Farm Structures
FACTSHEET

BRITISH COLUMBIA | Ministry of Agriculture

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ON-FARM PESTICIDE STORAGE AND HANDLING FACILITY

INTRODUCTION

Pesticides are chemical and biological products used to kill and/or control pests and weeds affecting the profitability of farm enterprises. Herbicides, fungicides, rodenticides, miticides and other products form part of the large family of pesticides. Proper use of these products has become and integral part of successful farming operations and due care must be afforded this tool of modern agriculture.

In British Columbia, over 200 food commodities are produced encompassing a wide range of production methods and using a variety of pesticide products. As well, farm sizes can range from intensive one-acre greenhouse operations in the Lower Mainland to 10,000-acre grain and oilseed farms in the Peace River region. For this reason, a single, economical pesticide storage plan that is suitable province wide is unreasonable; however, basic considerations apply regardless of size and specifics.

LEGISLATION

The regulations outlining requirements for pesticide storage and handling are largely contained in the following:

- The ***Pesticide Control Act*** administered by the BC Ministry of Environment, Lands and Parks.
- The ***National Farm Building Code of Canada 1995***, which is part of the National Building Code of Canada.
- ***Occupational Safety and Health Regulations***, under the authority of the Workers' Compensation Board.

Other legislation applies to the transportation, spraying and waste disposal of pesticides. The basic elements addressed in legislation require that pesticides are to be stored in such a way as to:

- Protect the environment from pollution.
- Protect the pesticide user from the toxic effects of concentrated pesticides.
- Minimize the probability of improper pesticide use or accident.
- Reduce the hazard to people and property and provide for cleanup in case of accident.

DESIGN CONSIDERATIONS

Specific planning and construction details addressing legislative requirements and which should be incorporated in a pesticide storage are as follows:

SAFETY

- Warning signs should be permanently positioned at all access points (see Figure 1).
- Access to storage should be from the outside only and secured from unauthorized entry.
- Pesticide handling hardware and clothing items, cleanup materials and a first aid kit should be readily at hand.
- An eye wash station should be mounted on a convenient wall. As a minimum, emergency wash facilities should include 10 gallons of clean water in a portable container so as to provide for 15 minutes of continuous eye irrigation.

Figure 1 Warning Sign

- A fire-spread protection rating of at least one hour should be part of building construction.
- A fire alert or alarm should be included.
- A fire extinguisher should be mounted near an exit.
- A list of emergency numbers should be posted at the storage and the principal residence (see page 9).
- An inventory of stored chemicals should be posted within the storage facility, with a copy kept at a separate location (see page 10).

HANDLING

- Store the minimum quantity of pesticides needed.
- Store chemicals on all-metal or all-plastic shelves. Sheet metal or plastic-lined wooden shelves are an acceptable alternative.
- Separate pesticides stored in different types of containers. A three-shelf system is preferred (see Figure 2). Shelves 12”-15” deep and 18” high are suitable. Bottom shelves should be at least 4” above floor level. Floor storage of pesticides is not recommended.
- When large quantities of pesticide are required for short-term storage, wooden pallets should be used.
- Keep all chemicals separated from food, feed and water supplies.
- Separate combustible chemicals from oxidizing chemical supplies.
- Separate incompatible pesticides and chemicals.
- Empty, triple-rinsed containers should be taken to the nearest authorized pesticide container disposal site.
- An outside area for mixing of chemicals should be available adjacent to the storage facility. It should consist of concrete or impervious pad designed to contain any spilled materials and at least a 24 hour design rain. It must also support farm tractors or equipment passing over it. Figure 3 suggests a possible arrangement. Table 1 indicates 24-hour rainfall amounts for various parts of the province. A facility, which incorporates a roof over the mixing area, is preferred in high precipitation areas because cleanup problems associated with rainfall on an open pad are minimized.

In some cases, the purchase of manufactured, prefabricated pesticide storage units may be most suitable for users. For storages built on-site, it is important to understand the purpose for specialized construction. Figures 3, 4 and 5 respectively indicate building siting, a typical plan view and a section detail.

