters, parks and ravines.

COMMON LAB SET-UPS FOR METHAMPHETAMINE MANUFACTURE

While there are numerous methods used to produce methamphetamine, only two of the more common processes will be briefly examined.

Anhydrous Ammonia Lab

An ammonia method lab, also known as the "Nazi" or the "Sodium" method, utilizes a reaction of ephedrine (an over-the-counter medicine) with lithium or sodium metals in anhydrous Ammonia. This method has some unique associated hazards.

The extraction and electroplating of either of these two metals in the caustic solution of anhydrous ammonia **creates extreme chemical hazards**. Lithium and sodium metals react violently with water and form explosive hydrogen gas.

Additionally, the anhydrous ammonia used in this process has been found to be stored in just about any kind of vessel capable of holding a pressurized liquid. These include but are not limited to propane cylinders, butane torch bottles, oxygen, acetylene, nitrogen and any other pressurized gas cylinder. The anhydrous ammonia corrodes the brass valves and fittings and will eventually cause the product to release through container failure. The presence of bluish green corrosion on the brass fittings is a strong indication of incorrect container usage. Do not attempt to move or otherwise deal with the container until a thorough assessment of the vessel has been completed.

Heavy build-up of blue green corrosion on the valve of a propane cylinder. This is an obvious indication of incorrect storage of materials in the cylinder.
(Photo 18)

The brass valve has failed at the threaded connection to the top of the cylinder, likely from corrosion caused by the storage of anhydrous ammonia in this propane cylinder. ***(Photo 19)***

Red Phosphorous Lab

The "Red Phosphorous" lab, also called the Red P, tweaker or Mexican National lab, utilizes a reaction of ephedrine in hydriotic acid and red phosphorous.

Note: Red phosphorus is easily ignited by friction, such as moving furniture across a carpet or a door slamming open.

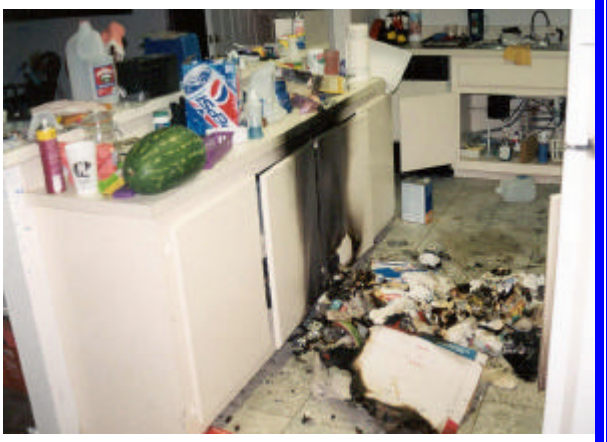
The main reaction involves cooking (refluxing) the ephedrine in hydriotic acid with the addition of red phosphorous usually in either:

- a large round bottom glass flask on a heating mantle; or
- in a triangular shaped Erlenmeyer flask on a heating element or stove.

Note

See further dangers of red phosphorous in the Chemical Precursor section following.

What appears to be a messy kitchen is really a meth lab that caused a small fire. ***(Photo 28)***



A round bottom flask sitting on a single burner hotplate. Note the hose fastened to the top used for vapour extraction/exhaust. ***(Photo 29)***

Mason jars on a camp stove have also been found. Devices utilized are limited only by the imagination or desperation of the cook/user. There is usually a vent line or tube leading from the top of the reaction vessel allowing the toxic fumes to be exhausted outside. Along with the production of toxic hydrogen iodide acid vapour, the **deadly pulmonary irritant phosphine gas is also a by-product of the reaction.**

