Trends in Technology

2014 NORA Conference & Trade Show: Puerto Rico
November 5-8, 2014

2014 Mid-Year Meeting Wrap-Up

Pictured: Facility of NORA Member Emerald Services Inc. see page 3
Parker's Point

Marketplace of Ideas

NORA is a big tent organization. Today, our association has 394 members that include collectors, processors, marketers, end-users, supplier/vendors and more from around the United States and around the world.

With that many members from this industry, there are a wide variety of opinions on business strategies, pricing policies and technology.

To that end, the association should serve as a community forum to introduce, discuss and debate these various opinions. By NORA serving as a marketplace of ideas, the industry and the members are strengthened.

The theme for this issue of NORA’s magazine, Liquid Recycling, is “Trends in Technology”. As industries mature, it is imperative that they seek out various technologies to improve their efficiencies and to add value to their finished products.

In this magazine, a wide variety of technologies that you may be interested in are discussed. NORA thanks the authors of the various articles for their submissions.

When it comes to technology, there is not one answer for an industry as diverse as ours. Some of the ideas presented in this publication may challenge some of your views about the industry. In part, that is by design as part of the marketplace of ideas.

The NORA Annual Conference and Trade Show will be held November 5-8, 2014. It will feature a trade show with over 50 exhibitors, many of whom have articles in this magazine. A floorplan including the exhibiting companies may be found on 26.

I encourage you to attend the conference in November to learn and explore the latest technology available to our industry.

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Member Spotlight:

Interview with Jim Munnell

Company: Emerald Services
Headquarters: Seattle, Washington
Web: www.emeraldnw.com

How long have you been with the company/industry and how did you get started?

I have worked for Emerald Services for 27 years. I started when it was known as Seattle Disposal Company. I operated commercial garbage trucks in the city of Seattle. I have held several jobs throughout my tenure. Truck Driver, Dispatcher, Safety Director, Purchaser, General Manager and currently Director.

What services do you provide?

Emerald provides collection of Used Oil for refining, Spent Antifreeze, Solvents, Part Washer services, Hazardous Waste Collection, Lab Pak Services, Transportation services, Vacuum Truck Services including overwater, Water treatment and processing, Barge and tank cleaning.

Where does your company provide service?

We provide service in Washington, Oregon, Idaho, Montana, Wyoming, Utah, Nevada and Alaska.

Why are you a member of NORA? How do you see NORA helping you build your business or gain new trading partners?

I'm a NORA member not only to build relationships with others in the same industry but to gain knowledge through networking which helps us grow our company. I don't view other NORA members as competitors but rather as business partners in that we can share information to help be more efficient in our business and sometimes customers to which products can be sold.

How has technology helped transform your business?

Using innovative processing technologies with a strong focus on sustainability, Emerald Services gives new life to waste products that would have been disposed of previously. In 2012, Emerald built the first used oil re-refinery of its kind in the Pacific Northwest. Using this and other recycling technologies, Emerald is proud to create products that repurpose fluids for resale and reduce reliance on foreign oil. Our current re-manufactured products include Marine Diesel Oil and fuel oil, recycled cleaning solvents, antifreeze and windshield cleaner.

For over 70 years, Emerald has invested in innovative changes and expansion of our waste management and recycling businesses. Currently, Emerald is the largest locally owned recycler in the Pacific Northwest of over 30 million gallons of waste oil, solvents, coolant and other fluids. We are a full-service partner for automotive, commercial and industrial environmental services that responsibly divert and renew our planet’s waste stream. We do our part to secure a greener tomorrow by solving society’s toughest waste disposal problems.

NORA Member Since: 2003
Location: Seattle, Washington
Contact: Jim Munnell
Phone: 206-832-3000
Email: jimm@emeraldnw.com
Web: http://www.emeraldnw.com
Imagine a city where highways, buildings and waste containers are talking with each other about traffic jams, weather and vehicle speeds. To some this might sound like a chapter out of a science fiction novel, but for others this is becoming business as usual.

Technological advances in the field of sensors and telecommunication networks have enabled businesses, cities and municipalities to deploy intelligent sensor nodes into the surrounding environment. Using the data generated by these sensor resources can be managed more efficiently.

Technology like this opens up new opportunities for companies in the recycling industry. By installing smart sensors in recycling containers companies can measure the fill-level from a distance, opening up a virtual window into each container. By harnessing the power of supercomputers and statistical tools these measurements can be turned into accurate forecasts of when the container will be full.

