

WASTE

MANUAL

VEHICLE
MAINTENANCE AND REPAIR

MINIMIZATION

WASTE



MINIMIZATION

MANUAL

**Vehicle
Maintenance
& Repair
Industry**

**Action
on WASTE**



Alberta
ENVIRONMENTAL PROTECTION

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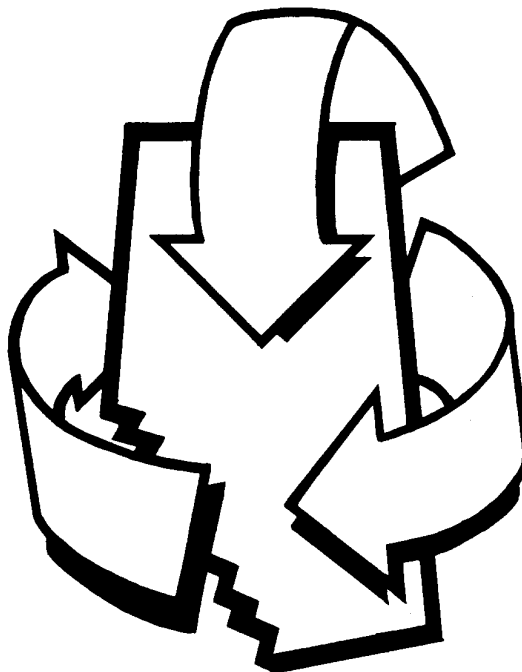
VEHICLE MAINTENANCE AND REPAIR INDUSTRY

INTRODUCTION

Governments, industry and the public have become increasingly concerned with the environmental, legal and economic issues associated with the disposal of wastes. As part of its Action on Waste Program the Government of Alberta has developed a Waste Minimization Program for Alberta Businesses. The main objective of this program is to develop an extended waste minimization program that will help small- to medium-sized businesses in Alberta implement waste minimization plans.

The Vehicle Maintenance and Repair Industry (VMRI) in Alberta employs over 47,000 people, who maintain over 2 million registered vehicles. A large volume of waste is generated from the maintenance and repair of these vehicles, much of which is currently disposed of in landfills. Alberta businesses can reduce the overall waste generated by industry by committing to waste minimization.

This manual provides Alberta Vehicle Maintenance and Repair businesses with an easy-to-use guide to minimize waste. The manual addresses all types of waste generated by this industry, including potentially hazardous waste, and provides a five step process to help you develop your waste minimization plan.



BENEFITING FROM WASTE MINIMIZATION

The development of a waste minimization plan for your business can lead to many benefits:

- economic benefits: saving money.
- environmental stewardship: improved public image.
- compliance with regulations and reduced liability.

Waste minimization can help you save money and protect the environment.

For example, controlling the use of materials can make the materials last longer; substituting non-hazardous materials for hazardous may lead to waste reduction and reduced recycling or disposal costs; improving waste management practices, such as segregating wastes, can lead to materials being more easily recycled.

Waste minimization can be used to improve your business's public image and reduce public concern.

Customers want to use environmentally friendly products and services. Shops may attract new customers by checking and replacing fluids only when needed. Shops may offer a discount on the purchase of a new lead-acid battery when a spent lead-acid battery is returned. These offers demonstrate a commitment to reducing waste and to protecting our environment.

Improved waste management practices may be required to comply with the Environmental Protection and Enhancement Act and reduce both personal and corporate liability.

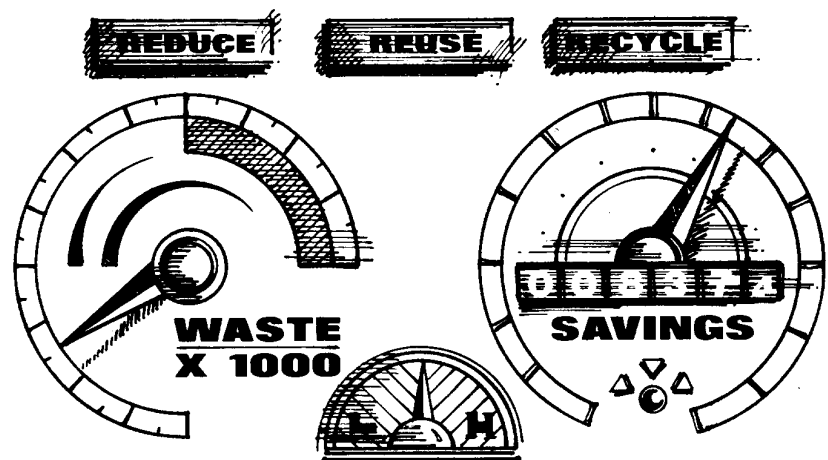
The Act can hold you personally liable for improper handling of wastes. It is important for business owners, supervisors, and workers to obey the laws governing the handling of wastes. For example, Alberta's Ozone-Depleting Substance Regulation prohibits the release of ozone-depleting substances to the atmosphere, thereby ensuring recovery and recycling. Servicing of vehicle air conditioning units must be performed by a person with a trade certificate issued under the Apprenticeship and Industry Training Act (1991).

The following success stories illustrate how waste minimization has helped two Alberta businesses.

1 The supervisor at a local maintenance shop noticed that the valves on three bulk lubricant containers were dripping. The supervisor placed drip trays beneath the valves to measure the amount of fluid being spilled. After two weeks, 20 litres had been collected in the drip trays. By installing three new valves at a cost of \$30/valve, the supervisor was able to save over \$600/year. The payback period for installing the valves was less than two months!

2 The manager of a local paint and autobody shop had been keeping an eye on new advances in spray paint equipment and decided to purchase new primer guns and new paint guns. The new equipment was designed to reduce the volume of paint required by reducing overspray. To verify the effectiveness of the costly new equipment, the shop manager decided to measure the changes in his paint consumption. He tracked all paint materials purchased over a two month period and found that the new equipment reduced paint consumption by more than 32%. These savings more than justified the cost of the new equipment.

There are many more money-saving opportunities that also benefit the environment. We encourage you to read on to learn how to identify other opportunities specific to your operation and learn how to implement them in your shop.



THE 4RS OF WASTE MINIMIZATION

Waste minimization requires the application of the 4Rs — Reduce, Reuse, Recycle and Recover — in order of preference.

Reduce

Means all activities that result in generating less waste prior to any reuse or recycling activities. Waste reduction can occur as a result of purchasing decisions or as a result of making changes in how tasks are handled. Waste reduction is often the best place to start because it reduces waste at the source (often referred to as source reduction). As a result, the amount of material used, the waste generated and the cost of disposal can all be reduced. It is often the simplest method to implement and there may be no cost to the business. Waste reduction often shows immediate results. Examples of waste reduction include reducing the amount of cleaner used to clean a part, and substituting a cleaner such as soap and water for a hazardous cleaner.

