2012 Used Oil Recycling in America

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Introduction

I first became aware of the problem of improper disposal of motor oil and of the pollution of my local watershed of Little Falls in Bethesda, MD, which runs into one of the drinking water reservoirs of our nation's capital in 1976. I was outraged.

My father's 40-year career as a congressional aide to both the U.S. House's Ways and Means Committee and to the Senate Finance Committee gave me firsthand exposure to the workings of oil tax subsidies. Ironically, we do little to benefit from oil pollution prevention although more people recycle now than vote. Still, we have a long way to go in dealing with oil waste by-products.

Last year the nation's leading energy expert estimated that the US spent between $49 billion and $100 billion on energy subsidies in 2007.[1] In the late 1970's, millions of dollars were given to states following on a multi-billion dollar law suit settlement from oil overcharges awarded to the Department of Energy to promote energy conservation measures. And yet, the efforts for promoting petroleum product stewardship have been greatly under-funded by both the private and public sectors, and if funded, the money was poorly allocated and irresponsibly used.

A Parade Magazine article[2], "*We Can Stop Wasting our Oil*," brought national attention to DIY oil recovery. This article cited a pitiful 5-10% recycling rate, with 85 million DIYers estimated to be throwing away 200 million gallons of used oil.

Later in 1981, after establishing the Washington DC used oil program, I had the opportunity to build a used oil plant that has recycled hundreds of millions of gallons of used oil (http://www.fccenvironmental.com/hydrocarbon_services/hs_used_oil.htmlput see Alexandria, VA facility).

In May of 1981, I testified before the House Appropriations Subcommittee on Commerce and Transportation as a representative of state oil recycling coordinators requesting money for the Used Oil Recycling Act that was never funded. Why do auto batteries have an 85 percent recycling rate and motor oil only a 20-35 percent recycling rate?

Recently Valvoline ads on the Car Talk radio show and at the Daytona 500 promoting their use of 50% recycled oil inspired me to update my past used oil updates.

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[1] http://www.csmonitor.com/USA/Politics/2011/0309/Budget-hawks-Does-US-need-to-give-gas-and-oil-companies-41-billion-a-year

[2] Jackson Harrison Pollack, "*We Can Stop Wasting our Oil*," Parade Magazine August 10, 1980, Page 14

Currently, the United States consumes 19.6 million barrels of oil per day.[3] Americans use over 7 billion barrels of oil products annually. The USA, which constitutes 4% of the world's population, uses over 20 % of the world's oil and produces 22% of climate-altering CO2.

We inject one trillion tons of oilfield waste into deep wells in addition to the 3 billion tons of oil and gas wastes we generate yearly through oil and gas exploration and production in the USA. The last publicly-generated report to Congress on this subject was made by the Environmental Protection Agency back in 1986. At the back end, we waste 400 million gallons of used oil and discard hundreds of millions of oil filters yearly in the United States. The current sampling method to evaluate the toxicity of oil--Toxicity Characteristic Leaching Procedure (TCLP) -- was designed for municipal landfills not oil, so this testing procedure is outdated. I ask you to simply reflect on the fact that one gallon of used oil improperly disposed of can contaminate one million gallons of fresh water or ruin the water supply for 50 people for a year.

The used oil recycling market provides a case study into the complexity of defining and regulating one area of recycling. Before we can understand the secondary oil market represented by recycled oil, we must understand the primary one. Each year in the United States, over 300 billion gallons of crude virgin oil are processed into various petroleum products such as gasoline, kerosene, plastics, etc. Of this amount, only 1/2 of one percent becomes used oil. Used oil disposal for the American do-it-yourself oil changer (DIYer) can become a serious problem or a valuable resource depending how it is managed.

One example can be found where I live. In the last four years, Virginia motorists disposed of 11.2 million gallons of oil, equivalent to the 1989 Exxon Valdez spill. The improper disposal of used oil, oil filters and antifreeze by those who perform their own automobile maintenance is a ubiquitous environmental concern. Three to 4.5 million gallons of used oil, 4.7 to 5.9 million oil filters, and approximately one million gallons of antifreeze were "lost" in Virginia's environment. Only 15-30% of these materials are estimated as recovered. Even the disposal of discarded oil filters and plastic containers reveals a residual amount of oil whose sheer volume is alarming.