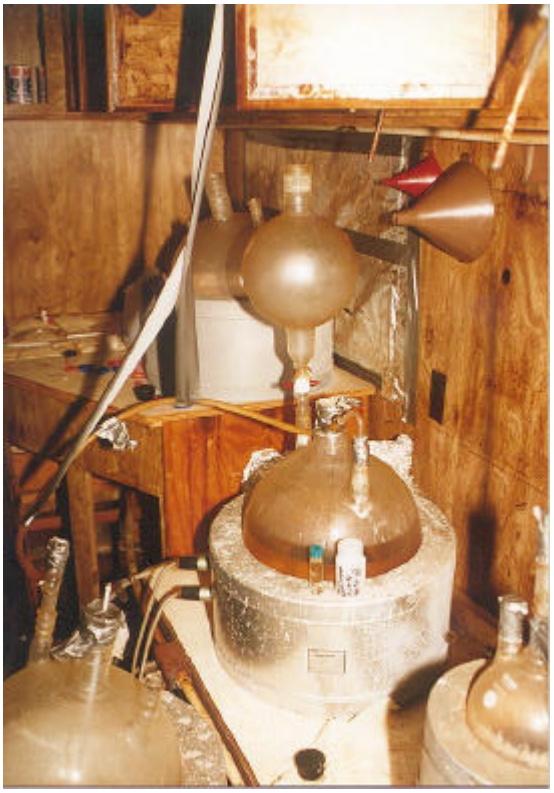
NOTE: Because of the deadly nature of Phosphine gas, it will be discussed in more detail in another section of this manual

Further to this, when the reaction vessel overheats, red phosphorous may be converted to

either the yellow or white elemental form of phosphorous. This creates an extreme or highly flammable fire hazard.

In a closed space, an **oxygen deficient atmosphere** may also result from the reaction. Depending on the stage of decomposition in the reaction vessel, a highly toxic irritating and corrosive phosgene gas will also be produced.

Do not attempt to stop or neutralize the reaction without consulting a qualified chemist, trained police investigator or qualified hazardous materials technician or specialist.



Large round bottom flask sitting in a heating mantle. Note the very small vapour extraction hose protruding from the side of the flask. There appears to be duct tape sealing the open necks of the flask in the photo. ***(Photo 31)***

Several large round bottom flasks sitting on heating elements. The red phosphorous solution is clearly visible boiling inside. ***(Photo 43)***

Note the group of round bottom flasks sitting in heating mantles. The vapour exhaust hoses are clearly visible extending from the top of the vessels. Note what appear to be half face cartridge respirators on the top of the heater/air conditioner in the rear of the patio.
(Photo 30)

A basement converted to a methamphetamine production lab. Note the air extraction duct suspended from the ceiling. ***(Photo 44)***

Common Lab Equipment and Glassware Examples

The type of equipment used to synthesize the desired products is limited only by the availability and the imagination of the 'cook'. Some sample equipment confiscated over the years would include the following:

Heating Mantle ***(photo 22)*** **?**
Designed to hold a round bottom flask and heat it to a desired temperature.

? **Round Bottom Flask** ***(photo 23)***
Typically a clear glass vessel with a round bottom. Various sizes. Requires a stand or base to sit in.

Separatory Funnel ***(photo 24)*** ?
May be glass or plastic.
Used to separate liquids of different density and/or precipitate crystals.

Beakers ***(photo 25)*** **?**
Glass or plastic, used to hold liquids, may also be used for a reaction vessel of sorts.

? **Buchner or Filter Funnels** ***(photo 26)***
Used to hold a filter paper to collect crystals or other material when a liquid slurry or solution is poured through the device.

Filter Flask ***(photo 27)*** **?**
An Erlenmeyer flask with a hose barb or tube attachment to the side. When the tube is hooked up to a water faucet attachment, a vacuum is created inside the flask – used with a filter funnel to clean crystals.

Although the preceding information depicts laboratory grade equipment, it is important to remember that much of the "clan lab" equipment first responders will run across will consist of Pyrex containers, mason jars and plastic tubing all held together with duct tape.

SUGGESTED MINIMUM EQUIPMENT REQUIRED FOR CLAN LAB SUPPORT

The following equipment list is by no means all-inclusive, and does not replace any requirements set forth by the local jurisdictional authority. In all cases local guidelines and procedures addressing Provincial and Federal regulations should be consulted before procuring a stock of equipment. Appropriate training for any instrument should also be considered prior to its placement into service.

- Confined space entry permit and personnel control systems as required.
- Basic air monitoring instrument, four-gas (or more) detector capable of displaying carbon monoxide, oxygen, combustible gas and phosphine concentrations, ammonia and acid gas are also advisable. Consult your instrument manufacturer.
- SCBA for all persons working in the premises.
- Chemical protective suits, 'Level A' required until a thorough assessment of the atmosphere and chemical contamination has been performed. Be aware of the potential flammability hazard as well.
- Suitable over-gloves for external hand protection.
- Chemical resistant high-top rubber boots.
- Plastic bag for containment and disposal of PPE after leaving the premises.
- Complete decontamination team and all necessary equipment and supplies.
- Fire suppression and rescue capability on scene.

