Waste oil — The second time around

Of the 188 million gallons (846 million liters) of oil sold each year in Canada, nearly 80 million gallons (360 million liters) will end up as waste oil. Its recovery and re-use would provide a viable approach to husbanding this important natural resource, essential to our way of life.

Industrial progress and many of the services Canadians take for granted are dependent on the use of petroleum, a nonrenewable natural resource which is essential to our way of life. The magnitude of this dependency becomes clear in view of the myriad conveniences of modern-day living which directly or indirectly owe not only their existence but also their adequate performance to petroleum products. However, disposing of used lubricating oils presents a real and significant health and environmental problem.

Of the 188 million gallons (846 million liters) of lubricating oil sold each year in Canada (according to a 1972 survey), nearly 80 million gallons (360 million liters) will end up as waste oil, a black and turbid liquid which should be either re-refined and re-used or destroyed in an ecologically acceptable manner. Existing studies indicate that up to 79 million gallons (356 million liters) could be recovered (although only a small percentage actually is), a volume amounting to 3.6 gallons (16 liters) per person per year or 42 per cent of the total sold.

The recovery and re-use of waste oil from service stations, truck fleets, large industries, airports, small businesses, government agencies and farms, does provide a viable approach to husbanding this important natural resource. However, there are problems in collection, segregation, the various recovery processes, maintaining continuity of quality of re-refined or recycled products, product evaluations, economics, and disposal of by-products. Mr. Paul Strigner of the Fuels and Lubricants Laboratory at the National Research Council's Division of Mechanical Engineering has been working with the waste oil recovery industry, principally rerefineries, in the area of product evaluation, since 1966.

"Lubricating oil has changed appreciably with the times," notes Mr. Strigner. "In order to meet the demands of increasingly sophisticated engines and machinery, today's oil is blended with a variety of organic and metallo-organic additives, some containing elements such as barium, calcium, zinc, magnesium, phosphorus and chlorine. These additives protect against higher operating temperatures and increased bearing loads, while assuring longer operating life. For special applications even vegetable and animal fat additives are used. Along with the contaminants the oil has acquired through use, from the air and the machinery itself, these chemical and metallic compounds are hard to remove. They biodegrade slowly, if at all, bringing the danger of environmental pollution."

The problems begin when the oil is collected. Present methods have been described as primitive, non-selective and, for the most part, inadequate. Lack of segregation is one problem, since the oil may be randomly mixed with various contaminating liquid wastes from septic and holding tanks, thereby compounding the dangers of immediate disposal without treatment. Moreover, while pick-up from bulk storage tanks is usually free of charge for amounts in excess of 200 gallons (900 liters), small businesses which use drums to store waste oil must often pay a fee to have these carted away. This leads to uncontrolled dumping at thousands of sites throughout the country. Since non-segregated handling and storage systems result in heavy contamination from waste chemicals, solvents, fuels and water, effective collection is important in the recycling of waste oil. "There is a



The life history of a re-refined motor oil. From the top: virgin base oil; engine-tested and warranty-approved motor oil formulated from virgin oil and additives; used motor oil; base oil re-refined from used motor oil, using the acid treatment process, and motor oil (not engine-tested) formulated from re-refined base oil and an SD additive package.

L'histoire d'une huile régénérée pour automobiles. De haut en bas: une huile de base vierge; une huile pour automobiles ayant subi des essais sur moteurs, avec garantie homologuée et fabriquée à partir d'huile vierge et d'additifs; une huile usagée pour automobiles; une huile de base régénérée à partir d'huile usagée pour automobiles avec un traitement à l'acide sulfurique; et une huile pour automobiles non essayée sur moteurs et fabriquée à partir d'une huile de base régénérée et d'additifs SD.

glimmer of hope now that governments and the petroleum industry are putting both feet into the used oil puddle," notes Mr. Strigner.

Road oiling companies collect most of the used oil in Canada to be used as a dust palliative. In each application, 0.2 to 0.5 gallons per square yard (1.1 to 2.8 l/m^2) are used, and one to four applications a year are required if this method of dust control is to be effective. However, this waste oil is not treated before use and according to one study, only one per