



WDO ROUND THREE PROJECTS

FINAL REPORT



Project Name: Standardizing Municipal HHW Data: Recording, Reporting and Tendering: Addendum

Municipality/Organization: AMRC/AMRC HHW Committee

Municipal Project Manager: Cynthia Hyland

Total Funding Provided by WDO: \$13,550

Total Project Costs Invoiced to Date: \$11,500

Current Invoice: \$2,000

Executive Summary

The AMRC, with funding from the Ontario Waste Diversion Organization, has carried out the sampling work necessary to ensure greater confidence in the units and standards that are being used to measure, tender and report quantities of household hazardous waste (HHW) in Ontario. A total of seven municipal HHW sites were sampled in January and February, 2001 to determine the accuracy of the present assumptions regarding drum and lab pack residual quantities and weights of individual items (such as vehicle batteries and gas cylinders). The purpose of the study was to adjust the standard tender forms now in use and begin to use the more rigorous conversions in compiling province wide data.

In general, lab pack and drum residual quantities were found to be lower than had been assumed by previous studies, while weights of individual items were found to be relatively consistent.

Because of the time of year that the study was carried out, certain items commonly found in the HHW stream such as pesticides, acids/bases and oxidizers were not well represented. Therefore, additional sampling was carried out in May at three sites to ensure greater confidence in the residual quantities determined for these waste classes. The remaining funds allocated for the project were directed towards this additional sampling.

The revised standardized tender table will be forwarded to all Ontario municipalities with HHW programs for use in upcoming tenders.



WDO ROUND Three PROJECTS FINAL REPORT

Secretariat to WDO:



FINAL REPORT GUIDELINES

RECOMMENDED SECTIONS FOR THE FINAL REPORT

1. EXECUTIVE SUMMARY

- Using template provided.

2. INTRODUCTION

- Summarizing goals, methodology and geographic scope of the project.

3. METHODOLOGY

- A thorough description of the methodology utilized to complete the project, including an overview of data collection and analysis procedures.

4. RESULTS

- Presentation of project results in table format (where appropriate) and a thorough analysis of project impacts and implications, lessons learned and suggestions for other programs.

5. TRANSFERABILITY TO OTHER REGIONS/MUNICIPALITIES IN ONTARIO

- Indicating how the project results could be used by other Ontario municipalities to increase diversion of residential organic waste.

Standardizing Municipal
HHW Data: Recording,
Reporting and
Tendering

ADDENDUM

Prepared for the
Ontario Waste Diversion
Organization

August, 2001



Introduction

Earlier this year, the AMRC carried out sampling at municipal household hazardous waste (HHW) sites in the cities of Toronto and Peterborough and the regional municipalities of Niagara and Peel. The goal of the sampling was to ensure greater confidence in the units and standards that are being used to measure, tender and report quantities of HHW in Ontario. The purpose of the study was to adjust the standard tender forms now in use and begin to use more rigorous conversions in compiling province wide data.

Because of the time of year that the study was carried out (January/February), certain items commonly found in the HHW stream such as pesticides, acids/bases and oxidizers were not well represented. Consequently, additional sampling was done in the spring to ensure greater confidence in the residual quantities determined for these waste classes.

Sampling was carried out at three municipal sites over three days. Table 1 summarizes sites and locations

Table 1 Municipal HHW Sites Sampled

Municipality	Site	Date Sampled
Peel, Region	Britannia HHW Depot	May 23, 2001
Toronto, City	Bermondsey HHW Depot	May 25, 2001
	Scarborough HHW Depot	May 31, 2001

Table 2 summarises the total number of items per category and includes the recommended measure for that category.

Table 2 Sampling Results

Waste Category	Number of Containers or Items Sampled	Total Number of Items in Containers (if applicable)	Container Volume or Weight/Residual Volume or Weight Per lab pack	Recommended Measure
Acid	3 drums	216	93.9 L/55.6 L	65 L/Lp
Base	4 drums	297	240.7 L/124.2 L	75 L/Lp
Oxidizers	3 drums	102	177.6 L/100.8 L	70 kg, L/Lp
Pesticides	3 drums	326	74.8 kg/Lp/43.3 kg/Lp	65 kg, L/Lp
Pharmaceuticals	1 drum	n/a	43 kg/Lp	70 Kg/Lp

Revised Tender Pricing Table and HHW Unit Conversions

The results from the sampling were incorporated into the revised tender pricing table and HHW unit conversions. Draft copies of the tables were then circulated for review to members of the AMRC's HHW Committee and HHW contractors.