BASIC AIR MONITORING INSTRUMENTS

First responder crews and any crew conducting operations inside either a methamphetamine or other clandestine drug manufacturing operation must be equipped with a basic air-monitoring instrument. If the production process is for methamphetamine, then a primary concern will be the potential for toxic phosphine gas from a red phosphorous cooker.

An ammonia detection-capable monitor will be an advantage in the event the anhydrous ammonia method is the reaction process encountered. Other acids may also be present in the atmosphere and some method for measuring acid gases should be considered. There is also the ever-present danger of flammable vapours, thereby requiring a monitor with combustible gas indicator capabilities or Lower Explosive Limit (LEL) sensors. Since the manufacturing premises may be enclosed and have poor ventilation, an oxygen sensor should also be standard on the monitor.

The most basic atmospheric monitoring equipment is a three-gas handheld detector with oxygen, carbon monoxide and an LEL sensor. A four-gas detector usually incorporates hydrogen sulphide (H_2S) as well. There are more complex versions that can be configured for five- and six-gas detection depending on the specific requirement. Some instrument manufacturers will accommodate the more exotic gas species, like phosphine, into a single gas detector.

In the event a fire crew is asked by a police unit to provide some air monitoring investigation prior to actually opening the door, there must be capability to actively draw an air sample from the interior. The addition of an air pump and sensor cover attached to a portable detector will provide the ability to sample from behind a closed door. A small diameter flexible hose is passed around the perimeter of the doorframe and can be inserted through a crack or mail slot to access the interior airspace.

B.W. Technologies Inc. single-gas detector for phosphine (left), and a four-gas monitor incorporating CO, H_2S, LEL and O_2 (centre). The Industrial Scientific Instruments ITX (right) can be configured to detect up to six gases. The model shown has five sensors in operation: phosphine (PH_3), ammonia (NH_3), hydrogen chloride (HCL), oxygen (O_2) and a combustible gas sensor (LEL). ***(Photo 32)***

B.W. Technologies Inc. uses a small battery powered air sample pump that is remote to the detector or monitor.
(Photo 33)

The Industrial Scientific ITX fits into a receiver on the air sample pump and becomes one unit. The pump operates from the monitor's onboard power supply. ***(Photo 34)***

Upon completion of operations, follow the manufacturer's maintenance instructions for your gas detector following use of the machine in a toxic and/or corrosive atmosphere. Maintenance will be critical for the safety of future operations.

ASSOCIATED DANGERS WITH METHAMPHETAMINE LABS

AWARENESS OF THE HAZARDS AS A FIRST RESPONDER

A chemical manufacturing lab represents several immediate threats to the personal safety of the on-site fire fighter because of the toxic atmosphere that may be present. While full PPE and SCBA may provide some protection, it is limited. Structural firefighting gear is not designed to provide protection for chemical exposures, liquid or vapour. Some chemicals present in chemical manufacturing labs may rapidly degrade the PBI/Kevlar® synthetic fibres used in fire fighter gear. [9]

Clan labs are usually either neat and organized or messy. In the tidy lab, the chemist is manufacturing the product for others. The setup will include laboratory style glassware, beakers, condensers and tidy chemical storage. The final product will be nicely pressed into pills and neatly packaged for distribution.

The other and more predominant style will be messy and potentially create obvious hazards. Chemical waste will be stored in soda pop bottles, food containers, mason jars or other container. There will be discarded chemical storage containers, dirty glassware and residue everywhere. Once the cook becomes addicted to the drug the only thing that matters is the final product. Over time the chemical induced paranoia becomes worse and literally nothing will get thrown out.

Crews attending a structural fire or medical call at such a facility must use extreme caution and wear full personal protective equipment (PPE) including SCBA. First responding units need to be observant and cautious of any smoke or flame with different colours or density than “typical” fires. Upon discovery that a fire is the result of a drug-manufacturing lab, the Incident Commander must consider defensive actions to reduce or minimize the dangers to fire fighters. If not already on scene, the Police should be notified right away.

Crews fighting a fire in a suspected lab will require thorough decontamination before returning to the pumper. If the incident involves an active manufacturing lab, then additionally any medical patient either found at the scene or requiring assistance should be decontaminated prior to being transported in an ambulance.