Further combining these forecasts with traffic information, collection routes and schedules can be optimized, eliminating unnecessary collections and creating significant savings. Not only can these solutions provide savings, they can also prevent overflow and ensure higher service quality.

Avoid common pitfalls

The selection of solutions provided to recycling companies range from simple sensors and analytics software to full end-to-end solutions that automate the planning process. As with all new technology it is essential for the customer to prepare and carefully plan the adoption of new solutions. When choosing a solution to use, recycling companies should pay attention to a few key points:

- Verify sensor robustness and accuracy: Before committing to a supplier recycling companies should test different sensor models to compare how accurate the readings they give in different container types. Sensors should also be subject to shock tests in order to ensure that they won't break down.

- Validate the business case: What kind of savings can be achieved by adopting a sensor based system? The best way find out is to deploy 50 sensors for a couple of months along an existing route and then compare costs before and after.

- Solution fees: How does the fee change depending on the amount of sensors, contract length and number of users. Are data, installation and maintenance fees included in the price? What is the cost of the sensor device?

- New modules: If the solution provider invents a new module to the service, will it be part of your service agreement, or is it a new product for sale?

- Post go-live sales: Does the solution provider offer service and care locally.

This article was contributed to NORA by Enevo, a provider of logistics solutions for recycling and collection industries. To learn more please visit enevo.com. You can also visit us at the NORA Conference. Contact locally markku.lento@enevo.com
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Mike Ebert Appointed President of Puralube USA, Inc.

NORA Member Puralube Inc recently announced the appointment of Mike Ebert as President of Puralube USA, Inc., its newly formed US subsidiary.

Mike Ebert is the former Vice President of Oil Engineering and Business Development of Safety-Kleen Systems Inc., the largest US used oil refiner which was acquired by Clean Harbors in December, 2012. “Mike’s knowledge and success in the leadership of the US used oil re-refining market will be a big asset for Puralube’s intention to expand in North America”, said Andreas Schueppel, Puralube Inc’s CEO.

“Puralube’s corporate culture, its sustainability concept and its clear process technology leadership based on the HyLube technology are attractive elements for a successful expansion in the US, and I am honored to lead this charge”, Mr. Ebert said.

Hydrodec Group to File for Provisional Patent

Hydrodec Group, a NORA member since 2012, has filed a Provisional Patent application to protect a method for hydrogenation refining of used oil and otherwise contaminated oil, to produce a high quality refined base oil product. This patent particularly applies to the re-refining of used oils.

The method described by the patent application reduces known problems of fouling and catalyst poisoning caused by lubricant and industrial oil additives as well as common impurities that are present in used industrial and lubricant oils. By increasing the robustness of the central hydrogenation processes, the technology also has the potential to expand the range of waste oil and hydrocarbons acceptable for re-refining.

DOT: States May Lose 28% of Highway Spending

According to recent media reports, if Congress does not close the funding gap, the Highway Trust Fund will go bankrupt next month. If this were to happen, the Department would begin to cut its repayments to States for shared transportation projects.

BGL Environmental Spotlight: Tapping Opportunities

NORA Member Brown Gibbons Lang & Company has just published its latest edition of Insider. This issue discusses market dynamics and investment activity related to used oil collections and re-refining. Major transaction announcements this March include Verolube/Thermo Fluids and Vertex/Omega which represent notable processing and collection assets aimed at shaping business models.

The deals come about 18 months after Clean Harbors completed the acquisition of Safety-Kleen. Other deals with regional significance include Clean Harbor’s acquisition of Evergreen Oil last September and Heritage-Crystal Clean’s purchase of certain assets of RS Used Oil Services from Universal Lubricants in November. Recent public statements by Newalta and FCC revealed that the companies were exploring strategic alternatives which include the potential spin-off or divestiture of used oil assets. Activist investors are soliciting portfolio reviews of public operators, first Newalta which prompted the announcement, which was later followed by Clean Harbors, after an investor increased its equity stake to 9.1 percent. Insiders also named a number of other known but not yet announced assets in the market to be sold.

US Ecology, Inc. Completes Acquisition of The Environmental Quality Company

US Ecology, Inc. announced the completion of its earlier announced acquisition of The Environmental Quality Company, for $465 million. The company also announced that David M. Luck, formerly President and CEO of EQ, was appointed to the Board of Directors of US Ecology. Lusk, age 53, brings more than 25 years of industry experience. In addition, Mario Romero, Vice President of Operations of EQ, was named US Ecology’s Executive Vice President of Field and Industrial Services. Romero, age 56, joined EQ in 2009 from WOW Energy where he was President, CEO, and co-founder. He brings more than 30 years of industry experience.
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Question: Is EPA considering modifying the CWT Regulations?