HHW Committee members agreed that there are still not enough items in the sample for us to be fully confident in the conversions for the materials in question. Thus, the figures used are the "best estimate" of the volume/weight of residuals in a "typical" lab pack.

It was also stressed that the household hazardous waste stream can be expected to vary depending on the season—this variability affects both the composition and weight of residuals in lab packs. For example, fertilisers can make up a significant portion of an organic oxidiser lab pack. This material can be densely packed with very little void space, resulting in a significantly heavier drum. Residents tend to dispose of this material at the beginning and end of the growing season, so oxidiser lab packs at these times of year might be considerably heavier than at other times. Variability is also a result of the different packing methods used by different contractors and/or on-site staff.

For this reason, the HHW Committee suggests that routine sampling be carried out through the year at various sites so that a snapshot of all seasons can be developed.

Despite these concerns, however, we can now quantify and categorise materials handled by municipal HHW programs with much greater confidence than ever before.

Table 3 on the following page updates the sample tender pricing table. It is followed by the revised HHW standardisation table. These tables will be posted on the AMRC's website for use by municipalities when they are preparing tenders and contracts for their HHW programs.

Table 3 Revised Tender Pricing Table

#	Common Materials	Waste Class	Recording Units	Conversion	Cost per Recording Unit
1	Inorganic Acids	148A, 114C	Lp	65 L/Lp	
2	Inorganic Bases	148A, 148B, 121C	Lp	75 L/Lp	
3	Dry Cell Batteries	121C, 148A	Lp	286 kg/Lp	
4	Car/Vehicle Batteries	112C	each or kg.	16 kg/battery	
5	Inorganic Oxidizers	148A	Lp	70 L/Lp	
6	Organic Oxidizers	263A	kg.	70 kg/Lp	
7	Antifreeze	212L	drum or litre	205 L/drum	
8	Bulked Fuel	221I, 221L	drum or litre	205 L/drum	
9	Flammables/Organics	263A, 233, 213A	Lp	65 L/Lp	
10	Large (20 In) Propane Tanks	331I	each or kg.	11 kg./tank	
11	Small non-refillable Propane Cylinders	331I	each or kg.	560 g/cylinder, 100 cylinders/Lp 60 kg/Lp	
12	Aerosols	331I	kg.	70 kg/Lp	
13	Oil	252T, 252L	drum or litre	205 L/drum	
14	Oil Filters	252T, 252L	kg.	105 kg/Lp (150 filters/Lp)	
15	Paint	145B	litre (L)	60 L/Lp, 1 drum=205 L	
16	Paint Sludge	145B	Lp	60 L/Lp;	
17	Pathological Waste	312P	kg.	0.2 kg/L	
18	Pesticides	242A, 269A	Liquid-Lp Solid-Lp	65 L/Lp 65 Kg/Lp	
19	Pharmaceuticals	261 A	Kg	70 kg/Lp	
	Uncommon Materials				
20	Inorganic Cyanides	148A	Kg.	Kg.	
21	Flammable Solids	148A	Kg.	Kg.	
22	Isocyanates	233	Kg.	Kg.	
23	Ignitable Gas Cylinders	331I	each (by volume)	record cylinder volume	
24	Non-ignitable Gas Cylinders	331R	each (by volume)	record cylinder volume (Freon: 3 Kg/unit)	
25	Non-basic Fire Suppressants	331R	each (by weight)	2.7 Kg/unit	

Table 4 Household Hazardous Waste Standardisation Table

Background

Over the years, data collected on materials received by municipal household hazardous waste (HHW) programs have been recorded in a variety of unit measurements by municipal staff. Two examples of this variance in unit usage are: household batteries may be recorded in litres or kilograms, and paint may be recorded in drums, lab packs, cages, or boxes. When attempting to put together the total amount of HHW diverted in Ontario through these programs, conversion factors have had to be used, which reduced the accuracy of the compiled results. In order to develop a more accurate reporting procedure, the AMRC's HHW Committee has developed a standardized method of recording and reporting materials handled. These materials have been received by municipal HHW programs, and are listed in the accompanying table, which has been reviewed and accepted by the Ontario Ministry of the Environment (MOE).