Caution must be taken to ensure chemical contamination is not taken back to either the station or to the homes of responders at the end of the shift. The pump crew is an essential component of the control and clean-up process that will follow. The risk of fire and chemical exposure will remain very high throughout the incident, including through the crime scene investigation and subsequent dismantling of the lab.

DANGEROUS CHEMICAL PRECURSORS AND WASTE PRODUCTS

There are more than two hundred individual chemical compounds that can be used to manufacture methamphetamine and other synthetic drugs. Some of these are listed below and grouped according to their function in the reaction process.

***For every kilogram of methamphetamine produced, 11 to 13 kilograms of toxic chemical waste is created.* (Amounts vary depending on method of synthesis).**

Precursors (basic compounds used to make methamphetamine)

- Cold or nasal decongestant tablets containing amphetamines
- Ephedrine – white crystals
- Pseudoephedrine – white crystalline material
- Phenyl-2-propanone, clear, moderately viscous liquid

Acids

- Acetic acid – colourless, corrosive clear liquid, pungent vinegar like odour, flammable
- Hydriotic acid – colourless corrosive liquid
- Hydrochloric acid – clear corrosive liquid, may be yellowish in colour.
- Sulphuric acid – clear, colourless, corrosive liquid, very heavy, may be present in a hydrogen chloride gas generator (container with a short hose fastened to the top).

Other Reagents

- Anhydrous Ammonia – Caution: may be in unusual container, such as a 20 lb propane barbeque cylinder, oxygen tanks, welding gas tanks, air compressor tanks. Obvious clue will be a greenish blue corrosion on any exposed brass valve or fitting. ***Use extreme caution***

- Red Phosphorous – red/burgundy fine powder. Produces lethal phosphine gas on heating. May be recovered from road flares, matchbook covers, or other pyrotechnics. Use *extreme caution*. When heated, red phosphorous converts to the yellow and/or white elemental form of phosphorous, which are self-igniting in air. Red phosphorous is *very unstable* and the slightest amount of friction (boots walking on carpet) *will ignite the material*. This may result in a fire you are unable to fully extinguish. On combustion, red phosphorous produces large volumes of dense white smoke, comprised mainly of phosphorous pentoxide – which creates phosphoric acid on contact with water. Since the human respiratory passages are lined with a moist membrane – inhalation causes respiratory edema. *This is fatal without rapid medical intervention*

- Lithium, Magnesium and Sodium Metals – extremely reactive with water, spontaneous violent reaction when exposed to moisture in air
- Iodine – irritant, acrid purple crystals
- Methylamine – corrosive liquid, flammable under pressure, strong ammonia odour

- Phenyl Acetic Acid – white powder, very unpleasant odour

Bases

- Sodium Hydroxide – solid white beads or pre-mixed solution. Extremely corrosive. May also be used in the form of strong bases like drain cleaner granules

Solvents

- Acetone – volatile flammable clear liquid
- Benzene – clear, colourless liquid, volatile, flammable/explosive, carcinogenic
- Chloroform – clear volatile liquid
- Camp fuel – Naphtha, white gas
- Ethanol (denatured alcohol) – flammable liquid
- Ethyl Ether – volatile flammable liquid
- Hexane – clear, colourless flammable liquid
- Isopropyl Alcohol (rubbing alcohol)
- Lacquer thinner – clear volatile, flammable liquid
- Nitroethane – oily liquid, pleasant odour
- Tetrahydrofuran – toxic, flammable solvent

By-Products of the Reaction And Processes

- Phosphine - toxic gas, heavier than air
- Phosgene - toxic gas, heavier than air
- Ammonium Acetate – crystals are explosive, solution is toxic and flammable

Phosphine Gas- Chemical and Physical Properties

Note: Often, when a 'meth cook' is found dead next to his chemistry set, the death is found to be the result of phosphine exposure

Chemical formula: PH_3

Synonyms: There is no ISO common name for Phosphine.
C.A.S. No. 7803-51-2

Toxicology data [8]

OSHA PEL 0.3 ppm 8 hour TWA
STEL (15 minutes) 1 ppm
IDLH 50ppm

Phosphine gas causes olfactory fatigue, which is the inability to detect an odour following exposure (similar to H_2S, hydrogen sulphide) [7]. The more that is inhaled, the less it is smelled. Exposure to intermittent low concentrations of 0.08– 0.3ppm have been associated with headaches. Higher exposure concentrations of 0.4 – 35ppm have been linked to the following symptoms; diarrhea, nausea, tightness of the chest and associated breathing difficulty, headaches, dizziness, skin irritation,