In July 2006, the U.S. Department of Energy Used Oil Re-refining Study[4] indicated that the United States consumed about 25 percent of the total worldwide demand for lube oils. Congress mandated this inquiry under the Energy Policy Act of 2005, Section 1839. Most European countries are more advanced in reducing, reusing and recycling used oil. For example Europe has three times more re-refining capacity, or the ability to convert used oil back into a lube oils, that the USA.

This report recommended the following:

"It is possible that state would be better served by channeling public education into the

1. [3] *maps.unomaha.edu/peterson/funda/sidebar/**oilconsumption**.html*

[4] http://www.fossil.energy.gov/epact/used_oil_report2.pdf, Used Oil Re-refining Study to Address Energy Policy Act of 2005 Section 1839

expansion of collection centers and financing recycling efforts as opposed to subsidizing space heaters."(See page 18.)

However, current national data is absent as to what the do-it-yourselfers do with their used oil, filters, anti-freeze and other petroleum by-products (e.g. oil bottles).

Millions of Sources of Pollution

A key issue is the non-point source of used oil pollution by oil changers. Presently the DOE estimates that 80% of Do-it-Yourself (DIY) used oil is improperly disposed. Also this study concludes that the annual volume of disposed oil has decreased from 426 million gallons in 1996 to 348 million gallons of an estimated million gallons in 2004 lost in the environment.

In 2009 the U.S. Department of Transportation cites that there over 209 million licensed drivers in America driving on average 14,000 miles per year. Because of the recession and higher oil prices, people have cut back on driving and consumption while the number of automobiles has increased. Oil change intervals have increased since now people do not change their oil at 3,000 miles, but rather every 5,000 miles.

Current Consumer Market

Total US motor oil sales have been flat for several years now despite these increases. However the economic recession and financial downturn has probably increased this for the DIY portion; there has been little info in trade journals on the DIY portion. DIY decline is estimated at around. 40%, and or Do-it-For-Me changes are at 60%. It is important to recognize that this is based on the volume of oil sold to DIYers, and likely does not represent the number of DIYers. It is not clear whether the DIYers are driving more miles between changes or if their numbers are declining. **Oil Filters**

The filter industry has claimed a 50% recycling rate for years, however this is questionable. The filter industry has refused to release any of their data for peer review and is actively engaged in lobbying the Federal, state and local governments to not enact any regulations on the disposal of used oil filters. No other used filter study has come even close to a 50% recycling rate. For example, the California recycling program can only reach 7%. There is no data to make any national claim.

One good indicator to track actual oil changes instead of folks who buy motor oil to "top-off" the engine is to follow oil filter sales. In 1998 there were 450 million light-duty oil filters sold in the United States, while 778 million light-duty filters were purchased in 2002 according to FMC.

Reusable Oil Filters

A typical used light-duty oil filter contains, on average, eight ounces of oil. Widespread adoption of reusable filter systems could virtually eliminate used oil being trapped in filters and prevent steel filters entering landfills. In addition to being able to capture the used oil, reusable oil filters would reduce solid waste by 90% (by weight, not volume). Reduction of waste is considered more environmentally friendly than recycling. This feature is designed into the product. It requires no effort on the part of the user or the government to achieve the 90% reduction. As an added bonus, consumers would save billions of dollars in disposal fees charged by repair facilities to dispose of the used filters.

There are reusable oil filters that are compatible with engines that use the one-piece sealed spin-on filter. No modifications or special tools are required to install these filters on any engine that uses a spin-on filter, and they allow for the recovery of all used motor oil. The assembly housing is reused; only the paper element is replaced, and this can be easily recycled or burned for energy. If produced in volume, this filter could be manufactured for under a dollar per unit. At the point of final sale, the replacement filter element would cost somewhat less than the current spin-on filter. Reusable filters were popular up to the early 1960s and are still widely used in the racing industry today.