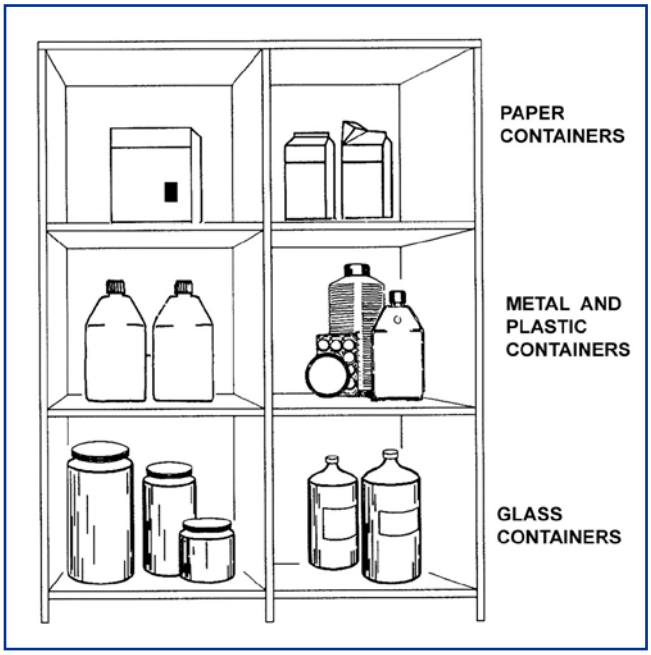

Figure 2 Pesticide Storage Shelf System

SITING

Consider both environmental and human factors before siting the pesticide storage facility.

The following guidelines must be followed to protect nearby water sources from becoming contaminated:

- Site the pesticide storage at least 30 metres (100 feet) away from wells, springs and surface water. In addition, most municipal and/or regional districts suggest building setbacks be 45 metres (150 feet) from property lines (see Figure 3).
- Do not site in areas with coarse soils or in low areas prone to flooding.
- Storage should be located on knolled areas whenever possible to ensure a well-drained site. Local drainage should be diverted away from the building site. Drainage culverts accomplishing this should be sized based on 15-minute rainfalls as shown in column 1 of Table 1.
- A grassed, earthen berm or ditch should be constructed to intercept upland water away from the building site.

A separate, dedicated use building is best for pesticide storage. As well as the previously mentioned environmental considerations, the storage should be located:

- To provide convenient road access by field sprayer, tractors and emergency vehicles.
- In an area not susceptible to vandalism and theft.
- To include fire separation from surrounding structures.
- Near a frost-free piped water supply year round for mixing.
- In a shady location to reduce solar heating.
- Downwind of principal residences.
- Near a source of electrical power for lighting, ventilation and heating.