Phosphine is actually odourless in its purest form, at least up to a concentration of approximately 200 ppm, a highly toxic level. At elevated concentrations phosphine gas has a garlic-like odour, is highly flammable and toxic by inhalation. When inhaled, phosphine reacts to form phosphoric acid, which will cause blistering and edema of the lung tissue. The onset of serious symptoms may take several hours but is expected to be debilitating or **fatal without rapid medical intervention.**

If it does have an odour at lower concentrations, it is because of the presence of odouriferous impurities in varying concentrations. The odour threshold is usually in the range 0.14 to 7.0 ppm. [8]

Pure **Phosphine** has an auto-ignition temperature of 38°C. However, in the **presence of other derivatives**: phosphorus hydrides, particularly diphosphine (P_2H_4)- as impurities, it **will often ignite spontaneously at room temperature**. [8]

Phosphine forms explosive mixtures with air at concentrations greater than 1.8%. [8]

BOOBY TRAPS

The nature of a drug operation often triggers desperate measures by its members. As the chemically induced paranoia increases in those running the illicit operation, so too does the likelihood of first responders encountering antipersonnel devices or booby traps. These may include trip wires connected to alarms, explosive devices or other toxic chemicals.

The goal of this section of the manual is to increase personal awareness of emerging trends in encountering antipersonnel devices. If during the initial assessment of the building suspicions are aroused regarding any possibility of a clandestine drug lab behind closed-doors, call for assistance before opening the door. Some examples as to why are given below.

During 2002 in the British Columbia lower mainland, a pump crew was asked to attend a clan lab scene with the local Police Emergency Response Team. Their function was to provide fire safety, back-up and decontamination. After the scene was considered secure, a small object was observed protruding from the wall behind the entry door in an unnatural fashion. Further investigation revealed a military hand grenade with a crude trip wire. The device was armed and live, but luckily failed to explode on opening the door.

Other examples encountered include:

- Light switches, refrigerators, VCRs or other electrical appliances wired to explosive devices.
- Buried wooden planks with nails or spikes protruding upwards.
- Light bulbs partially filled with gasoline or other flammable liquid.

Never turn on or off a light switch, appliance or other electrical device in the premises.

There has been some anecdotal information about small improvised explosive devices designed to maim and injure investigators. The following reference describes these devices.

> "The Arizona Dept. of Public Safety reported that aluminium foil-wrapped "mini-bombs" were discovered during several drug seizures. The foil was wrapped tightly around a mixture of chemicals, which were extremely sensitive to heat, shock, and friction. The round balls or 'droppers' ranged in size from a marble to a baseball and resemble foil-wrapped drugs. The Department of Public Safety reported that attempts to unwrap the foil resulted in explosions blowing off fingertips, and dropping the bombs caused detonation." [9]

DRUG MANUFACTURING PARAPHERNALIA

The type of equipment used to synthesize the desired products is limited only by the availability and the imagination of the 'cook'. Some examples of confiscated equipment follow.

Materials required for manufacturing methamphetamine can be easily stored in a small back-pack or picnic cooler. This was possibly a "conversion" process to change methamphetamine into "Crystal Meth" ***(Photo 35)***

An investigator carefully inspects an assortment of glassware and chemicals easily concealed in a back-pack. ***(Photo 36)***

A larger red phosphorous cook in progress. The acid solution with “Red P” and precursors is slowly refluxing in the round bottom flasks. The silver container they sit in the heating mantle. Note the hoses used for toxic vapour extrication taped to the top of the flasks. ***(Photo 37)***

A small pill box with what appears to be completed methamphetamine crystals in plastic bags. This was found in the back-pack in photo 36. ***(Photo 38)***

Investigators prepare to open a van where glassware and chemical containers were visible on the front seat. The chemical protective clothing, over-gloves, and full SCBA are mandatory as there is no way to thoroughly assess the air quality or chemical contamination that may be present inside the vehicle. ***(Photo 39)***

The van's interior was a mess of clothing, blankets, chemicals, sharps, and broken glassware creating serious risks to investigators. Precursors and completed product were found inside. ***(Photo 40)***

The assortment of chemicals, glassware and finished product found in the van's interior. ***(Photo 41)***

From the van's interior, an open top Erlenmeyer flask with what appears to be finished methamphetamine crystals.