Used Oil Burned vs. Reused

The DOE estimates that of the 780 million recycled gallons of used oil each year, 83 percent is burned, while 17 percent is re-refined into new lubricating oil. It was found that re-refining used oils saved 8.1 percent of the energy content of the used oil compared to combusting the oil for heating purposes.

Presently, most used oil is burned for fuel in small space heaters, asphalt plants, industrial kilns, boilers and furnaces in America and little is re-refined. Roughly, 110 million gallons of used oil is burned as fuel in 75,000 small used oil space heaters. Serious environmental and energy questions have been raised concerning the combustion of used motor oils in space heaters. This report cites that small burners do not provide the levels of pollution reduction found in large-scale industrial combustion processes since asphalt/ cement plants and steel mills have flue gas treatment technologies.

DOE Report Policy Options

This study recommends a national workshop of state used oil management officials to exchange information and stimulate active recycling programs that benefit from the experiences of those that have well established and successful programs., The report also encourages those states that have not yet passed used oil legislation to take action.

The study points to the need to assist rural and farming communities. Urban areas appear to have more effective recycling programs in place due to the closer proximity to recycling centers. DIY consumers in rural and farming communities offer the highest growth potential for recovering additional volumes of used oils. Thus, increasing the recovery of DIY oil is an important factor in making substantial progress in used oil recycling.

Targeting cost-conscious DIY consumers with effective public awareness and education programs can communicate the benefits of recycling used oils. Also, targeting non-English speaking oil changers and communicating in their language should be considered.

California's Used Oil Program

California has the largest state oil recovery program. In 2008, a total of 85.0 million gallons of used lubricating oil were recycled. Most of the oil, about 72 percent, is managed by private entities such as companies that perform oil change services or maintain their own fleet of vehicles. The remaining 28 percent of the oil was collected at public collection sites through local government programs, curbside collection programs, and certified centers.

The combined estimate for all public collection accounts for approximately 23.5 million gallons of used lubricating oil collected, or 5 percent more than the 22.4 million gallons collected in 2007.

In September 2009, significant changes were added to their program. The California Oil Recycling Enhancement Act restructures the lubricating oil recycling fee and the used oil recycling incentive payment system, streamlines the used oil grant programs, promotes the production and use of re-refined oil, makes changes to the used oil certified collection center program, and makes various changes to the handling and management of used oil.

This law is designed to discourage the illegal disposal of used oil. It requires oil manufacturers to pay to CalRecycle $0.26/gallon through December 31, 2013, of lubricating oil sold in California. On and after January 1, 2014, the fee decreases to $0.24/gallon. Registered industrial generators, curbside collection programs, and certified collection centers are eligible to receive an incentive payment from CalRecycle.

Used oil filter collection is extremely low, with only 1.1 million DIY filters collected in FY 2005-2006, a collection rate of only 7 percent. An estimated 13.2 million filters from DIYers were lost containing more than one million gallons of used oil not drained from the filters. There is no economic incentive for collection centers to take used filters unless they pay for the hauling cost of used filters

In 2006, California estimated 15 percent of households changing their oil resulting in less DIY oil improper disposal. Their ability to measure what is happening is why they are a model and have one of the nation's most effectively managed DIY oil programs.

South Carolina: Another State Managing Used Oil[5]

South Carolina's statewide used oil recycling program targeting do-it-yourselfers (DIYers) continues to flourish. Similar to California they have a tax on every quart of oil sold, and this advanced disposal fee stimulates greater recovery of these petroleum by-products. Through a combination of technical assistance and grant funding for local governments, the Office has helped develop one of the nation's most comprehensive used oil recycling programs targeting DIYers.

Do-it-yourself (DIY) oil changers in South Carolina recycled 984,437 gallons of used motor oil in 2010. Since the used oil recycling program began in 1990, DIYers have recycled more than 17 million gallons of used oil.

There are nearly 900 collection sites across the state for DIYers.