Reuse

Means to use a material more than once before it is recycled or discarded as waste. Many materials are discarded as waste even though they can still be used again. In many cases, a product or package can be reused in its original form, either for its original purpose or for a different purpose. Reuse usually extends the life of a material, thereby reducing the cost of purchasing new material and reducing the amount of waste generated. Examples of reuse include reusing rags many times over before they are laundered, and reusing dirty solvents as a precleaning solution.

Recycle

Means to collect and reprocess certain wastes for their resource value instead of discarding them. In the VMRI business, recycling involves collecting a used material and sending it to a recycler where the material is reprocessed into a usable product. Many VMRI wastes can be recycled for original use (such as used oil or solvent) or into other products (such as used plastic oil containers being recycled into plastic building products).

Recovery

Involves extracting usable energy from waste materials. For example, used oil is being burned as a fuel by asphalt plants. In addition, tires are being used for energy recovery in cement kilns. Despite some of its benefits, recovery is the least preferred option of the 4Rs. This manual, therefore, focuses on how the first 3Rs can help you minimize waste.

AN OVERVIEW OF THE WASTE MINIMIZATION PLAN

The following steps will help you get started on your own waste minimization plan:

- Step 1:** Get Commitment from Everyone Involved
- Step 2:** Conduct a Waste Audit
- Step 3:** Select Waste Minimization Options and Develop Your Plan
- Step 4:** Put Your Waste Minimization Plan into Action
- Step 5:** Monitor Progress

A separate chapter has been dedicated to each step in the process. The appendices contain waste minimization options, extra worksheets and tables to help develop your waste minimization plan.

STEP 1: GET COMMITMENT FROM EVERYONE INVOLVED

A successful waste minimization plan begins with commitment from shop owners, supervisors and employees. Everyone in the shop should be aware of the importance of waste minimization and should be encouraged to participate in the waste minimization plan. Waste minimization activities may require changes to work routines and, in some cases, additional training. It is often helpful to designate a person or committee to coordinate and communicate activities and information about the waste minimization plan. Once employees realize how waste minimization can benefit the shop, they will be more committed to the waste minimization program.

STEP 2: CONDUCT A WASTE AUDIT

The second step is to carry out your own waste audit to track the procedures you currently follow and the wastes you currently produce. The waste audit can be a simple walk-through survey of your shop to visually identify opportunities for waste minimization. It can also be an in-depth investigation involving waste stream sampling and analysis.

The audit method provided in this manual is in two stages. The first stage is a **Waste Minimization Checklist** that identifies common activities found in a typical VMRI operation and provides corresponding options for waste minimization within those activities. The questions are phrased to draw your attention to waste minimization practices which could be implemented in your shop and to familiarize you with the options. The second stage, **The Waste Audit**, takes a closer look at a comprehensive list of the waste streams you may generate in your shop. It encourages you to quantify the various wastes generated, to identify the current waste management method used, and to identify the costs associated with waste management. In both of these activities, you are encouraged to identify waste minimization options, specific to your own operation, that could be implemented.



A. Waste Minimization Checklist

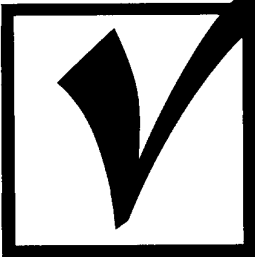
The following checklist covers various activities found in a typical VMRI shop:

- 1 Material Handling**
 - Inventory Control*
 - Drums, Containers and Packages*

- 2 Maintenance and Replacement Services**
 - Solvents and Water-Based (Aqueous) Cleaning*
 - Automotive Fluids*
 - Automotive Repairs*

- 3 Body Repair and Paint Application**
 - Body Repair*
 - Paint Application*

- 4 General Waste Management**
 - Employee Training*
 - Shop Clean-up*



In the checklist, the preferred answers are in bold print, with comments provided in italics. Complete the questions as they apply to your operation. Use the blank right hand column to complete answers to questions and note waste minimization options that apply to your shop.

1.0 MATERIAL HANDLING

1.1 Inventory Control

1. Is the dispensing of raw materials supervised and controlled?
_____ yes no _____

A computerized inventory system can reduce overstocking and wastes due to out-of-date materials.

Supervising the dispensing of raw materials can help minimize product use (eg. cleaners, automotive fluids, thinner, body filler, paint).

Some shops require empty containers to be returned before issuing new supplies.

2. Do you employ rigid inventory controls for:

- solvent use yes no _____
- other cleaners yes no _____
- automotive fluids yes no _____
- thinner yes no _____
- body filler yes no _____
- paint yes no _____

Use all materials until they have exhausted their useful life.

3. Is anyone responsible for overseeing waste management and waste management equipment in your operation? yes no _____

Designate someone to oversee waste management.

4. Are records kept of the quantities of materials sent off-site for recycling, treatment or disposal?
 yes no _____

This information is essential when assessing ways to minimize waste.

**1.2 Drums,
Containers and
Packages**

5. Is there any tracking of volumes of wastes versus purchases of materials (material balances)?

yes no

Track the volumes of waste versus the purchase of materials. This is another method of identifying processes where waste can be minimized.

6. Are drums, packages and containers inspected for damage before being accepted?

yes no

Use the space provided to describe handling procedures for damaged items.

7. Are stored items protected from damage, contamination, or exposure to rain, snow, sun and heat?

yes no

Use proper storage techniques as recommended by the supplier or Material Safety Data Sheets (MSDS) to prevent loss of raw materials and stock.

Monitor bulk liquid containers regularly for leaks.

8. Are any containers reused or recycled? (In the space provided list containers which are **not** presently reused or recycled)

yes no

Return used drums, containers and packaging to suppliers if they will take them back.

Reuse or recycle drums, containers and packaging (several shops recycle and reuse plastic, cardboard and metal containers).

Purchase materials in bulk to reduce the number of containers used.

If you are generating small volumes of recyclable materials (such as cardboard or plastic jugs) consider negotiating the use of a recycling bin with a neighbouring shop.

9. Are safeguards in place

- to prevent spills as tanks are filled and liquids are dispensed?

___ **yes** ___ **no**

Use proper pumps and valves to prevent drips. If drips are present, they should be collected in a drip pan. Consider changing valves to achieve a better seal.

- to prevent air emissions from solvent storage? ___ **yes** ___ **no**

Cover solvent storage tank when not in use.

- to prevent leaks from storage tanks and drums? ___ **yes** ___ **no**

Routinely monitor tanks and drums for leaks.

2.0 MAINTENANCE AND REPLACEMENT SERVICES

2.1 Solvents and Water-Based (Aqueous) Cleaning

If you use hot tanks, caustic solutions, jet spray washers or spray cleaner, you are using water-based (aqueous) cleaning.