Anyone that may have come into contact with the product during the course of routine duties was at serious risk of chemical/drug exposure if not properly protected. ***(Photo 42)***

DECONTAMINATION

Any operation into or in support of a suspected drug manufacturing operation must have several key components in place prior to conducting the investigation. In the event the operation is found by chance or during other routine duties, the same key components must be brought into place as soon as practical. In most situations the fire service is requested by the local police investigation unit to provide back-up, air monitoring, decontamination and fire suppression services to the members conducting the operation.

Entry teams should be wearing full SCBA, chemical protective clothing, gloves, boots and have a decontamination system in place. *After* atmospheric monitoring has determined the working environment safe, then SCBA may be downgraded to appropriate full-face respirators with adequate filters for the potential toxic chemicals present. There should be back-up personnel ready to effect a rescue if necessary. There should also be a fire suppression team in place in the event a fire erupts.

A decontamination team with associated equipment should be available to remove any possible chemical contamination prior to anyone returning to a vehicle or place of employment. This can be as sophisticated as a dedicated mobile self-contained decontamination trailer/unit, or as simple as a two-person team with a hose from a fire pump, scrub brushes, appropriate decontamination or cleaning products, and an inflatable 'kiddie pool' for run-off containment. A Hazardous Materials Technician, Specialist or other chemistry resource should be consulted for appropriate decontamination solutions and procedures. Wastewater from the decontamination process must be disposed of appropriately as per local and provincial procedures/guidelines.

All gear should be thoroughly cleaned and inspected prior to return to service. At all costs, avoid cross contamination to other vehicles and the station.

Rapid Decontamination by a Pump Crew

If a Hazardous Materials Response team attends a "Clan Lab" incident, they will almost always have the necessary equipment for a thorough decontamination line. There may be times when a pump crew is first on scene and someone at the incident requires decontamination. A simple kit can be assembled and stored on the fire pump that can be rapidly deployed at the incident.

The pump crew opens the kit, someone inflates the pool (truck's air supply or SCBA cylinder adapter). The pump operator engages the fire pump and connects the forestry hose to a discharge using the required adapters. The contaminated person stands in the inflated pool to contain the run-off and the garden wand spray applicator is used to apply a soft yet copious flow of water. Use the scrub brush and soap to remove the chemicals as thoroughly as possible. Ensure the person assisting with the washing is wearing adequate personal protective equipment. Follow with a clean water rinse. Remove clothing from the top down as

necessary. Make sure the person does not touch any part of the body until thoroughly washed. If applicable, the SCBA is the last item removed. A medical assessment may be necessary following any chemical contact and subsequent decontamination.

Compact Decon Kit

- 20 L plastic pail with removable lid
- 1 - 15m length of 25mm forestry hose
- 1 - 38mm female to 25mm male adapter
- 1 - garden wand/spray head water applicator
- 1 - small inflatable kiddie pool (five or six feet diameter)
- 1 - length coiled air line with hand valve and quick connect to fit truck's air supply (used to inflate the kiddie pool quickly)
- 1 - long handle scrub brush
- Soap for washing

SUGGESTED PROTOCOLS FOR CLAN LAB SUPPORT OPERATIONS

The need for full co-operation between all authorities is critical for a successful operation. The following is a suggested starting point for operational protocols when assisting the police with a clandestine drug operation investigation. In no way should the protocols provided here replace existing procedures without a thorough evaluation. All regional and provincial regulations must be maintained.

- The incident is a crime scene and falls under the jurisdiction of the local police authority.
- **Coordinate with the police** agency prior to conducting support operations. Discuss levels of respiratory protection, chemical protective clothing, decontamination, fire suppression and environmental monitoring required.
- Have all **sectors in place and ready for deployment prior to operations.**
- If possible, provide a monitor to the police entry team. Observe and record peaks on exit.
- Support the police investigators as necessary.
- **Provide air quality monitoring** of the premises and report observations to the investigators.
- **Never shut down a chemical reaction in progress.** If a qualified offensive-trained Haz-Mat Specialist is not available, and a trained chemist is not able to attend the scene in a timely manner, then consult with another specialist over the telephone. Describe clearly the nature of the reaction, vessel shapes, sizes, fluid colour, vapour present, heating underway, cooling hoses and any other equipment in the process. Also record the air monitoring results observed during the initial environmental survey. The police agency on scene should have a knowledgeable chemical contact.
- Provide **emergency back-up and rescue support** to the investigators during the initial phases of the operation.
- Provide **decontamination** to persons leaving the premises. Avoid cross contamination to any vehicles or equipment.
- Fire suppression may be necessary during the clean-up and dismantle phases of the operation.
- In all cases, **follow good Haz-Mat management principles** to avoid personal injury, identify and secure product containment, and prevent cross contamination.