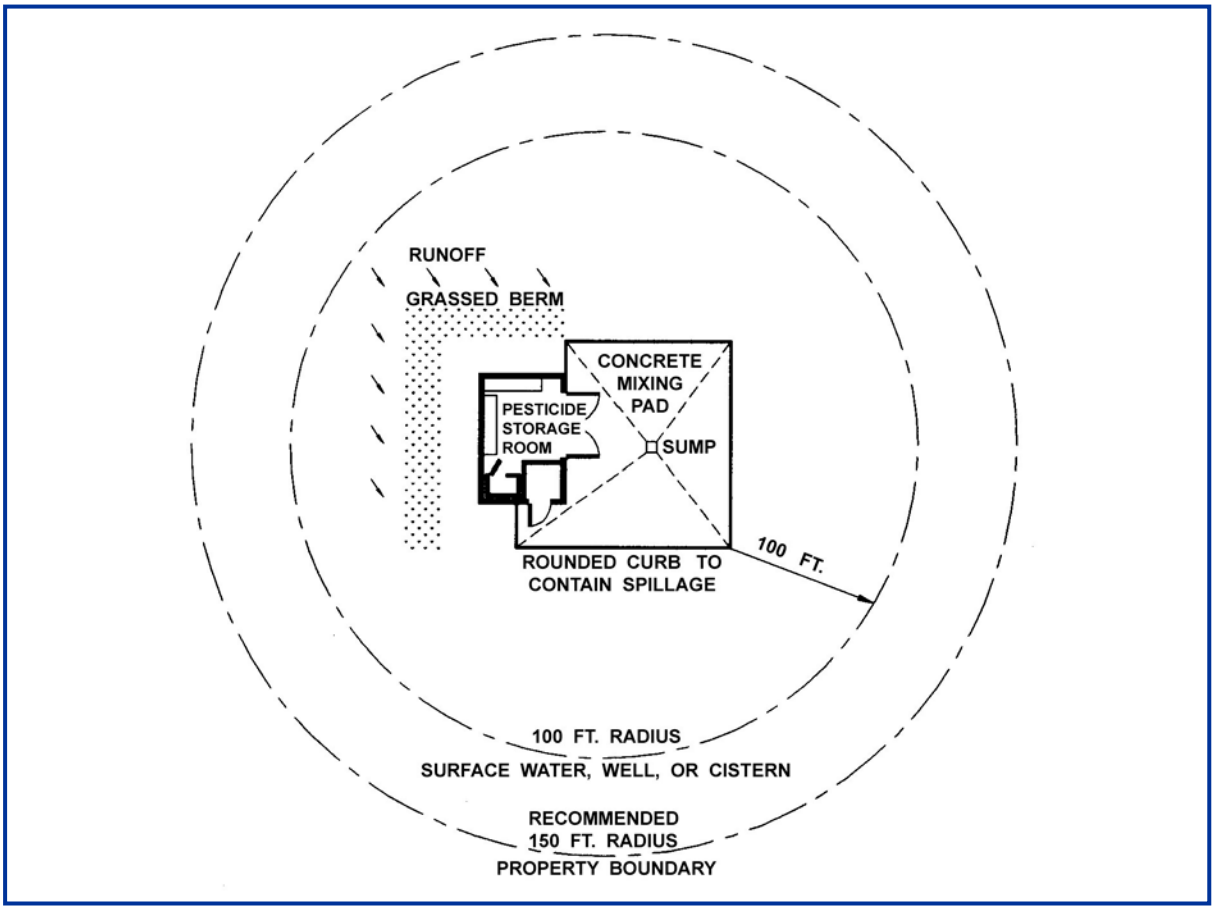

Figure 3 Siting of Pesticide Storage

BUILDING CONSTRUCTION

Various building designs can provide a suitable pesticide storage structure provided the following requirements are met:

- It is built on a well-compacted granular subgrade that is at least 6 inches thick.
- The foundation and floor must contain spills. A floor sloping to a shallow, watertight sump makes for easy cleanup of spills.
- Concrete surfaces should be durable and watertight. A 30 MPa, low-slump concrete mixed with a super plasticizer, and specifying 5% air entrainment provides and ideal base. Building foundations and floor should be constructed in a continuous pour to ensure watertightness.
- Whenever possible, fire-resistant and nonabsorbent materials should be used in construction. A minimum one-hour fire spread rating is required between the pesticide storage and any other structure. Two sheets of 5/8 inch gypsum wallboard on wood-framed walls and ceilings provide this rating.

! The building is structurally sound for given site conditions and climatic area. Figures 3, 4 and 5 show the construction specifications for an economical stud frame storage that could be used in most areas of BC. If in doubt, construction

Table 1 RAINFALL AMOUNTS FOR DIFFERENT LOCATIONS IN BRITISH COLUMBIA

REGION	15 MIN. RAINFALL (mm)	MAX 24 HR. RAINFALL (mm)
Dawson Creek	18	67
Prince George	15	50
Abbotsford	10	83
Kamloops	13	57
Victoria	9	74
Kelowna	10	64
Cranbrook	10	43

Specifications which address ***extreme*** climatic conditions-such as snow and rain loads, wind loads and cold winter temperatures as shown in Table 2-in local areas should be followed.

! Building size should allow for the organized storage and handling of pesticides. A minimum size of 8 feet x 12 feet is recommended (see Figure 4).