Most maintenance and parts replacement services require some type of parts cleaning. Popular cleaning methods include use of solvents, aqueous (water-based) cleaners in hot tanks, and a large variety of specialty cleaners. To reduce cleaning waste look at your operation and re-evaluate which cleaners are required to do the job. In many cases a simple soap and water wash or recyclable multipurpose cleaner may be adequate.

10. Have you established guidelines as to when parts should be cleaned with solvents and how much solvent should be used to clean? _____
_____ yes no _____

*Solvent should be used for cleaning specific automotive parts only, **not** floors.*

11. In either solvent cleaning or aqueous cleaning do you use dry pre-cleaning methods such as baking or wire brushing or a reusable rag to reduce the need for changing solvent? _____
_____ yes no _____

For very dirty parts, try soaking in dirty solvent before using your clean solvent sink.

12. Have you switched from solvents or caustic-based cleaning solutions to detergent-based cleaners or other less hazardous cleaners? _____
_____ yes no _____

Consider the disposal method you will use before switching cleaners. Alternate cleaners may not be reusable or recyclable.

13. Have you tried using a steam cleaner instead of chemical cleaners? _____
_____ yes no _____

14. Have you installed a primary rinse tank, or converted free running rinses in your aqueous cleaner to still rinses? yes no

Installing a primary rinse tank immediately after an aqueous cleaning tank allows the cleaner to be recovered (for reuse) which reduces wastewater discharge. The water from the still rinse can be used as make-up for your cleaner bath.

15. Do you use solvent sinks instead of pails or dunk buckets? yes no

16. Do you allow cleaned parts to drain inside the sink or hot tank for a few minutes to minimize the amount of cleaner dripped onto the shop floor? yes no

17. Do you keep all solvent sinks/ buckets covered when not in use? yes no

18. Do you routinely monitor aqueous cleaning solution composition (for strength and quality) and make adjustments accordingly? yes no

19. Do you routinely remove sludge and solids from the tank or sink? yes no

20. Do you use demineralized water for your cleaning bath make-up? yes no

Demineralized water helps reduce solids in the tank and reduces the amount of detergent required in the cleaning tank.

2.2 Automotive Fluids

21. Does a registered waste hauler collect your dirty solvent or aqueous cleaning solution for recycling or treatment?

___ yes ___ no

If you use only small volumes of solvent, contact a recycler only when the solvent is dirty. If you generate a large volume of waste solvent, it may be cost effective to purchase your own solvent recovery equipment.

22. Is your aqueous cleaning tank agitated:

- with ultrasound? ___ yes ___ no
- mechanically? ___ yes ___ no
- with air? ___ yes ___ no

Agitation increases the cleaning efficiency (listed above in order of decreasing efficiency).

23. Do you test fluid quality or use other methods to determine when automotive fluids should be changed? ___ yes ___ no

Testing is most economical for fleets but it is also an option for personal vehicles. Monitor fluid quality and change only when required.

24. When the following fluids must be drained to service a part, are they stored in a clean container so they may be used to refill the vehicle? (Space is provided for additional fluids you may want to drain.)

- Coolant ___ yes ___ no
- Refrigerant ___ yes ___ no

- Brake Fluid yes no _____
- _____ yes no _____
- _____ yes no _____

Add distilled water to dilute coolant as it reduces scale build-up.

25. Are all waste fluids kept segregated?

- Oil? yes no _____
- Synthetic oil? yes no _____
- Coolant? yes no _____
- Chlorinated solvents? yes no _____
- Non-chlorinated solvents? yes no _____

Mixing fluids often renders fluids non-recyclable. Segregation allows fluids to be recycled and often makes disposal easier.

Consult your recycler regarding recycling compatibility of similar fluids. For example: Certain petroleum-based fluids may be mixed (but not with synthetic oils); some recyclers allow brake fluids to be mixed with coolant; carburetor cleaner may be recycled only if segregated.

Use recycled products for oils, coolant and refrigerant.

Educate consumers to have regular maintenance checks done on their vehicles to reduce the potential for fluid leaks and vehicle emissions. Accept your customers' used oil as a service or in exchange on the purchase of new oil.

2.3 Automotive Repairs

26. Do you use a recovery/recycling system to service air conditioning units? yes no

The new Environmental Protection and Enhancement Act (EPEA) requires that all air conditioning refrigerant be recovered and that servicing be performed by a person with a trade certificate.

27. Are used oil filters recycled? yes no

Opportunities exist in Alberta to recycle oil filters. Under EPEA, used lubricating oil and undrained lube oil filters removed from internal combustion engines are classified as hazardous wastes.

28. Are used lead-acid batteries sent to a collector for recycling or reconditioning? yes no

Opportunities exist in Alberta to recycle or recondition batteries.

Accept your customers' lead-acid batteries as a service and in exchange on the purchase of new lead-acid batteries.

29. When working with brakes, do you contain loose asbestos or other dusts that may be released? yes no

30. Do you sell or give worn parts and metal to a re-manufacturer or scrap part dealer? yes no

Many scrap dealers offer higher prices if your metals are segregated.

Offer retreaded tires for sale.

Educate customers to maintain required air pressure and wheel alignment, and to rotate tires to extend tire life.

3.0 BODY REPAIR & PAINT APPLICATION

3.1 Body Repair

31. Do you generate large quantities of waste autobody filler?

yes no

Mix the least amount of filler required for the job.

32. Are vacuum units available for your workers to use?

yes no

Use vacuum units to collect filler dust to avoid flushing it down the sewer. Sump sludges may be hazardous waste and the introduction of non-hazardous filler dust needlessly increases sludge volumes which require costly treatment as hazardous waste.

3.2 Paint Application

33. Do you generate large quantities of waste paint or thinner?

yes no

Collect paint and thinner for recycling.

34. Do you use any of the following options to minimize waste paint?

• use less than 1/2 gallon of thinner per car yes no

• mix the volume of paint based on the surface area to be painted yes no

• purchase only volumes of pre-mixed paint as needed yes no

• provide customers with leftover paint (*enamel or lacquer only*) for touch-up use yes no

- use high transfer efficiency spray equipment

__ yes __ no

The new high transfer efficiency spray equipment reduces paint used by 30-60%. The painting technique is different so operators will have to be retrained.

35. Have you investigated the use of low volatile organic compound (VOC) paints?

__ yes __ no

36. Have you investigated other methods to reduce waste from paint and body operations such as:
(Use space provided for additional waste reduction methods)

- cleaning and reusing booth filters
__ yes __ no
- reusable styrofoam booth filters
__ yes __ no
- using a spray-on mask instead of masking paper
__ yes __ no
- _____ __ yes __ no
- _____ __ yes __ no

37. Have you tried using or do you use an enclosed gun cleaning system?

__ yes __ no

Most shops use recirculating gunwash systems.