Table Format

Column 1: "CATEGORY"

The category column is separated into subcategories of the MOE# column. The classifications in this column have been made for several reasons, as follows:

- consideration of the packaging and transportation requirements according to materials properties,
- consideration of the packaging and transportation requirements of the Transportation of Dangerous Goods Act,
 - i.e. both acids and bases fall under MOE# 148A, but if packed together and should they leak, they would react dangerously
- facilitation of off-site treatment,
 - i.e. liquid paint may be recycled into paint, but not so for paint sludge,
- as the off-site treatment of materials varies, some being much more costly than others, segregation of different materials ensures that the higher charges are not applied to other materials which are less costly to treat.

Column 2: "MOE #"

The second column of the table shows the waste class numbers, as determined by the Ontario Ministry of the Environment's Regulation 347. Only class numbers applicable to municipal household hazardous waste programs are listed. When municipalities report to the MOE, they are required to use these class numbers.

Column 3: "PRODUCT TYPE"

The Product Type column lists materials that may fall into the various sections of the Category column and are representative of materials collected by municipal HHW programs. Some product types may fall into more than one category, i.e. a "cleaner" may be an acid or a base. Should a product type have the characteristics of two categories, i.e. wax stripper may be both a base and a flammable, it is classified based on its primary characteristic. If it is possible, the material will be placed in the category with the lowest off-site treatment cost.

Column 4: "SUGGESTED MEASURE"

The suggested measures are the measures most often used by municipalities and contractors. Initially, most of the conversion factors listed were obtained from municipalities and contractors. In the first half of 2001, on-site sampling was carried out at a number of municipal HHW programs, allowing us to assign more accurate conversion factors for individual items and for the actual residual quantity of material in lab packs.

CATEGORY	MOE #	PRODUCT TYPE	SUGGESTED MEASURE	
ACID	148A--Inorganics 114C--Other Inorganic Acid Waste	ACIDIC CLEANERS DESCALER ACIDIC DISINFECTANT DRAIN OPENER METAL CEMENT METAL CLEANER	MURIATIC ACID OTHER pH < 7.0 PHOTO CHEMICALS POOL CHEMICAL--pH REDUCER RUST REMOVER ACIDIC TOILETRIES	Litres 65 L/Lp
AEROSOL	331I--Waste compressed gases, including cylinders	AEROSOLS BUTANE LIGHTERS	SPRAY PAINT	kg 209 cans/Lp 70 Kg/Lp
ANTIFREEZE	212L--Aliphatic liquids	ANTIFREEZE		Litres 205 L/drum 80 L/Lp
BASE	148A, 148B--Inorganics 121C--Alkaline sol'ns	ABC DRY CHEMICAL FIRE EXTINGUISHERS AMMONIA BASIC CLEANERS CORROSIVE PAINT REMOVER BASIC DISINFECTANT DRAIN OPENER	METAL CEMENT MERCURY OTHER pH >7.0 PHOTO CHEMICALS POOL CHEMICAL--pH BOOSTER BASIC TOILETRIES WAX STRIPPER	Litres 75 L/Lp
BULKED FUEL	221I--Bulked Fuel (221L if Diesel alone)	BULKED FUEL		Litres 205 L/drum 80 L/Lp
CAR/VEHICLE BATTERIES	112C--Acid solutions containing heavy metals	CAR/VEHICLE BATTERY	LEAD-ACID BATTERY	kg 1 Battery = 16 kg
DRY CELL BATTERIES	148A--Inorganics 121C--Alkaline sol'ns	ALKALINE H.H. BATTERY BUTTON BATTERY LITHIUM H.H. BATTERIES	NICKEL-CADMIUM H.H. BATTERIES	kg 286kg/Lp 1 20 litre size Pail = 27 kg
FIRE SUPPRESSANTS (NON-BASIC)	331R--Waste compressed gases, including cylinders	CARBON DIOXIDE	HALON	per cylinder and kg, recorded by cylinder volume 2.7 Kg/fire extinguisher