Table 2 SAMPLE OF DESIGN DATA FOR STRUCTURAL CONSIDERATION

REGION	MINIMUM JANUARY DESIGN TEMPERATURE (°C)	MAXIMUM JULY DESIGN TEMPERATURE (°C)	GROUND SNOW LOAD (KPA)	RAIN LOAD (KPA)	WIND LOAD (KPA)
Dawson Creek	-39	27	2.3	0.2	0.31
Prince George	-36	28	3.1	0.2	0.25
Abbotsford	-11	29	1.8	0.3	0.42
Kamloops	-28	34	1.6	0.2	0.30
Victoria	-8	24	1.0	0.2	0.48
Kelowna	-20	33	1.5	0.1	0.34
Cranbrook	-25	23	2.7	0.2	0.22

- For safety and economical reasons, it is wise not to store an overabundance of pesticide supplies. Unused, unopened chemical containers can often be returned to the supplier and will reduce on-farm storage requirements.
- Explosion-proof wiring, switches and fixtures are necessary for storage of flammable pesticides.

TEMPERATURE CONTROL

A temperature range of 5° - 30° C should be maintained within the storage. Many chemicals are susceptible to increase combustibility at higher temperatures and are subject to reduced effectiveness once they are frozen. A list of chemicals to be protected from extreme high temperatures is shown in Table 3.

For protection from frost, all framing should be installed with a 6 mil vapour barrier and insulated to at least R 20 (RSI 3.5) for walls, R 28 (RSI 4.9) for the ceiling and R 8 (RSI 1.4) for foundation perimeters.

Table 3 HIGH TEMPERATURE HAZARDS OF PESTICIDES

PESTICIDE	WARNING
Acephate	Decomposes rapidly above 40°C
Azinphosmethyl	Container may explode after heating above 85°C
Dinoseb	Container may explode. **DO NOT** heat above 100°C
Dinoseb-amine	Container may explode above 190°C
Disulfoton	Reactive above 38°C
DNOC	Dry salts can be explosive
Malathion	Decomposes above 50°C
Maneb, Mancozeb	Can decompose and undergo spontaneous combustion at elevated temperatures
Promoetryne	Dangerous at high temperatures
Proparqite	Store below 45°C

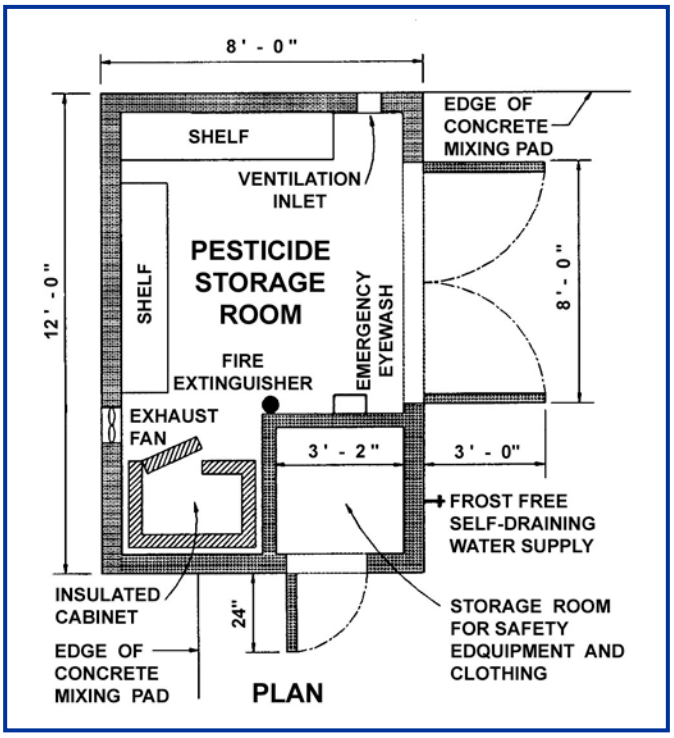

Figure 4 Pesticide Storage Plan

A heating unit must be provided in areas experiencing freezing conditions. A capacity of 1.5 kW should be sufficient to maintain nonfreezing temperatures in a well-insulated building for most areas of the province. In milder areas, a low-wattage light bulb can protect chemicals susceptible to freezing if stored in a separate insulated cabinet (see Figure 4).

LIGHTING

Good lighting should be provided inside and outside the storage to ensure safety and to permit easy reading of labels on pesticide containers. Lighting levels in frequently-used mixing areas should be at least 300 lux (30 foot candles), whereas storage area lighting levels can be reduced to 100 lux (10 foot candles). Double-tube fluorescent lighting is recommended for use indoors at a level of 2.5 watts per square foot of building area. High-intensity discharge lamps, such as low-pressure sodium, are efficient and suitable for use as outdoor lighting.