ADDITIONAL RESOURCE AGENCIES AVAILABLE

- Fire Department Hazardous Materials Decontamination Unit
- Health Canada, for chemical analysis and investigation services
- R.C.M.P. or authority having police jurisdiction in your area.
- Regional Health Authority, Environmental Health Division or authority having jurisdiction for Regional Health Administration.
- Family and Children's Services
- Alberta Environment, 1-800-222-6514
- Alberta Fire Commissioner's Office, 24-hour emergency 1-877-427-8393

OTHER RESOURCES

- Health Canada Clan Lab Response Team
  Western Canada 24-hour pager, 604-975-1672

SUMMARY

When investigating nuisance odour complaints, consider the telltale odours and other external indicators described previously in this manual. There may be nothing that can be done immediately other than a phone call to the local police department or Drug Investigation Unit to initiate a more detailed investigation. The situation may be completely innocent; however, in the event there is an illicit drug lab or grow operation a pump crew or Haz-Mat unit is not equipped to deal with the situation. This is best left to others.

If you do enter the premises and further assessment confirms suspicions, use the information contained in this manual to ensure that first responder functions and protocols are completed in a thorough and safe manner.

Be aware; be observant; be careful; and above all else be safe. In all cases, consult with a qualified specialist, chemist, or member of a regional Hazardous Materials Response team. This is a resource you should become familiar with now, rather than when you come upon a lab by accident.

TERMINOLOGY AND DEFINITIONS

Anaphylactic 'shock'- a sometimes severe and often fatal body reaction to an antigen (i.e. a wasp sting or penicillin) after previous sensitization.

Auto-ignition temperature- the temperature at which a material begins to burn without an external ignition source.

Carbon Dioxide Generator- basically an open burner bar enclosed in a protective housing. Most commonly uses propane or natural gas as a fuel source. The unit provides carbon dioxide to the atmosphere for increased plant growth. It may produce some carbon monoxide if poorly maintained or if there is an inadequate oxygen supply to support clean combustion.

Carcinogens- chemical or other substances that cause or initiate cancer cells; examples include formaldehyde and benzene.

Catalyst- An agent bringing about changes but which itself is not changed during the process.

Corrosives- Chemical compounds, often toxic, that causes irreversible tissue damage. Chemical groups include acid and bases.

Distillation- heating of a liquid to produce vapours, and then condensing the vapours to produce a more pure or refined substance.

Heating mantle- an electric heater shaped to securely hold a round bottom flask. A rheostat usually controls the temperature.

I.D.L.H. (Immediately Dangerous to Life and Health)- refers to an atmospheric concentration of any toxic, corrosive or asphyxiant substance that poses an immediate threat to life or would cause irreversible or delayed adverse health effects or would interfere with an individual's ability to escape from a dangerous atmosphere

PPE- Personal Protective Equipment.

Ppm (Parts Per Million)- A method of expressing the concentration of a chemical compound. Parts of contaminant per one million equal parts of air (or liquid).

Precursor- A raw material or controlled substance that becomes part of the finished drug when it is used in a chemical reaction.

Reagent- A substance that reacts chemically with one or more precursors but is not part of the finished product.

Reflux- A method of heating liquid so that the evaporated vapours condense and are returned to the liquid to be reheated.

Solvent- A liquid that is used to dissolve a substance. Typically a hydrocarbon liquid, or an alcohol or ether.

SCBA- self-contained breathing apparatus.

S.T.E.L. (Short Term Exposure Limit)- According to the American Conference of Governmental Hygienists, this is the time weighted average (TWA) maximum airborne concentration to which workers may be exposed for periods up to 15 minutes. No more than four (4) such exposures per day should take place, with at least 60 minutes time between exposures.

Swamp Cooler- An arrangement where cool water is trickled over the surface of a radiator and air forced through the radiator by a fan. If not properly cleaned or maintained, a swamp cooler can be a source of airborne mould contamination.

Synthesis- The process of creating a new or target chemical compound through various chemical reactions and physical conversions.