For about 25 years, I have been asked this question or others about the EPA Centralized Waster Treatment (CWT) Effluent Limitation Guidelines (ELG). Recent communications indicates that EPA is investigating the possible need to re-evaluate the CWT-ELG.

As background, NORA represented the CWT industry as EPA began developing the CWT-ELG in the early 1990s. After about 10 years of drafting, proposing and re-proposing the CWT-ELG, EPA finalized the CWT-ELG on December 22, 2000. Throughout this time and to the present time, I have worked on behalf of NORA to negotiate with EPA more reasonable effluent limits and more practical requirements. In 2003, our NORA team was able to persuade EPA to modify the final rule to eliminate or modify some of the discharge limitations. This was a major accomplishment for NORA and the CWT industry. Since then the NORA CWT members have been successfully operating their facilities in compliance with these rules. As a result of this experience, I receive many inquiries about the status of the CWT-ELG and how to comply with the rules and limits.

In the beginning of July, 2014 I was contacted by EPA Headquarters in Washington D.C. for them to learn more about the current CWT industry and an EPA concern about CWTs possibly receiving significantly contaminated wastewater from the oil and gas industry which is called Shale Gas Extraction (SGE) water. SGE water typically results from hydraulic fracturing (fracking) backflow water, produced water, spent drilling fluids, etc. The volume of these contaminated waters has greatly increased resulting from the high level of fracking activities occurring in many parts of the USA. Each well can generate several millions of gallons of water. Under the rules governing the development of ELGs, EPA is required to re-evaluate each industry ELG every two years to determine if there have been significant changes to the regulated industry that would justify possible modification to the ELG. It appears that the possibility of CWTs receiving SGE water has caused EPA to begin looking harder at CWTs and possible changes to the CWT-ELG.

The constituents in SGE waters depend on the oil and gas geological formation. Typically SGE waters have very high concentrations of Total Dissolved Solids (TDS) that can be over 100,000 mg/l or 3 times more TDS than sea water. Examples of other troublesome constituents are Strontium and Naturally Occurring Radioactive Materials (NORM). As a general rule, these SGE waters have historically been handled on-site through injection back down the drilled holes and treatment recycling on-site. Some is disposed by commercial deep well injection facilities; however, some of these waters have been sent to CWTs.

EPA has recently focused on the CWTs because there were a few instances in the past few years where these high TDS waters have been handled and treated by CWTs and discharged to the local POTW or directly to a stream. Some of these resulted in causing substantial environmental problems with the receiving streams; these events have been highly publicized. For example, this has happened in Pennsylvania and Ohio.

My recent conversations with some of the larger CWTs have indicated that these SGE waters are not typically accepted. In the past they have investigated treating SGE water. This is because of the high TDS which is difficult and very expensive to remove and the potential negative impact on the local POTW and/or receiving stream. Many POTW ordinances would not allow for these high TDS waters to be discharged. Even putting these problems aside, the price that SGE facilities are willing to pay for a CWT to treat SGE water typically does not offset the cost of transportation and treatment.

In a recent conversation that NORA (Scott Parker and Jack Waggener) had with EPA, we implied that we did not believe that the CWTs were likely to be receiving these waters, and if so, it would be very limited. The EPA plans to follow-up with NORA to learn more about this issue and the CWT industry. I would welcome any comments and questions that you have on SGE waters.

To Contact Jack Waggener, PE, email Jack.Waggener@urscorp.com

Jack Waggener is a Professional Engineer and Senior Consultant to NORA.

If you have a question you would like Jack to address in the next issue, email sparker@noranews.org
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The “Internet of Things” (IoT) is a concept and perhaps a movement that has been with us for over 15 years. Always growing and becoming more relevant thanks to advances in technology and a world ever hungry for information or data.

Simply, The Internet of Things (IoT) is a scenario in which objects, animals or people are provided with unique identifiers and the ability to transfer data over a network without requiring human-to-human or human-to-computer interaction. It can be described as a layer of digital connectivity on top of an existing infrastructure made up of things. Cisco refers to it as “bringing together people, process, data, and things to make networked connections more relevant and valuable than ever before.”

If we use the home as a scaled down example, imagine all appliances, instruments, mechanisms or tools from your microwave to your water tap or even toilet seat, were part of a manageable circuit which used the internet to report their activity and receive commands.

Once intelligently analyzed, the information would not only provide useful reports such as detailed breakdowns of electricity usage, how much time and money we spend cooking or washing clothes, but insights into the habits of the inhabitants. An intelligent home.