The life of the gunwash can be increased by scraping paint from paint cups into a storage pail before cleaning with gunwash. The waste paint can then be recycled separately from the dirty gunwash.

The life of the gunwash may be extended by decanting dirty thinner and using it as an initial wash thinner.

38. Do you contract with an off-site thinner supplier/recycler?

yes **no**

If you paint a large number of cars each month, it may be economical for you to look at on-site recycling systems.

4.0 GENERAL WASTE MANAGEMENT

4.1 Employee Training

39. Is there a regular personnel training program which includes the following? (*Note how often training is given and by whom.*)

- Raw material handling _____
_____ yes no
- Spill prevention _____ yes no
- Proper storage techniques for all materials and wastes _____
_____ yes no
- Waste handling procedures _____
_____ yes no
- Mixing the minimal amount of filler required for body repair _____
_____ yes no
- Using painting equipment properly so as to minimize overspray _____
_____ yes no
- Learning new techniques required for new high transfer efficiency spray equipment. _____ yes no

4.2 Shop Clean-up

40. Are drip pans placed under leaking cars and dirty parts placed on drip pans to reduce the need for floor cleaning? _____
_____ yes no

41. Do your workers wipe up small spills of fluids as soon as they occur? _____
_____ yes no

42. Do you have an award program for workers who keep their work bays clean (i.e. prevent leaks and spills)? _____
_____ yes no

Awards or recognition provides incentive to reduce wastes.

43. When a spill of liquid occurs in the facility, what clean-up methods are employed (e.g., wet or dry)?

Also record the way in which the resulting wastes are handled.

44. Do you:

• use cloth rags instead of paper for cleaning and wiping?

___ yes ___ no

• reuse rags until they are too dirty to reuse?

___ yes ___ no

• use a laundry service to clean your rags and uniforms?

___ yes ___ no

Negotiate a collection bin with a couple of neighbouring shops if you generate waste volumes which are too small for pick-up and recycling (e.g., a cardboard bin).

45. How do you clean your shop floors?

• vacuum ___ yes ___ no

• water wash ___ yes ___ no

• water and detergent wash ___ yes ___ no

Use a biodegradable detergent for cleaning shop floors. Some shops try to avoid using detergent altogether and simply wash with water.

46. Do you discharge area washdown wastewater to a municipal sanitary sewer or industrial sewer, instead of to the storm drain?

___ yes ___ no

Discharging to the sanitary sewer will allow washdown to be treated before reaching the environment.

47. Are sludge and solids

- screened and filtered or settled out before they reach the waste sump?

___ **yes** ___ **no**

- potentially hazardous?

___ **yes** ___ **no**

Heavy metals and potentially hazardous chemicals are often components of sump solids and sludges in VMRI operations. You can have these solids and sludges analyzed to determine if specialized disposal is necessary.

B. The Waste Audit

Now that you have had a chance to look at the various activities in your shop from a waste minimization perspective, it is time to take a closer look at the actual wastes generated by those activities. The following table is a comprehensive list of waste streams generated by the VMRI. The purpose of this table is to help you identify and rank the importance of waste from your operation.

Complete the table as accurately as possible and include any additional wastes not listed in the table. Please write down the amount of waste disposed of (on a weekly or monthly basis), the current disposal method and the disposal cost. This information will help you in the following steps to determine the best waste minimization alternatives for a particular waste stream. This will form the basis for your waste minimization plan. The information collected can also be used as baseline data to monitor your progress in reducing waste. Refer to Appendix A — Waste Minimization Options — and the completed checklist in the previous section to assist you in identifying waste minimization options. Space has been made available at the end of the table for you to include additional waste streams generated at your shop which are not included in this list. Also, an extra copy of this table is provided in Appendix B, which may be copied and used for successive waste audits.



Waste Audit

| Waste Streams | Significance of Waste in Your Operation | | | |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------|---------------------------------|--------------------------------------------------|------------------------------------------------|
| | Quantity of Waste Generated (per month or per week) | Current Waste Management Method | Cost of Waste Management (per month or per week) | Waste Minimization Options* (your suggestions) |
| Absorbent | | | | |
| Adhesives | | | | |
| Batteries: Lead-acid Dry | | | | |
| Body Filler (left over) | | | | |
| Brakes: Dust Fluid Parts | | | | |
| Cleaners: Alkaline Cleaner Ammonia Bleach Brake cleaner Carburetor cleaner Detergents Degreaser Floor Wash Water Parts Wash/Rinse Water Sludges and Filter Wastes (Solvent Sink, Floor Sump, Machinery) Spent Solvent (including gunwash thinner) Strippers | | | | |

* Refer to Appendix A

Waste Audit

| Waste Streams | Significance of Waste in Your Operation | | | |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------|---------------------------------|--------------------------------------------------|------------------------------------------------|
| | Quantity of Waste Generated (per month or per week) | Current Waste Management Method | Cost of Waste Management (per month or per week) | Waste Minimization Options* (your suggestions) |
| Compressed Gases: Argon Refrigerant (CFC) Oxy-Acetylene | | | | |
| Container Disposal: Corrugated Cardboard Foam Popcorn Metal: - crates - 205L drums - 20L containers - 20L pails - spray cans Mixed Material Paper Paperboard Plastic: - sheeting/wrap - bubble wrap - blister wrap - 1L - 4L - 20L - 205L containers - sampling - containers Wood | | | | |

* Refer to Appendix A

Waste Audit

| Waste Streams | Significance of Waste in Your Operation | | | |
|---------------------------------------------------------------------------------------|-----------------------------------------------------|---------------------------------|--------------------------------------------------|------------------------------------------------|
| | Quantity of Waste Generated (per month or per week) | Current Waste Management Method | Cost of Waste Management (per month or per week) | Waste Minimization Options* (your suggestions) |
| Dirty Rags | | | | |
| Fertilizers | | | | |
| Filters: Air Fuel Hydraulic oil Motor oil | | | | |
| Fuel and Oil Additives | | | | |
| Fuels: Diesel Gasoline Jet Fuel Kerosene Methanol Naptha Propane | | | | |
| Glass | | | | |
| Grease | | | | |
| Hoses Hydraulic Other | | | | |
| Metal Conditioner | | | | |
| Oil (Used): 2 cycle chain heavy/light | | | | |

* Refer to Appendix A

Waste Audit

| Waste Streams | Significance of Waste in Your Operation | | | |
|------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------|---------------------------------|--------------------------------------------------|------------------------------------------------|
| | Quantity of Waste Generated (per month or per week) | Current Waste Management Method | Cost of Waste Management (per month or per week) | Waste Minimization Options* (your suggestions) |
| Oil (Used) (continued): gear hydraulic motor transmission | | | | |
| Oil Conditioner | | | | |
| Paint Booth filters | | | | |
| Paint (left over) - spray, liquid | | | | |
| Parts: Core Used Panels | | | | |
| Pesticides | | | | |
| Radiator: Coolant Core Dust (glass bead blasting/ sand blasting) Flush Sludge Solder Flux/Tinning Compound | | | | |
| Sanding Dust | | | | |