THC (Tetrahydrocannabinol)- usually refers to the naturally occurring isomer of delta-9-THC; found in Marihuana weed oil extraction. This is the desired or target component in Marihuana.

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P.O. Box 36427, Las Vegas, NV 89113, www.clialabs.com
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PHOTOGRAPH CREDITS Continued

Minnesota State Fire Marshal Division
444 Cedar Street, Suite 145
St. Paul, MN 55101-5145, http://www.dps.state.mn/fmarshal/hazmat/methlabtank.html
Photo 18 used with permission

Publishers Group, LLC
2805 Alvarado Lane, Plymouth, MN 55447, http://www.streetdrugs.org
Photo 19 used with permission.

Riverside County, California, Drug Endangered Children Program
http://dec.co.riverside.ca.us/agency.htm
Photos 28, 29, 30.

Alberta Municipal Affairs, Fire Commissioner's Office
16th Floor, Commerce Place, 10155 – 102 Street
Edmonton, AB, T5J 4L4
Photos 16 & 17 used with permission.

APPENDIX A

CONFINED SPACE ENTRY PERMIT

The following example of a Confined Space Entry Permit was taken directly from the Alberta Occupational Health and Safety Code Explanation Guide.

> **"As defined in section 1 of the OH&S Code, a confined space is an enclosed or partially enclosed space that is not designed or intended for continuous human occupancy with a restricted means of entry or exit and may become hazardous to a worker entering it because**
>
> **(a) of its design, construction, location or atmosphere,**
> **(b) of the work activities, materials or substances in it,**
> **(c) the provision of first aid, evacuation, rescue or other emergency response service is compromised, or**
> **(d) of other hazards relating to it." [1]**

Please click on or go to the link below to view a sample of a Confined Space Entry Permit.

http://www3.gov.ab.ca/hre/whs/law/pdf/ohsc_p5.pdf

Part 5, Confined Space, figure 5.2, Example of a typical confined space entry permit, page 5-10.

APPENDIX B

CHILD PROTECTION

- When local law enforcement personnel receive a report of a suspected meth lab, they will first determine through a thorough investigation if a meth lab is likely operating. If children are present, their safety is a primary concern. The appropriate investigators, including drug investigator, child crimes investigator, and CPS are notified and respond.

- CPS work jointly with other officials at the scene to ensure that the child is protected from further chemical exposure and that information necessary for both the drug investigation and the potential child abuse case is collected.

- An interview of the child can take place at the scene, but generally occurs in a more child friendly environment, such as a Child and Family Service A uthority office (CFSA).

- Law enforcement, fire and hazardous material investigators, and CPS Investigators share information with each other to facilitate their collaborative, multidisciplinary effort.

SAFEGUARDING CHILDREN

- The local CFSA ensures that children receive an immediate and appropriate medical exam, including a test for exposure to toxic chemicals and developmental screening. Upon being removed from the crime scene, the children are showered or bathed according to safe and recommended procedures in order to reduce chemical exposure and they are provided with new clothing, food, and, if needed, crisis counselling. A forensic interview will be conducted with the child, most often in a child friendly environment. The medical exam and interview p rovide important evidence to be used in the drug prosecution and child welfare court application.

(Note: Child welfare protocol based on the Arizona State Drug Endangered Children Protocol)

QUESTIONS

Please complete the following quiz as a crew exercise.

1. List three possible clues to the presence of a clan lab.

_____

_____

_____

2. Why is structural firefighting PPE not suitable for entering a suspected clan lab?

3. Upon entering a suspected clan lab, should you turn on the nearest light switch because it's dark in the room?

4. True or False: Is it not advisable to unplug the hotplate under the round bottom flask?

5. True or False: It's okay for me to have a quick peek inside the premises without SCBA, besides the "cook" just walked outside.

6. There's a strong chemical smell coming from behind a closed door. List three potential dangers that await you behind this closed door:

_____

_____

_____

7. Phosphine gas has an IDLH of _____ ppm?

8. The BBQ propane cylinder located at a response site has blue fuzz around the hose connection. Possible reason?

9. During the course of fire suppression, your crew has discovered what appears to be marihuana grow operation in the basement of a house. It's very bright in there with the grow lamps on. Is it okay to turn them off?

10. True or False: After extinguishing a fire in a suspected clan lab, crews must be decontaminated on-scene before returning to the station in service.