A different example of IoT is how parking meters in San Francisco have become smart and connected to revolutionise an experience that is traditionally stressful. Through a smartphone app, drivers can search for available parking spaces, access the difficulty level to park in certain spaces and if their meter is running low, the driver will receive a message and be able to top up the meter remotely. The parking meter, which has for decades been viewed negatively, has been transformed digitally and is now helping people!

According to Gartner, there will be nearly 26 billion devices on the Internet of Things by 2020.

Essentially, IoT gives us power through information and insights. The decision making data presented with sign posts for efficiency and productivity. Armed with this information we can plan expenditures more accurately, change processes for the better and optimize the way we as people and businesses operate.

Apply this to every single device, appliance or tool across the globe and this is the Internet of Things.

Some of you will have heard about IoT for years, some of you may never have. Either way, we will all be hearing more and more about it over the coming years as trillions of dollars are being invested in it today in multiple mini and major sectors by thousands of businesses, Governments and Universities.

For now, IoT is in a holding pattern, waiting to connect the world and all its worldly things. One issue that will slow down its progression are privacy laws, however for the most part this will not hinder businesses from using the concept IoT to make huge gains today, as a combination of greater sensor technologies and cloud computing provide richer, more intelligent and user friendly data.

Today, the shrewd companies are using intelligent data to leverage their assets or are listening to the IoT to optimize their operational assets to either
generate more revenue or reduce costs. Information generated by IoT is enabling companies to exploit their assets and surge past their competitors.

So how can IoT be applied to the Liquid Recycling industry? Well in truth it has been applied, tested and is boosting the bottom line of Liquid collectors across the globe. The collectors that are willing to adapt with technology and embrace the IoT movement will make operational advancements, reduce costs, improve outcomes and inevitably make monetary gains by using the information IoT provides.

The question is, which assets can you exploit? What information about these assets can empower your company to make well informed decisions on a daily basis? Did you know that there are sensors made especially for collection containers in industries such as Liquid Recycling? The technology to monitor the fill-levels of your assets, temperature, geo-positioning and tilt is here and being used today by members of the Liquid Recycling industry.

This technology not only allows you to monitor your container assets but will also generate optimized collection routes for drivers meaning you collect only from the containers that are full. Immediately, thanks to an IoT solution, you have the information that will reduce both man hours and travel costs.

The physical and the digital are converging and it is time waste liquid collectors looked on their physical assets as a living, talking, infrastructure, sharing real-time information to provide clarity and help make important decisions easier. Look to Internet of Things as the greatest opportunity your business has ever had. Each day that you ignore it is another day of lost profits and another day without the decision making data.

For more information, contact Eoin Kettle, SmartBin International Marketing Executive, at eoin@smartbin.com.

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Burning used oil for energy recovery has come a long way. In 1903 the first used oil burner was patented in the UK. These first units were categorized as a vaporizer and the result of burning used oil in a vaporizing unit was messy, produced black smoke and was very inefficient. Since then many modifications have been achieved and advancement in technology has brought us to the present day process of a very efficient, odorless and colorless clean burning of used oil in a furnace and boiler systems.

Today's technology uses atomization to create a clean, efficient burn. This term refers to breaking up a fluid into a fine mist. Used-oils burn most efficiently when they are sprayed from the burner nozzle as a fine mist. Atomizing the fuel greatly increases the surface area available for burning and insures that all of the fuel is burned. Used oil and compressed air pass through the heater block in separate passageways. A heating element and thermostatic switch regulate the temperature in the heater block so that the used oil and compressed air are heated to a temperature of 140° F. Our research has established that this temperature is crucial for the proper atomization and ignition of used oil.

The nozzle adapter also includes a heating element and thermostat to maintain the temperature of the oil and compressed air. This secondary heating process is particularly critical for igniting synthetic and semi-synthetic oils. The nozzle adapter channels the oil and compressed air to the nozzle. At the nozzle, compressed air flows through slanted slots on the distributor of the nozzle. These slots spin the compressed air that in turn shatters the heated oil coming through the nozzle orifice into a fine mist. Good atomization is essential to cleanly burning used oil. This type of burner puts to rest the old myth of used oil burning with black smoke. You will be astonished to see that no smoke comes from the stack while the burner is operating.

Many manufacturers use flame-retention burners. Combustion air flows through angled vanes in a retention head forming a tight, whirlwind of air that traps the atomized oil spray. When the oil is ignited by a spark, the whirling combustion air retains the flame in a tight pattern, which is called flame retention. The igniter produces a high voltage charge, which travels down the electrodes to the spark gap. The Jacob's ladder design at the spark gap produces a large, blue spark for ignition of the atomized oil mist.