CATEGORY	MOE #	PRODUCT TYPE	SUGGESTED MEASURE	
FLAMMABLES / ORGANICS (not bulked; items listed here may have different waste classes if bulked)	263A--Misc. Waste Organic Chemicals 233--Other poly-meric wastes 213A--Petroleum Distillates	ADHESIVE ALCOHOLIC DISINFECTANT AIR FRESHENER CRAFT PAINT BRAKE FLUID CANNED HEAT CARBON TETRACHLORIDE CARBURETOR CLEANER CLEANERS CONCRETE WATER SEALER CONTACT CEMENT DE-ICER DRIVEWAY SEALER ENAMEL FILLER (MISC.) FUEL GAS LINE ANTIFREEZE GLUE HIGH HEAT PAINT INKS LACQUER LINSEED OIL LIQUID PLASTIC LUBRICANTS MINERAL SPIRITS	MOTH BALLS (NAPHTHALENE) MOTOR OIL PAINT REMOVER OR THINNER PETROLEUM DISTILATES PHOTO CHEMICALS POLISH OR WAX POWER STEERING FLUID PRIMER SEALER RESIN OR SEALER RUST OR METAL PAINT SHOE CARE PRODUCTS SOLVENT (MISC.) SPECIALTY PAINTS STAIN TAR OR ROOFING PATCH FLAMMABLE/ORGANIC TOILETRIES TRANSMISSION FLUID UNDERCOATING VARNISH VARSOL WALL PAPER PREP WATER REPELLANT WAX STRIPPER WOOD FINISH WOOD PRESERVATIVE	Litres 65 L/Lp 5 Gallon pail = 20 l
FLAMMABLE SOLIDS	148A--Inorganics	METAL POWDER	ZINC POWDER	kg
FLUORESCENT LAMPS	146T	FLUORESCENT LAMPS		Kg 1 Fluorescent Lamp = 0.2836 kg
GAS CYLINDERS (IGNITABLE)	331I--Waste compressed gases, including cylinders	ACETYLENE	PROPANE (50 lb)	per cylinder and kg, recorded by cylinder volume
GAS CYLINDERS (NON-IGNITABLE)	331R--Waste compressed gases, including cylinders	CARBON DIOXIDE FREON	HELIUM OXYGEN	per cylinder and kg, recorded by cylinder volume (Freon: 3 Kg/unit)
INORGANIC CYANIDES	148A--Inorganics	INORGANIC CYANIDES		kg
INORGANIC OXIDIZER	148A--Inorganics	BLEACH CLEANERS DISINFECTANT FERTILIZER OTHER	INORGANIC PEROXIDES PHOTO CHEMICALS POOL CHEMICAL INORGANIC OXIDIZING TOILETRIES	Litres 70 L/Lp
ISOCYANATES	233--Other poly-meric wastes	ISOCYANATES		kg
OIL	252T--Leachate toxic liquid waste 252L--Waste crankcase oils and lubricant	MOTOR OIL		Litres 70 L/Lp 205 L/drum

CATEGORY	MOE #	PRODUCT TYPE		SUGGESTED MEASURE
OIL FILTERS	252T--Leachate toxic liquid waste 252L--Waste crankcase oils and lubricant	OIL FILTERS		Kg 105 kg/Lp 83 kg/Lp 1 360 l Otto Cart = 157 kg 1 Oil Filter = 0.759 kg
ORGANIC OXIDIZER	263A--Misc. waste organic chems	FERTILIZER WITH PESTICIDE HARDENER	METHYL ETHYL KETONE PEROXIDE ORGANIC PEROXIDES	Kg 70 kg/Lp
PAINT	145L--Waste paint and related materials	ALKYD/OIL PAINT ENAMEL LAQUER LATEX PAINT PRIMER SEALER RESIN	RUST OR METAL PAINT STAIN VARNISH WATER REPELLANT WOOD FINISH WOOD PRESERVATIVE	Litres 60 L/Lp
PAINT SLUDGE	145B--Waste paint and related materials	PAINT SLUDGE		Litres 60 L/Lp
PATHOLOGICAL WASTE	312P--Pathological wastes	SYRINGES		kg, 0.2 kg/L 8.6 kg/BFI Box, 9.73 kg/BFI Carton 5 kg/Hotz Biohazard box
PCBS	243D--PCBs	PCB CONTAMINATED WASTE	PCB WASTE BALLASTS	Litres for liquid, Lp for ballasts 200 ballasts/Lp, 290 kg/Lp
PESTICIDE	242A--Halogenated pesticides and herbicides 269A--Non-halogenated pesticides and herbicides	FUNGICIDE HERBICIDE INSECTICIDE	AEROSOL PESTICIDES	Litres/Kg 65 L or kg/Lp
PHARMACEUTICALS	261A--Waste poisonous solids Nos	NON PRESCRIPTION DRUGS	PRESCRIPTION DRUGS	Kg 70 kg/Lp
PROPANE TANKS	331I--Waste compressed gases, including cylinders	PROPANE LARGE PROPANE SMALL		kg 1 large (20 lb) tank = 11 kg, 1 small (1 lb) tank = 560 grams 1 Lp (small (1 lb) tanks) = 60 kg