South Carolina has developed a statewide awareness program on used oil recycling. The program includes NASCAR driver Jeff Gordon, who serves as the state's spokesperson on used oil recycling and appears in a 30-second public service announcement. The Office also has developed three nationally award-winning 30-second PSAs starring the Recycle Guys. In

[5] Email from Eric Melaro, 3/5/12 SCDHEC Used Oil Coordinator

addition, the Green Driver Project, a special program for high school driver education classes, has been developed. The program centers on a class presentation and includes a used oil recycling lesson from "Action for a cleaner tomorrow" and a video, "DHEC1: Behind the Oil Change."

In addition, DIYers continue to recycle used oil filters and oil bottles in most counties. Precise recycling efforts are not measurable as many counties collect and market used oil filters and oil bottles with other metals and plastics, respectively. With this being the case, not all filters and bottles that are being recycled could be counted directly. Nearly all of the state's 46 counties accept used oil filters for recycling with most of those counties also collecting oil bottles for recycling.

To assist farmers with the proper management of used oil generated on the farm, DHEC continues to encourage local governments to establish oil recycling sites for farmers. Agricultural oil tanks typically hold 600 gallons of used oil and are fitted with a pump and hose in an effort to make it easier for farmers to deliver up to 55 gallons of used oil at one time. Such tanks are currently available at 66 locations.

South Carolina continues to expand its used motor oil recycling program by adding oil/gasoline mixture collection sites to the county programs. The oil/gasoline mixture tanks are typically 500 gallons and are designed to accept oil, gasoline and oil/gasoline mixtures from lawn equipment and recreational vehicles. Oil/gasoline mixture collection sites have been established at 95 locations[6].

DOE Study Recommendations

The DOE recommends accelerated tax depreciation allowances to expedite re-refining and to expand re-refined lube base oil production capacity. Such financial incentives can be offered to manufacturers to expand production capacity for a base oil end product that is suitable for blending either new motor oil and/or industrial oil products. This incentive is not recommended for combustion end users. Finally, they recommend requiring automobile manufacturers to proactively state in owner manuals that re-refined oils are acceptable as a blending component in motor oils as long as they meet the API certification requirements.

Also this study urges federal agencies to make additional volumes of used oils available for sale for the purpose of being regenerated to re-refined base oil. Furthermore, the government could explore entering into potential joint venture operations with private industry to re-refine those oils and produce products that can be supplied back to federal government agencies.

The DOE suggests that the Federal Government conduct an extensive study of used oil recycling programs to update what progress has been achieved. They also support initiatives such as programs for extended drain intervals (i.e. every 5000 miles), and enhanced oil filtering systems, and other energy conservation and environmental protection measures.

[6] www.scdhec.gov/environment/lwm/recycle/oil_recycling.htm.

Conclusion

For many decades I have observed millions of dollars lost in useless laws and studies of used oil where the money would have been better spent in enacting management programs and funding existing laws. For example, if regulatory agencies were serious about environmental protection they would ban small waste oil burning unless they can document significant pollution controls and also better monitor the transporters of used oil.

Back in the late 70s a close friend who owned a chain of drugstores reinforced my interest in this topic since the number one selling items in his shops were quart bottles of motor oil. Today the most successful DIY recycling activity is when consumers return their used oil to auto supply stores, and new business is stimulated by this take-back. It's the same scenario with auto batteries, however their product stewardship reveals 95.7 percent were recycled in 2009.according to EPA [7].

Back in 1981, I served on the American Petroleum Institute's (API) "Used Oil Subcommittee." Today there is a modest national effort to promote used oil recovery. A few states like California and South Carolina have gone as far as listing used oil as hazardous waste. They are the exceptions and not the general rule. The federal government back in the mid 1980's also proposed doing this but, ironically, backed off to help promote DIY used oil collection.

The API today is the body that reports on our oil and gas waste. Their Model Used Oil Legislation encourages states to tax motor oil sales to fund used oil recycling programs. California, South Carolina and other states that have a tax on motor oil have the best programs. Follow the money and you will find a management and reporting system. Several decades ago, some states ruled that used oil was a hazardous waste. Several of these states, such as California and South Carolina, developed model programs. However product stewardship is lacking.