The heat exchanger is composed of a combustion chamber and heat exchanger flues. The hot gases from the burner flow into the combustion chamber, through the heat exchanger flues, out the furnace breach and up the stack. This process heats-up all the metal in the combustion chamber and the heat exchanger flues. A blower circulates air over the combustion chamber and heat exchanger and heated air flows out the hot air discharge or ductwork of the furnace. It is important to note that the heat exchanger is a sealed system, so that no odor comes from the furnace as the blower operates. Control components are individually designed for each model of furnace to control the blower. The control components turn on the blower when the heat exchanger has reached its optimal temperature. When the wall thermostat is satisfied, the burner turns off. At the end of the heating cycle, the blower continues to run to cool the heat exchanger and utilize the residual heat in the furnace. Once the heat exchanger has cooled down, the blower stops running. This completes the heating cycle. The coil tube boiler system operates in much the same way because of the burner system; except it is a closed loop boiler system which operates from a primary loop to heat many zones or for different hot water requirements.

For more information contact Tina Phillips, Clean Burn, LLC's International Sales & Marketing Manager, at tphillips@cleanburn.com.

Clean Burn, LLC is a strong advocate of environmental protection and energy conservation. Our multi-fuel heating systems meet all EPA requirements for used-oil recycling and help avoid the possibility of used oils entering our water supplies and soil.
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Antifreeze recycling. Antifreeze that is kept separate from waste oils can be easily treated and recycled into a virgin-like product with the aid of our chemical process that pretreats used antifreeze before it is blended with virgin ethylene glycol or redistilled.

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Mid-Year Meeting Committee Highlights

Antifreeze
- DEF in used antifreeze forming ammonia – methods to determine presence of ammonia discussed.
- ASTM updates related to antifreeze provided.
- Industrial Heat Transfer Fluids – NORA considering creating a committee for this.

Conference
- The room block for the 2014 Annual Conference in Puerto Rico is 50% sold and the trade show is 70% sold.
- The 2015 Winter Meeting will be in New Orleans.
- The 2015 Mid-Year Meeting will be in Seattle.
- The 2015 Annual Conference will be in Orlando.

Distilled Fuels
- Plastics to Oil (PTO) – how to mix use oil with plastics and the economics of PTO were discussed.
- Tire to Oil – the economic and technology challenges were explored.
- A new VGO facility will be coming on line in September/October.
- A tour of an MDO facility will happen during the 2015 Mid-Year Meeting in Seattle.

Filter & Absorbents
- Used Oil Filter FAQs was reviewed and will be posted to NORA website.
- Tests for element filters appear to confirm the material is non-hazardous. Additional testing will occur.
- NORA letters sent to auto manufacturers about recycling concerns of element filters.
- NORA Member Land Ban Tool Kit unveiled.

Research
- The CalRecycle Used Oil LCA report to the legislature has not been finalized.
- CalRecycle is building a Used Oil LCA Online Tool.
- API has started a follow up research project to the CalRecycle LCA.
- NORA is beginning work on a project to measure used oil collection rates.
- A list of standard industry terms is being compiled for members.

Guiding Principles
- The NORA Complaint Resolution Process was documented.
- NORA will be releasing a new and improved truck decal.
- NORA will also be offering members customized decals featuring the NORA logo and the member logo with the phrase “We Recycle”. It is intended to be placed on the entrance door of clients of members to promote an environmental message.

Membership & Marketing
- A survey will be conducted to explore current and potential membership value.
- A NORA International Working Group has been formed to attract and provide value to members in Canada and around the world.
- The next NORA EH&S Forum will occur February 18, 2015 in New Orleans.

Parts Cleaning
- Status of states adopting the Ozone Transport Commission Solvent Degreaser rule was reviewed.
- A list of states recognizing Continuing Use Programs is being assembled.

Re-Refining
- NORA’s effort to derail California’s biosynthetic lubricants initiative was successful.
- A NORA document outlining the association’s plan to allow PCB used oil to be managed by re-refineries that can destroy PCBs was reviewed.
- An update on the completion of the Chevron’s Pascagoula plant was provided.
- A new re-refinery in the Gulf was announced.