* Refer to Appendix A

Waste Audit

| Waste Streams | Significance of Waste in Your Operation | | | |
|------------------------------------------------------------------------------------------------|-----------------------------------------------------|---------------------------------|--------------------------------------------------|------------------------------------------------|
| | Quantity of Waste Generated (per month or per week) | Current Waste Management Method | Cost of Waste Management (per month or per week) | Waste Minimization Options* (your suggestions) |
| Scrap Metal: Copper Aluminum Steel Mixed | | | | |
| Sealant | | | | |
| Tanks (Above Ground, Under Ground) Abandoned Leaks Spills during filling & dispensing | | | | |
| Tires: New Used | | | | |
| Volatile Organic Compound Air Emissions (from overspray) | | | | |
| Welding Rods | | | | |
| Windshield Washer Fluid | | | | |
| Other: | | | | |

* Refer to Appendix A

STEP 3: SELECT WASTE MINIMIZATION OPTIONS AND DEVELOP YOUR PLAN

As evident from your audit work in Step 2, there are a large number of options for minimizing waste. You may at this point want to share the audit results with some of your employees. They can provide valuable insight and generate even more ideas.

The next step is to consolidate the options identified and develop an action plan. The following **Waste Minimization Plan** table is provided to help you develop that plan. A blank table has also been provided in Appendix C to photocopy as needed to complete your specific plan.

Select the waste streams you wish to focus on and list them in the left column of the table. You may wish to list wastes:

- that are most hazardous.
- with the highest purchase costs.
- with the highest disposal costs.
- for which you are unsure of the regulations.

You may find additional criteria to select your target waste streams.

Several waste minimization options may be available for each waste stream. Generally, reduce and reuse methods are preferred over recycling since they both reduce the raw material used and the amount of waste generated. Also, they can usually be implemented at a low cost. Recycling options are now available in Alberta for many wastes generated by the VMRI. Recycling options should be considered in combination with reduction and reuse strategies.

Record the options for minimizing your waste in the centre column of the table. For each waste stream you have selected, review the entire process from waste generation to disposal. Ask yourself why the original raw material is used, how it is used, if the process which generates the waste stream is necessary, and how the waste is currently managed. Also use the waste audit information you highlighted in Step 2, the Waste Audit.

Carefully choose the waste minimization options you wish to implement in your operation. Record the best options in the third column of the table. When selecting the best option, you might ask yourself the following questions:

- What is the purchase cost of the original material?
- What is the cost of disposal using current methods?

- How will you now manage the material? For example, is recycling available?
- Is the option easy to implement?
- Is there a cost involved in implementing this option? Is the cost recoverable? What is the pay-back period?
- What do you gain by implementing the option? (a reduction in waste volume, waste diversion away from landfill, money saving, etc.).

| Waste Minimization Plan | | |
|--------------------------------|--------------------------------------------|--------------------|
| Targeted Waste Stream | Options for Minimizing Waste Stream | Best Option |
| | | |

STEP 4: PUT YOUR WASTE MINIMIZATION PLAN INTO ACTION

Now that you have conducted a waste audit of your operations and selected waste minimization targets and options, it's time to finalize your plan and put it into action.

Prioritize the options you have selected for the various waste streams.

It is best to limit the number of options you initiate at one time. A phased approach will help avoid making too many changes in the daily routines of your shop. Making each step a “winner” will also help you and your staff see and monitor the progress you're making.

To implement the waste minimization plan:

- inform staff about the benefits of using the plan.
- train staff on how to make the plan work as opportunities are put into place.
- be a leader and believe in your plan – they are opportunities for your shop.

STEP 5: MONITOR YOUR PROGRESS

Keep records of the amounts of raw materials purchased, wastes sent off-site and the costs involved in both purchase and waste management (waste recycling and disposal). These records will be essential in monitoring the progress and benefits of your waste minimization plan.

Your waste minimization plan is a continuous process. It is not finished when you decide to implement waste minimization options. **You should evaluate your waste minimization measures at regular intervals** using the following methods:

- conduct regular waste audits of your operation so that new ideas for minimizing waste may be used in your operation.
- use the successive waste audits as a means of tracking the changes in waste management methods and costs.
- monitor the volumes of waste versus purchases of materials as another indicator of how your plan is developing.

Make waste minimization a part of the everyday operations. Encourage staff to come up with new methods of minimizing waste. Support and reward staff who are innovative.

To help keep you on track, a **Waste Minimization Plan Checklist** is provided in Appendix D.



Waste Disposal

Even after you've minimized the waste generated, you will still have some waste for disposal. When choosing a disposal option, consider the following questions:

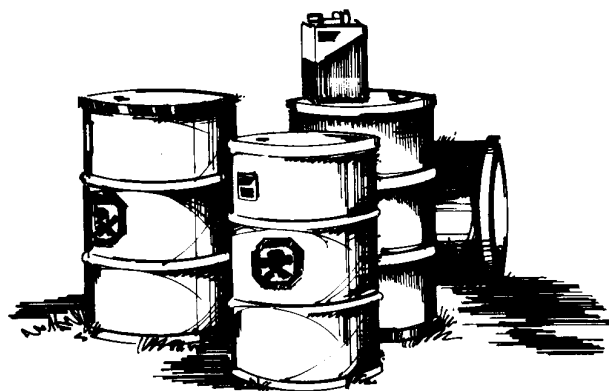
- Are there any hazardous contaminants in the material or is the material hazardous itself?
- Are there any regulations regarding disposal of this material or its contaminants?
- Does the Material Safety Data Sheet (MSDS) include suggestions for disposal?

Certain types of wastes may be prohibited from disposal at local landfills. Contact your local municipality for this information.

You should pay particular attention to the new regulations under the Environmental Protection and Enhancement Act (EPEA) which contains important laws to protect the environment. For example, refrigerant release is prohibited and it is mandatory to drain oil filters from internal combustion engines if they are being disposed. Guidelines are now in place for the proper handling and disposal of contaminated soils which may exist at your site due to leaks or spills. Information about these guidelines and regulations can be obtained from Alberta Environmental Protection, Industrial Wastes Branch.

Despite the fact that tipping fees of most Alberta landfills are relatively low, you should work towards minimizing wastes. Our landfills are filling up and new landfills are becoming more difficult to approve due to public opposition. This decrease in available landfill space will most likely lead to higher tipping fees in the future.