Used oil recovery will expand once there is greater producer responsibility. End of life manufacturer responsibility and product stewardship is growing in Europe and Canada, and increasingly in the US (for electronics, mercury lighting, batteries, and carpet). The state tax approach, like California's, is antiquated and relies too heavily on the government and taxpayer. We need to see programs where the product producer is responsible for establishing end of life management for their product. Why should they get a free ride to the disposal or even to the recycling facility, when we don't allow them a free ride on the extraction and production side of getting oil?

Some would disclaim recycling and re-refining of used oil. They claim it is more energy intensive than using virgin feedstock. This only takes recycling out of context. We attribute depletion benefit and other forms of corporate welfare to make oil cheap; recycling is unattractive under the current market conditions because the whole system is designed to facilitate resource extraction.

The DOE study addresses minimization of improper disposal of used oil in landfills, on the ground or in waterways, and increasing re-refining capacity and production volumes while recognizing that re-refining maximizes the energy resource preservation with minimal impact on

[7] earth911.com/recycling/automotive/car-batteries/facts-about-car-batte

the environment. Since the Used Oil Recycling Act of 1980, the DIY recycling rate has doubled. However, now over a quarter of a century later, 80 percent of this black gold is lost as a harmful waste. DIYers though have declined from 60 percent to 40 percent. Also in the last 30 years, our energy consumption and population has increased by 40% and vehicle miles driven have increased by 150%[8]. Current economic factors, the need for national filter sales and other factors can give us better feedback of where used motor consumer recovery is at.

Questions that were brought up in the South Carolina 2009 State Report are pertinent. *The U.S. Department of Energy reports that the DIY population decreased from 60 to 45 percent between 1995 and 2004, however has the recession changed this trend? How many local governments use DIY used motor oil in waste oil heaters and may not track or report that volume? The frequency of DIY oil changes may be decreasing, but is that due to the economy, use of synthetic motor oil and other factors*?

In the past six years, the number of motor oil recycling listings included in Earth911.com's Recycling Directory, the largest recycling directory in the U.S., has tripled to 36,000[1]. These community–based locations include auto parts stores, service stations or local government agencies that collect used motor oil. Go to http://search.earth911.com or call 1-800-CLEANUP.

Good public education/outreach and convenient collection locations (ideally curbside collection) are the two key facets to getting consumer participation. Yet, without funding public awareness and a management program these recovery efforts will not properly grow.

The contribution of the DIYer has certainly diminished in the last 30 years. However, in recent years, is this trend reversing due to economic woes? Used oil does not only originate from the crankcase drainings of cars, trucks, motorcycles, buses, lawn mowers, boats, and planes, but from all types of machinery and industrial applications as well, which may make contamination more likely. Re-refining represents the best attempt to return used oil to its original state.

The draining, recycling, and reusing of used oil filters, bottles and antifreeze also requires increased private, public and government support. Every motor vehicle administration in the U.S. could, at a minimum, promote such recovery.

The opportunities to develop on-site, closed-loop, recycling technologies following California's example can be expanded. Reclaiming oil for re-use on site is a very attractive prospect since transportation costs and the possibility of increased spills are severely curtailed.

As oil prices spiral maybe we can remember that used oil does not wear out, it just gets dirty and additives are depleted. States that have a management program (a tax on motor oil sold) and track their used oil such as California, and South Carolina do the best job of tracking their waste.

Increased awareness is essential to stimulate greater support in extending oil changes beyond every 3,000 miles (when applicable), using synthetic oils, utilizing reusable oil filters, oil bottle recovery and used oil and antifreeze recycling. We should follow Valvoline's lead in purchasing re-refined or recycled motor oils. Further, private/public cooperative efforts may prevent used

[8] Jared Diamond's, *"Collapse: How Societies Choose to Fail or Succeed"* Viking Press, 2005, Page 523

oil pollution, save energy, and create new forms of commerce. The future will show how used oil can be used again and again.