Used Oil Recycling
- Certain states are considering lowering sulfur dioxide rules for asphalt plants. NORA is continuing to monitor this potential threat to RFO.
- A NORA Guide on How to Rebut the Presumption was presented and is now on the NORA website for members.
- NORA’s Best Management Practices for prevention of PCB contamination was addressed. This document has been provided to EPA.
- A letter has been sent to EPA Region 10 about a misunderstanding about the use of Chlor-D-Tect as it relates to detecting PCBs.
- NORA is going to research the recent banning of Vacuum Tower Bottoms by some states in asphalt pavement and develop a strategy to reverse this.

Wastewater
- A discussion about how NORA’s Best Management Practices for prevention of PCB contamination relates to wastewater processors, specifically as it relates to guard tanks.
- A concern was raised about POTWs competing with CWTs.

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2014 Mid-Year Meeting Attracts 150+ Attendees

From June 18-20, over 150 leaders from the liquid recycling industry came together from across the nation and out of the country to discuss regulatory and business issues. The event was held in Milwaukee, Wisconsin.

During this event, each committee met to discuss opportunities and threats for recyclers of used oil and related materials.

There was also time set aside for networking by the attendees which included the opening reception, Thursday happy hour, and other informal opportunities.

The minutes, photos, and other related materials from the meeting in Milwaukee are available for members by logging into the NORA website (www.noranews.org).

If you were unable to attend, you can download the presentational materials at www.noranews.org. Those available include the powerpoint on “How to Handle An Awful & Horrible Used Oil PCB Incident” and “How to Rebut the Rebuttable Presumption.”
Thank you to the 2014 Mid-Year Meeting Sponsors

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812-395-7226 (Office) • 812-449-0411 (Cell)
jbrown@chem-group.com • www.poly-freeze.com
Preparing for Environmental Product Declarations

by Heather Dylla, NAPA

The transportation and construction industry is facing an ever-growing demand from lawmakers, the public and other stakeholders to respond to such issues as natural resource depletion, carbon emissions, increasing energy costs, water availability and climate change. As a result, many regulatory agencies, businesses, and organizations are embracing principles of sustainability reflected in their visions, missions, and policies. Consequently, in order to remain competitive, it is essential that the asphalt pavement industry and their suppliers understand how choosing asphalt pavements can help agencies achieve these goals. We need a good environmental message.

Fortunately, asphalt pavements have numerous sustainable technologies ranging from Reclaimed Asphalt Pavements (RAP), Recycled Asphalt Shingles (RAS), Porous Asphalt, Ground Tire Rubber, Perpetual Pavements, and Warm Mix Asphalt. Many of these technologies are acknowledged in green construction rating systems such as the Federal Highway Administration’s INVEST, Greenroads, New York State Department of Transportation’s GreenLITES, and Illinois Department of Transportation’s I-Last. However, demonstrated by the release of the U.S. Green Building Council’s LEED v.4, the green construction market is entering a new era of sustainability focusing on product transparency and quantification of a product’s potential impact towards sustainability. As a result, green construction rating systems, are moving away from credits that focus on single attributes and instead developing credits that encourage use of products with life-cycle assessments and those products that demonstrate improved potential environmental impacts.

For example in the LEED v.4, materials will no longer be able to achieve LEED credits for simply using recycled materials or by being manufactured locally without life cycle information. Instead credits are awarded to products that have an “Environmental Product Declaration” (EPD) or have quantified and illustrated an improved environmental life-cycle impact. Yet many rating systems still have single attribute credits, this is likely to change in the upcoming versions. In fact, the 2015 International Green Construction Code (IGCC), which is currently being revised, will likely require an EPD, as well, in some form of fashion.

What is an EPD?

An EPD, often compared to a nutrition label, reports a product’s potential environmental impacts such as acidification, global warming, resource depletion, toxicity, and eutrophication, in a simple, verified, and comparable format (See Figure 1). Information used in an EPD is based on LCA methodology following certain product-specific requirements and boundaries called “product category rules” (PCRs) which essentially defines the how a material calculates and communicates its environmental impact.

As a result, EPDs are valuable tool for manufacturers to demonstrate their commitment to sustainability and showcase their environmental improvements.

Figure 1: Sample Environmental Product Declaration (Santero 2014); Note values are for illustration purposes only.
in a credible reporting format. The environmental improvements may not only be from new technologies; they also include decision making within the supply chain such as what type of energy sources a manufacturer chooses to use. This puts pressure on manufacturers’ suppliers to be a part of the sustainability effort. This includes the used-oil industry.

"We need a good environmental message."

What is the asphalt industry doing?

Over the past few months, NAPA has taken a strategic role in helping the industry move forward to develop a PCR and an EPD program for asphalt pavement mixtures. A PCR/EPD Technical Working Group has been developed comprised of industry members to oversee the PCR and EPD development process. The project is in its initial stages and expected to be completed mid-year 2015.