VENTILATION

Storage facilities for pesticides should be ventilated to the outdoors by either mechanical or natural means sufficient to prevent the accumulation of toxic or flammable vapours

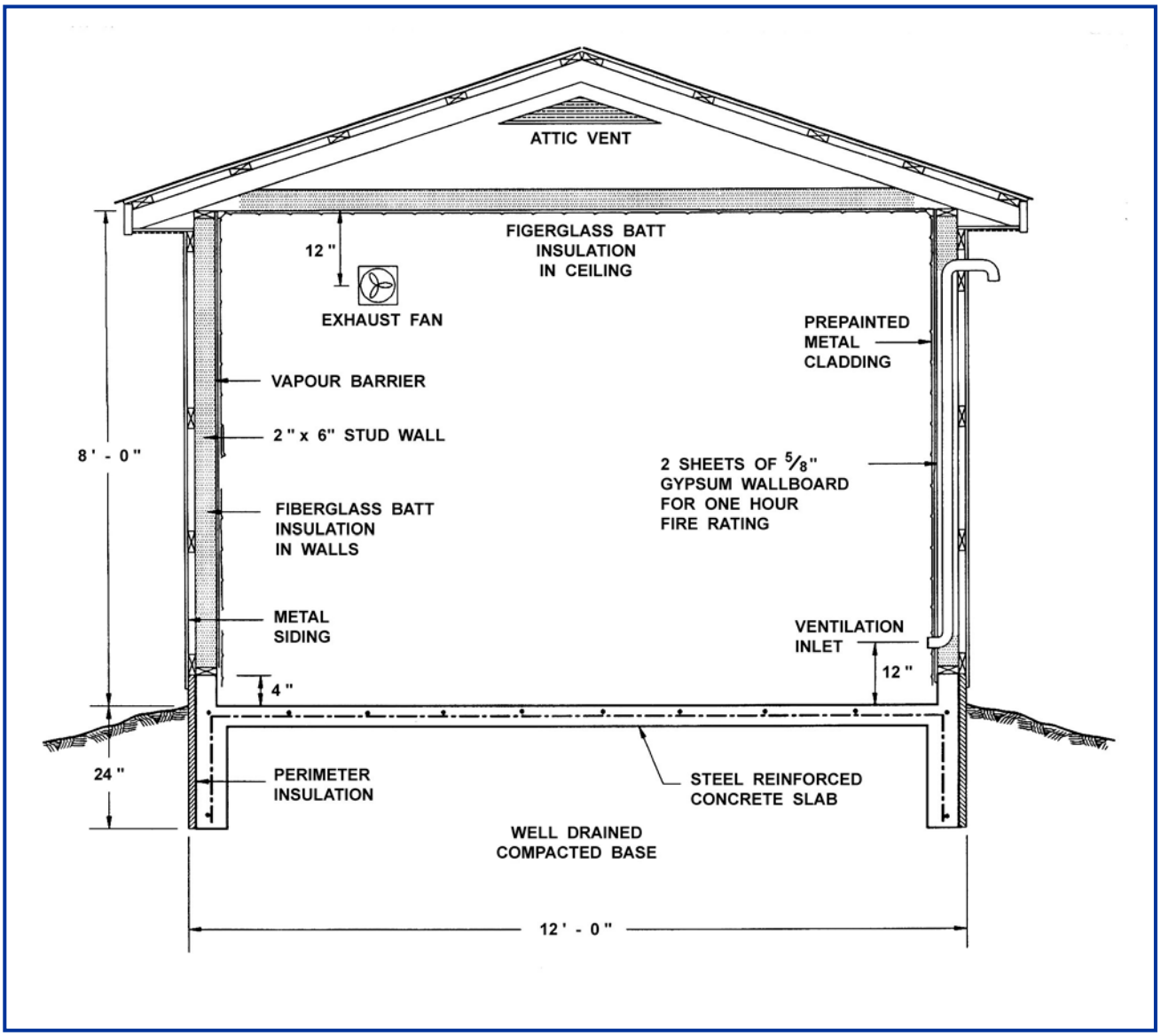

Figure 5 Pesticide Storage Section

Vapour concentrations can be kept at safe levels by installing a louvred, 8 in. diameter exhaust fan as shown in Figure 5. It should be wired so that an outside switch activates the unit before entering the enclosure. A fan capacity of six air changes per hour is recommended for a storage facility if mixing is done inside; otherwise, one air change per hour is adequate.