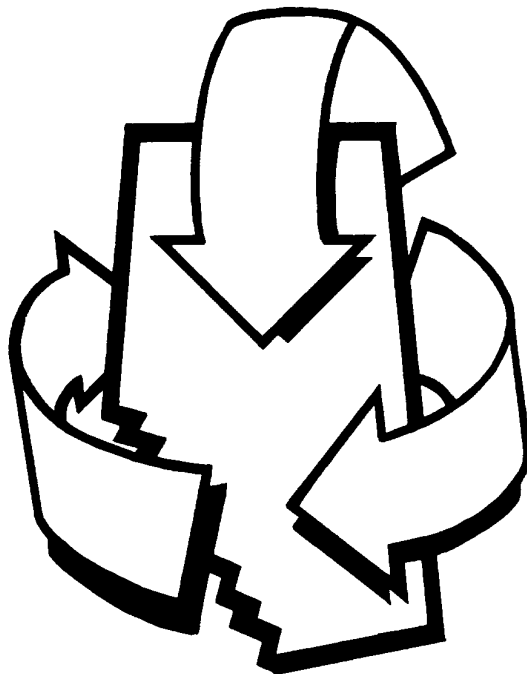
It is your responsibility to understand the nature of your waste. As a responsible shop operator, you should pay attention to the waste hauler you choose and the final disposal destination of your waste. Record all wastes which leave your shop, the volumes, the hauler and the destination.



KEEPING UP TO DATE

Keep abreast of new opportunities which could assist you in waste minimization. The following sources can be consulted for new opportunities:

- your suppliers - keep asking them for reduce, reuse or recycle ideas.
- personnel in your own shop - encourage them to become part of the waste minimization team.
- fellow members of the VMRI.
- industry associations such as the Automotive Service and Repair Association of Alberta, Alberta Motor Association, and North American Radiator Services Association. Associations provide regular newsletters, magazines and seminars outlining new developments in the industry.
- Alberta's Recycle Info-Line (1-800-463-6326).
- publications such as Biocycle, Eco-Log, Recycle Canada, and Resource Recycling.
- *Alberta User Guide for Waste Managers* (Alberta Environmental Protection, Industrial Wastes Branch).



HOW TO GET MORE INFORMATION

You can contact the following organizations for more information on waste minimization and proper waste management.

For information on recycling opportunities in Alberta, call:

Action on Waste
 Alberta's Recycle Info Line
 1-800-463-6326

or

Recycle Hotlines in your municipality (Talking Yellow Pages and/or municipal offices)

For information on characterizing your waste, using outside help to conduct a waste audit and finding a hazardous waste hauler, call:

Environmental Services Association of Alberta
 1-800-661-WASTE
 (1-800-661-9278)

For information on hazardous waste management and regulations, call:

Alberta Environmental Protection, Industrial Wastes Branch
 427-5847 (from Edmonton)
 or call your local Government of Alberta Rite number and ask for
 427-5847

or

Alberta Special Waste Management Corporation
 1-800-272-8873

For additional VMRI information contact:

| Organization | Telephone Number |
|------------------------------------------------------------------------------------|--------------------------------|
| Alberta Motor Association (Edmonton) Office of Approved Auto Repair Services | 430-5521 |
| Alberta Motor Association (Calgary) | 240-5462 |
| Automotive Service and Repair Association Executive Director (from Edmonton) | 1-800-282-9909 476-8711 |
| Automotive Recyclers and Dismantlers Association | 347-2650 |
| Tire Recycling Management Board | 990-1111 |

APPENDICES



APPENDIX A

The following tables will help you identify options for reducing, reusing, and recycling waste materials generated in VMRI operations as you conduct your waste audit and prepare your waste minimization plan. Contact Action on Waste: Alberta's Recycle Info Line 1-800-463-6326 or Recycle Hotlines in your municipality (Talking Yellow Pages and/or municipal office) to find the names of recyclers in your area.

There are, however, practices which are not recommended, some of which are listed below:

- do not mix recyclable fluids which are incompatible (ie. coolant with oils, synthetic oils with other oils, chlorinated solvents with solvents).
- do not pour potentially hazardous fluids or materials such as oils and coolant directly into the sump, storm sewer, or into the environment.
- do not landfill hazardous liquids. Hazardous liquids are banned from municipal landfills.
- do not evaporate fluids such as solvents as a method of disposal as it results in air emissions.
- do not burn wastes in an uncontrolled burner.
- do not spread potentially hazardous sump sludges on the ground as a means of disposal.
- do not vent refrigerants to the atmosphere during the servicing of air conditioning units.

WASTE MINIMIZATION OPTIONS

Suggested Waste Minimization Options

Material

ABSORBENT AND RAGS (paper and cloth used to wipe up leaks, spills, and general shop cleanup)

Options

Reduce

- Use durable, wear-resistant cloth rags and a laundry service instead of paper or absorbent

Reuse

- Use rags until completely soiled before laundering

**BRAKE FLUIDS &
CARBURETOR CLEANERS**

Reduce

- Bleed fluids from brakelines only as required for servicing

Reuse

- Use devices such as aspirated bleeders to drain brake lines, and collect fluid for reuse
- Reuse carburetor and brake cleaners to their full capacity

Recycle

- Small quantities of brake fluids can be recycled with engine coolant; contact your local recycler for acceptable volumes
- Synthetic brake fluids are a problem for recyclers and should be separated from recyclable brake fluids
- Recycle carburetor cleaner

**APPENDIX A - WASTE
MINIMIZATION OPTIONS**

Suggested Waste Minimization Options

Material

Options

DEGREASERS

Reduce:

- Use precleaning methods (e.g., wiping)
- Use alternatives such as a pressure washer or steam cleaner
- Use environmentally friendly cleaning products
- Adopt a policy which limits the use of degreaser

FLOOR DUST
(including paint chips and sanding dust)

Reduce

- Use strict guidelines regarding the amount of autobody filler materials used as it can reduce the need for sanding down excess filler
- Vacuum floors regularly to keep the dust (paint chips, sanding dust, etc.) from entering the floor drains
- Collect and properly dispose of dust from autobody work

FLOOR WASH WATER

Reduce

- Vacuum floors as often as possible
- Wash floors as little as possible
- Do not use solvent cleaners as floor cleaners
- Wipe up shop spills as they occur
- Maximize use of drip pans

**APPENDIX A - WASTE
MINIMIZATION OPTIONS**

Suggested Waste Minimization Options

Material

Options

FLOOR WASH WATER
(continued)

- Examine incoming vehicles for leaks and use drip pans
- Establish an award program to encourage employees to keep their work areas clean
- Segregate water from other recyclables or potentially hazardous waste fluids

LEAD-ACID BATTERIES

Reduce

- Encourage customers to clean battery posts
- Top up batteries with distilled water to ensure maximum capacity battery life
- Use proper storage areas and handling techniques to minimize the potential for leaks

Recycle

- Direct to a recycler through retailers, suppliers, scrap metal dealers and battery reconditioners. Consider an additional charge to the customer if an old battery is not returned when a new battery is purchased. This charge can be refunded when the old battery is returned.