Once the project is complete, each asphalt producer will be able to create a specific EPD for the various asphalt mixtures that they produce. Inputs will not only include mix design specifics but also what type of energy and how much energy is used during the plant operations. Therefore, the question becomes, how will the energy source, impact the overall environmental footprint of asphalt mixtures? Will recycled oil be able to improve the environmental footprint and thus offer additional shared value?

As the asphalt pavement industry through NAPA develops its EPD, the members of NORA should keep current on our industry’s activities and even consider developing an EPD for recycled oil. The fact is EPD’s are not going away and its better for the industry to develop an EPD than to have some other group do it for them.

For more information, contact Dr. Heather Dylla, NAPA’s Director of Sustainable Engineering, at hdylla@asphaltpavement.org.

In the early 1950s World War 2 had ended and Europe, and really the world, was realigning. The most important raw material in the struggle to gain political and military upper hand was oil. The Soviet Union built up colossal oil reserves in the form of oil tanks and "oil lagoons". G.M. Lees, head geologist of the Anglo-Iranian Oil Company, estimated the total petroleum reserves of the Soviet Union at the beginning of 1950 at about 14 billion tons, and the renowned American oil expert Dr. Egloff put that figure at about 20 billion tons. Much of these reserves are still there, especially in the petroleum regions of the Caucasus, in the Central Asian petroleum region, and in the vicinity of the oil fields near the Emba River in the northeast Caspian Sea, today's Kazakhstan.

The fall of the Iron Curtain was more than 20 years ago, and these oil lagoons are still being emptied. There are also recoveries originating in the slop oils of refineries or larger oil deposits that have formed due to breaks in oil pipelines in the former Soviet Union. All these mixtures containing oil are being processed to remove the oil and reuse it. In the 1960s Flottweg developed the first 3 phase centrifuge for oil, water solids separation in a single operation. The Tricanter is still today a mainstay in oil recovery today. Its use has spread around the world and millions of gallons of recycled oil have been processed over the years.

Treatment of an oil lagoon

Treatment of oil lagoons continues today. A company in Western Kazakhstan recently purchased a complete system solution including a pontoon collection float with a pump and mixing system, a steam generator, reaction vessels, pumps, and a land based Tricanter centrifuge. Lagoon oil treatment requires a number of different sub-systems. Oil which has been enriched into a floating layer floats to the surface while the solids sink. A watery mid-phase forms between them. A suction pump mounted on a pontoon float is placed into the pond. To achieve the desired viscosity during pumping, heat exchangers are installed on the suction side. From the pontoon, the oil sludge then flows into land side mix tanks. If necessary this step can also include demulsifying chemicals in order to separate the emulsion.

The second separation process is via a preheated feed to a Tricanter centrifuge. The Tricanter® was developed specifically for oil sludge processing. The Tricanter continuously separates the oil, water and solids in a single pass using centrifugal force typically >2500 G. Oil is then sent for reuse or further processing; water is sent to the wastewater treatment facility and solids are land filled or used as a solid fuel.

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For more information, contact Ed Sweeney at esweeney@flottweg.net.

1 See Herbert Grund, The energy economy of the Soviet Union, Sonderhefte Neue Folge No.18: Duncker & Humboldt
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The Strange Assault on Asphalt Extenders Made From Used Oil

It goes by several different names: asphalt flux, asphalt extender, asphalt blowdown, VTB (Vacuum Tower Bottoms) and WEOR (Waste Engine Oil Residue). Whatever we call it, there's a very peculiar controversy brewing. And like many controversies, the instigators have not been overly burdened with either logic or facts. Let's call it asphalt flux and start with a noncontroversial definition:

Asphalt Flux (AF) is a thick, tarry hydrocarbon product which is derived from crude oil or from used oil. AF produced from used oil is typically blended with other asphalt materials, where it enhances the quality of finished products (mainly due to superior physical characteristics). It has two main applications: road paving and roofing materials.

In road paving, liquid asphalt (containing AF) is mixed with aggregate to build roads. In roofing materials, the AF is used in blends to produce sealers and roof shingles. AF is produced in different ways; some AF is produced from used oil via distillation processes that also produce VGO, or that produce base lube oil (re-refining).

So, what’s the problem with asphalt flux produced from used oil?

Two gentlemen associated with the Department of Chemistry at Queen’s University in Kingston, Canada, H.F. Survell and A.M. Hesp, claim that “WEO residue is very likely a contributing factor in widespread premature and excessive pavement cracking” and blame the high zinc content of WEO residue.