In my three decades of tracking DIY used oil, current interest in addressing this pollution is at an all-time low point both in national awareness and measurement. Two friends of mine, with whom I helped build a used oil recycling plant, later revolutionized golf cleats by founding a company called Softspikes. How can we put so much energy into banning metal golf spikes, while all over the world still dump automotive by-products that menace our drinking water?

Americans still remain in the dark about the present improper disposal of motor oil and other auto by-products. Used oil is not being properly managed, and public health and the environment are being impacted.

How we choose to address the challenge to engage millions of DIY consumers in not just the disposal of oil but hundreds of other toxic products will have significant ramifications. If we can get the golf world to change their type of shoes, then there is hope that we can convince Americans to change their behavior and recycle their automotive by-products.

Internet links of Interest

http://www.earth911.org/master.asp?s=lib&a=oil/links.asp
http://www.filtercouncil.org/fmccontact.html
http://www.recycleoil.org/ American Petroleum Institute
http://www.epa.gov/epaoswer/hazwaste/usedoil/

USED OIL REFERENCES: Other titles by the author, Robert Arner:

- "Arner's Angle: Used oil reborn: Re-refining new lubricants**,** April 5, 2001 www.solidwaste.com
- "Used Oil Recycling: Closing the Loop." Presented to 7th Annual SWANA Symposium on Waste Reduction, Prevention, Recycling and Composting, February 26, 1996, Nashville, Tennessee
- "Safe Recycling of Used Oil," *Biocycle* magazine, September 1995.
- "What Oil Changers in America Are Doing With Their Used Oil," *Waste Age* magazine, April 1995.
- "Separating the Steel from the Oil," *Biocycle* magazine, January, 1995.
- "Re-refining in 1994: Converting Used Oil Back into a Lubricant," *Biocycle* magazine, and *Lubricants World* magazine, June 1994.
- "Used Oil Markets and Best Management Practices in the United States," National Recycling Congress, September 15, 1992, Boston, MA.
- "Curbside Recycling of Used Oil," *Resource Recycling* magazine, September 1991.
- "State and Local Used Oil Programs," *Resource Recycling* magazine, May 1989.
- "How to Set Up a Local Used Oil Recycling Program" (co-author), and assisted in the development of numerous newsletters and brochures on used oil recovery, USEPA, 1988.

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Robert Arner

Mr. Robert Arner is President of Recovery Enterprises and has hands-on experience in all aspects of used oil recycling, having been one of the first organizers of the National Oil Recyclers Association and the National Recycling Coalition. Presently Rob works as a private consultant. He has worked on Virginia, Florida and California's consumer collection and recycling programs in the last several years. Also, Mr. Arner did a used oil study for the International Executive Service Corp in Namibia in 2001. He has worked closely with the National Oil Recyclers Association, the American Petroleum Institute and state

government officials and was the national environmental organizer (Earth Day '80). In 1981, Mr. Arner testified before Congress regarding the Used Oil Recycling Act of 1980.

Mr. Arner has worked previously as a Pollution Prevention Specialist for Southeast RCAP, Solid Waste Program Manager for the Northern Virginia Planning District Commission, and as a recycling coordinator for five eastern towns on Long Island and, the City of San Diego, and the Washington D.C. Energy Office. Additionally, he has worked as a private consultant for Recovery Enterprise and was an environmental scientist for Versar, Inc., in Springfield, Virginia.

For over 30 years, Mr. Arner has dealt with numerous facets of the used oil recycling industry and public education programs for the "do-it-yourselfer" oil changer. He has experience as a builder and plant manager of a used oil recycling facility in Alexandria, Virginia.

Mr. Arner has developed numerous innovative avenues of public education, recruiting such spokespeople as Mary Joe Fernandez, Peter Jennings, Jack Anderson and Wes Unseld. For the U.S. Environmental Protection Agency, he has co-authored numerous used oil recycling newsletters, brochures, and a "how-to" manual for community action. He has also developed informational used oil recycling inserts and news items for several state motor vehicle tag renewals.

Mr. Arner has written and spoken extensively on used oil management and recycling, developing a network of private and public experts on this subject. He has a B.S. from the University of Maryland.