**APPENDIX A - WASTE
MINIMIZATION OPTIONS**

Suggested Waste Minimization Options

Material

OIL (used)

Options

Reduce

- Change fluids only as needed (sample/test)
- Use drip pans to keep fluids from entering the sump and recycle captured drips. *Note: under the new EPEA, spent lubricating oil removed from internal combustion engines is classified as a hazardous waste.*
- Use longer lasting synthetic oils to reduce the frequency of changing fluid
- Use secondary containment for the storage of fluids where appropriate

Reuse

- If fluids must be drained to service a part, save fluids for reuse in the vehicle after the maintenance operation
- Purchase recycled oil

Recycle

- Recycle used oil (contact Alberta's Recycle Info Line 1-800-463-6326 for recyclers in your area)
- Only mix petroleum based fluids for recycling, or only as directed by the recycler. NEVER mix chlorinated solvents or coolant with the used oil.

**APPENDIX A - WASTE
MINIMIZATION OPTIONS**

Suggested Waste Minimization Options

Material

Options

OIL (continued)

- Accept used oil from the public or encourage the public to use existing recycling facilities available in the community.

OIL FILTERS

Reduce

- Drain filters as completely as possible before disposal. *Note: under EPEA, undrained oil filters from internal combustion engines are considered hazardous waste.*
- Change only as needed
- Crush filters to reduce volume and remove oil
- Monitor fuel usage to determine when oil filters need to be changed

Reuse

- Reusable metal mesh filters are available for motorcycle applications

Recycle

- Accept used oil filters from your customers for recycling
- Recycle oil filters (contact Alberta's Recycle Info Line 1-800-463-6326 for recyclers in your area)

**APPENDIX A - WASTE
MINIMIZATION OPTIONS**

Suggested Waste Minimization Options

Material

PAINT

Options

Reduce

- Mix only the amount of paint needed to do the job
- Use computers which have been developed recently for precisely measuring paint
- Pour excess paint into a waste drum, to reduce the need for clean gunwash
- Use high transfer efficiency spray equipment (low pressure, high volume guns)
- Keep updated about low VOC paints and use them as they become available
- Use spray-on masking instead of masking paper

Reuse

- Provide customers with left over paint for touch-up use
- Save mixed paint for reuse (on another vehicle)

Recycle

- Collect paint and thinner and have them recycled by an approved recycler (or disposal facility)
- Consider purchasing your own recycling unit for paint and thinner if you are a large operation

Suggested Waste Minimization Options

Material

PAPER PRODUCTS
(Including cardboard, masking
paper, other paper and packaging)

Options

Reduce

- Use spray-on masking for painting instead of masking paper
- Encourage suppliers to minimize packaging
- Photocopy on both sides of a page
- Use backside of printed paper for note taking
- Use computer modem connections for invoicing and purchase orders

Reuse

- Use recycled paper products
- Reuse paper and packaging for another purpose
- Use suppliers who accept back their own packaging at the next delivery of supplies

Recycle

- Recycle paper products
- Use a cardboard recycling bin provided by a waste contractor. If the shop generates small volumes, negotiate the use of a cardboard bin with a couple of neighbouring shops.
- Keep updated with technology to recycle masking paper

**APPENDIX A - WASTE
MINIMIZATION OPTIONS**

Suggested Waste Minimization Options

Material

PLASTIC CONTAINERS

(e.g. used oil, antifreeze, windshield washer containers)

Options

Reduce

- Purchase supplies in bulk
- Encourage suppliers to minimize packaging

Reuse

- Sell bulk fluids to the public by refilling their containers
- Return containers to suppliers
- Reuse for another application within the shop
- Encourage suppliers to accept back their containers when delivering next supply

Recycle

- Send plastic containers to a recycler (contact Alberta's Recycle Info Line 1-800-463-6326 for recyclers in your area)

RADIATOR COOLANTS

Reduce

- Test and adjust coolant additives rather than replacing coolant
- Flush cooling systems only when required (flushing creates additional waste)
- Mix distilled water instead of tap water with coolant to reduce scale build-up
- Dispose of radiator flush through a hazardous waste hauler due to its hazardous nature (the flush water may contain lead and other heavy metals)

**APPENDIX A - WASTE
MINIMIZATION OPTIONS**

Suggested Waste Minimization Options

Material

Options

RADIATOR COOLANTS
(continued)

Reuse

- Save for reuse during servicing operations
- Use recycled coolant
- Educate your customer on the benefits of recycled coolant

Recycle

- Segregate from other waste liquids
- Recycle waste coolant (contact Alberta's Recycle Info Line 1-800-463-6326 for recyclers in your area)

REFRIGERANTS (CFCs)

Recycle

- Recycle refrigerants using an in-house recovery and recycling unit, contract air conditioning service out to a shop with a recovery and recycling unit, or use the recovery and recycling systems provided by suppliers.

SLUDGES AND FILTER WASTES
(e.g. sump, equipment filter, recycle machine, and solvent sludges)

Reduce

- Reduce the amount of sludge by minimizing its creation at the source
- Use drain pans for each type of fluid to reduce reliance on sumps
- Use a separating sump to separate particles, sludges and oil from the water entering the municipal sewer system

**APPENDIX A - WASTE
MINIMIZATION OPTIONS**

Suggested Waste Minimization Options

Material

SLUDGES AND FILTER WASTES
(continued)

Options

- Clean sumps regularly to avoid absorption of contaminants into the water destined for sewage treatment
- Neutralize caustics to an acceptable pH
- De-water sludges to concentrate metals and sludge
- Use a waste hauler who properly treats and disposes of waste
- Test and analyze the composition of sludges to determine the proper disposal method. Some sludges and spent caustic solutions are hazardous due to high metal content (e.g., generated from cleaning radiators having lead solder).