For a naturally ventilated building, two screened vents on opposite sides of the building within 12 in. of the floor should be provided. A vent size of 1 sq. ft. per 100 sq. ft. of floor area is adequate under normal storage conditions. If mixing is done inside, however, doors should be left wide open. In cold weather, all inlets and outlets should be blocked to prevent the possibility of freezing.

VANDALISM OR THEFT

Steel doors and padlocks can provide building security to prevent vandalism or theft. If temporary outside storage is also contemplated for container waste or bulk storage, a secured fenced area not prone to pollution risk is suitable.

EMERGENCY MEASURES

Fires and spills require prompt action to ensure worker safety.

The following actions are necessary in the event of fire:

- The storage facility must be vacated immediately and bystanders kept away.
- People and animals downwind of a burning pesticide building must be evacuated.
- The fire department must be contacted and notified of the building's contents.

In case of spill, the following steps are essential:

- People, animals and vehicles must be prevented from nearing any spill.
- Information on proper cleanup procedures must be obtained.
- Personal protective gear must be worn.
- Enclosed areas must be ventilated.
- At least two people should be involved in any cleanup procedure.

! If cleanup is beyond the capability of the user or operator, the Provincial Emergency Program should be contacted at 1-800-663-3456 for assistance.

A helpful acronym to assist in remembering proper cleanup procedures in the event of spill is:

B arricade or dike spilled material

A bsorb with suitable materials and

N eutralize any remaining residue with an agent appropriate for a given pesticide.

MANAGEMENT

A management plan combined with good facility design ensures a safe total system that provides proper storage and disposal of empty containers, unused product and rinsates. A well managed, tidy storage and handling facility can be considered "good insurance".

The cost of building a well designed facility is far less than the potential costs associated with cleanup of a large spill or fire, and potential subsequent litigation. Inventory, record keeping, worker safety and emergency action are all part of a management plan.

SUMMARY

A properly designed and constructed pesticide storage facility will reduce the risk of surface and groundwater contamination, increase user safety in the handling of products, protect nearby storage food/feed products from contamination and limit access to authorized persons.

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FOR FURTHER INFORMATION CONTACT
Phone: 604.556.3001
Toll Free: 1.888.221.7141

MINISTRY OF AGRICULTURE
1767 Angus Campbell Road
Abbotsford, B.C. V3G 2M3

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6. Stone, R.P. and Gaunt, D., ***Pesticide Handling Facility***, Ontario Ministry of Agriculture and Food, Order No. 90-230.

Workers' Compensation Board, ***Standard Practices for Pesticide Applicators***, 1990.

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EMERGENCY TELEPHONE NUMBERS

AMBULANCE: _____

FIRE: _____

POLICE: _____

FAMILY DOCTOR _____

NEAREST HOSPITAL _____

FOR MORE INFORMATION ON PESTICIDES CONTACT:

WCB Information Office	Local (604) 276-3100 Long distance 1-800-621-7233
BC Poison Control Centre	Local (604) 682-5050 Long distance 1-800-567-8911
Provincial Emergency Program	1-800-663-3456
Agriculture Canada Hotline	1-855 773-0241
Canadian Transport Emergency Centre (CANUTEC)	(613) 996-6666
Canadian Centre for Occupational Health and Safety (CCOHS)	1-800-668-4284

PESTICIDE STORGE INVENTORY

TRADE NAME	CHEMICAL NAME OF ACTIVE INGREDIENT	PURCHASE DATE	QUANTITY PURCHASED	ACUTE TOXICITY GROUP	TARGET PEST CLASS	CHEMICAL CLASS	SAFETY NOTES (PERSONAL PROTECTIVE EQUIPMENT, EMERGENCY PROCEDURES, STORAGE PRACTICES, ET.)