SPENT SOLVENT
(Including gunwash thinner)

Reduce

- Use water or water/detergent as a solvent substitute
- Use precleaning methods (steam, pressure wash or wiping) to reduce loading on the solvent sink
- Avoid the use of solvents for general floor cleaning
- Establish guidelines as to when parts should be cleaned with solvent to eliminate its unnecessary use

Suggested Waste Minimization Options

Material

SPENT SOLVENT (continued)

Options

- Scrape excess paint into a waste drum before cleaning the paint gun to reduce the frequency of changing the gunwash
- Use alternatives such as ultrasonic cleaning, glass bead blasting, and specialty cleaners
- Monitor solvent use and call for solvent recycling service only when solvent is too dirty to continue using rather than using a pre-schedule changeout
- Use water-based paints. Paint manufacturers are developing water-based paints which will reduce emissions from the painting process

Reuse

- Reuse solvent as often as possible before recycling
- Use a waste exchange. Operations requiring uncontaminated solvents (e.g., electronics, aviation) can provide solvents for operations requiring less pure solvents for their cleaning needs

Recycle

- Use a solvent recycler/supplier
- Purchase and operate an in-house recycling machine

**APPENDIX A - WASTE
MINIMIZATION OPTIONS**

Suggested Waste Minimization Options

Material

Options

TIRES

Reduce

- Encourage customers to select tires with the highest mileage rating

Reuse

- Encourage customers to use retreaded tires, especially for large trucks

Recycle

- Collect tires for recycling into new useful rubber products (contact Alberta's Recycle Info Line 1-800-463-6326 for local recyclers)

USED PARTS/SCRAP METAL

Reuse

- Fix parts in the shop if economically possible
- Maximize use of rebuilding opportunities
- Return core to supplier for remanufacture

Recycle

- Segregate different metals and other recyclable materials and recycle

APPENDIX B

THE WASTE AUDIT

| Waste Streams | Significance of Waste in Your Operation | | | |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------|---------------------------------|--------------------------------------------------|------------------------------------------------|
| | Quantity of Waste Generated (per month or per week) | Current Waste Management Method | Cost of Waste Management (per month or per week) | Waste Minimization Options* (your suggestions) |
| Absorbent | | | | |
| Adhesives | | | | |
| Batteries: Lead-acid Dry | | | | |
| Body Filler (left over) | | | | |
| Brakes: Dust Fluid Parts | | | | |
| Cleaners: Alkaline Cleaner Ammonia Bleach Brake cleaner Carburetor cleaner Detergents Degreaser Floor Wash Water Parts Wash/Rinse Water Sludges and Filter Wastes (Solvent Sink, Floor Sump, Machinery) Spent Solvent (including gunwash thinner) Strippers | | | | |

* Refer to Appendix A

APPENDIX B - THE WASTE AUDIT

| Waste Streams | Significance of Waste in Your Operation | | | |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------|----------------------------------------|---------------------------------------------------------|-------------------------------------------------------|
| | Quantity of Waste Generated (per month or per week) | Current Waste Management Method | Cost of Waste Management (per month or per week) | Waste Minimization Options* (your suggestions) |
| Compressed Gases: Argon Refrigerant (CFC) Oxy-Acetylene | | | | |
| Container Disposal: Corrugated Cardboard Foam Popcorn Metal: - crates - 205L drums - 20L containers - 20L pails - spray cans Mixed Material Paper Paperboard Plastic: - sheeting/wrap - bubble wrap - blister wrap - 1L - 4L - 20L - 205L containers - sampling - containers Wood | | | | |

* Refer to Appendix A

APPENDIX B - THE WASTE AUDIT

| Waste Streams | Significance of Waste in Your Operation | | | |
|---------------------------------------------------------------------------------------|-----------------------------------------------------|---------------------------------|--------------------------------------------------|------------------------------------------------|
| | Quantity of Waste Generated (per month or per week) | Current Waste Management Method | Cost of Waste Management (per month or per week) | Waste Minimization Options* (your suggestions) |
| Dirty Rags | | | | |
| Fertilizers | | | | |
| Filters: Air Fuel Hydraulic oil Motor oil | | | | |
| Fuel and Oil Additives | | | | |
| Fuels: Diesel Gasoline Jet Fuel Kerosene Methanol Naptha Propane | | | | |
| Glass | | | | |
| Grease | | | | |
| Hoses Hydraulic Other | | | | |
| Metal Conditioner | | | | |
| Oil (Used): 2 cycle chain heavy/light | | | | |

* Refer to Appendix A

APPENDIX B - THE WASTE AUDIT

| Waste Streams | Significance of Waste in Your Operation | | | |
|------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------|----------------------------------------|---------------------------------------------------------|-------------------------------------------------------|
| | Quantity of Waste Generated (per month or per week) | Current Waste Management Method | Cost of Waste Management (per month or per week) | Waste Minimization Options* (your suggestions) |
| Oil (Used) (continued): gear hydraulic motor transmission | | | | |
| Oil Conditioner | | | | |
| Paint Booth filters | | | | |
| Paint (left over) - spray, liquid | | | | |
| Parts: Core Used Panels | | | | |
| Pesticides | | | | |
| Radiator: Coolant Core Dust (glass bead blasting/ sand blasting) Flush Sludge Solder Flux/Tinning Compound | | | | |
| Sanding Dust | | | | |

* Refer to Appendix A

APPENDIX B - THE WASTE AUDIT

| Waste Streams | Significance of Waste in Your Operation | | | |
|------------------------------------------------------------------------------------------------|-----------------------------------------------------|---------------------------------|--------------------------------------------------|------------------------------------------------|
| | Quantity of Waste Generated (per month or per week) | Current Waste Management Method | Cost of Waste Management (per month or per week) | Waste Minimization Options* (your suggestions) |
| Scrap Metal: Copper Aluminum Steel Mixed | | | | |
| Sealant | | | | |
| Tanks (Above Ground, Under Ground) Abandoned Leaks Spills during filling & dispensing | | | | |
| Tires: New Used | | | | |
| Volatile Organic Compound Air Emissions (from overspray) | | | | |
| Welding Rods | | | | |
| Windshield Washer Fluid | | | | |
| Other: | | | | |

* Refer to Appendix A

APPENDIX C

THE WASTE MINIMIZATION PLAN

| Targeted Waste Stream | Options for Minimizing Waste Stream | Best Option |
|------------------------------|--------------------------------------------|--------------------|
| | | |

APPENDIX D

WASTE MINIMIZATION PLAN CHECKLIST

- Is everyone involved in your shop committed to developing and implementing a waste minimization program?
 Yes No
- Have you used the following tools to conduct a waste audit on your shop?
 - Waste Minimization Checklist Yes No
 - The Waste Audit Yes No
 - Waste Minimization Options (Appendix A) Yes No
- Having completed the waste audit, did you identify options to minimize waste for different waste streams? (list them in the Waste Minimization Plan)
 Yes No
- Have you selected the best waste minimization option for each waste stream? (list them in the Waste Minimization Plan)
 Yes No
- Have you prioritized the best waste minimization options you plan to implement?
 Yes No
- Have you implemented one or more options?
 Yes No
- Are you monitoring the progress of each option you implement?
 Yes No
- Are you keeping up to date to find new opportunities for waste minimization?
 Yes No
- Are you periodically reviewing/conducting the waste audit to reassess your waste minimization needs?
 Yes No

Alberta
ENVIRONMENTAL PROTECTION