Then on June 11, 2014, the State of New Hampshire’s Department of Transportation issued this edict:

The New Hampshire Department of Transportation, in conjunction with the other five New England state transportation agencies, has discussed the potential impacts of the presence of re-refined engine oil bottoms in Performance-Graded asphalt binder. As a result, NHDOT has determined that all suppliers of PG binder must certify that the PG binder supplied for use on Department projects does not contain re-refined engine oil bottoms, also known as waste engine oil. This requirement will become effective on August 1, 2014. This requirement is being enacted in response to documented incidents of premature failure of pavements that were produced with asphalt containing re-refined engine oil bottoms.

What’s the real story?

Asphalt flux derived from used oil distillation has been successfully used as an ingredient in asphalt pavement and roofing materials at least since 1983. It provides the critical element of flexibility to “hard asphalt.” It also enhances the performance of ordinary asphalt with adhesive strength, joint sealing and other qualities such as water proofing.

Road and highway construction and repair in the United States is a big deal. Each year billions of dollars of taxpayers' money goes into paving contracts. Obviously, it is important that these roads and highways last as long as possible.

Typically, a state Department of Transportation (or the Federal Highway Administration) will issue specifications for the asphalt. Competing paving contractors when bidding on a contract have to demonstrate that their asphalt will meet the government’s stringent specifications (which include laboratory test results on viscosity, specific gravity, flash point, density, ash content, etc.).

Paving contractors do not reveal their recipes for asphalt. (These recipes are as closely guarded as those for Classic Coca-Cola or Colonel Sanders' fried chicken.) In addition, used oil recyclers and re-refiners (who have produced hundreds of millions of gallons of asphalt flux for the paving and roofing markets) provide detailed specifications on their products. Both the paving contractors and the re-refiners know that the appropriate amount of asphalt flux should be about 6 to 8 percent of the final asphalt product.

Significantly, the Queen's University study evaluated asphalt products containing up to 15 percent of “waste engine oil residue.”
As Gary Farrar (a marketer of asphalt flux for over 30 years), a Vice President at Heritage – Crystal Clean pointed out, “if you’re baking a cake and the recipe calls for one cup of sugar, don’t be surprised if the cake is a failure when you put three cups of sugar into the mix.”

Who’s fighting back?
NORA perceives New Hampshire’s ban on asphalt flux produced by re-refiners and others who process used oil via distillation as a direct threat to the used oil recycling industry.

At the NORA Board of Directors meeting in Milwaukee, NORA President Bill Hinton appointed a task force, chaired by Greg Ray and Ellie Bruce, to help develop NORA’s response.

In addition, several NORA members (DeMenno/Kerdoon, Safety-Kleen and Heritage-Crystal Clean) met with representatives of the Asphalt Institute, headquartered in Lexington Kentucky, to propose a fact-based refutation of the allegations that asphalt flux is the cause of pavement failures.

The Asphalt Institute was supportive of the position of oil recyclers, and agreed to establish a special committee to evaluate the issue and provide recommendations.

A recent meeting in Washington, D.C. with key officials of the Federal Highway Administration (including FHA’s senior analytical chemist, Terry Arnold) revealed that the FHA, which has an intense interest in the causes of pavement deterioration, has not adopted New Hampshire’s position against asphalt flux. Indeed, the FHA generally endorses the use of recycled materials in asphalt products.

An additional next step is for NORA representatives to meet with the National Asphalt Pavement Association (“NAPA”) and the National Center for Asphalt Technology (“NCAT”) headquartered in Auburn University in Alabama. NORA has a long history of cooperation with NAPA on various policy issues affecting the used oil recycling and asphalt pavement industries.

As NORA Executive Director Scott Parker has made clear, “we take this threat very seriously and we have launched an intense and coordinated defense against unwarranted attacks on asphalt flux.” Stay tuned for late breaking news.

For more information, contact Chris Harris at gallating@aol.com.

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The 2014 NORA Annual Conference and Trade Show will be held November 5-8, 2014 in Fajardo, Puerto Rico at the El Conquistador Resort. Join over 400 industry leaders for networking, business development, and education.

Trade Show
The NORA Trade Show will feature over 50 exhibit spaces with companies displaying the latest products and services available to the liquid recycling industry. Companies interested in exhibiting should visit www.noranews.org for more information.

Attendee Registration
A conference attendee registration form is enclosed with this newsletter. You may also register online at www.noranews.org. Early bird registration for NORA members starts at $830 for the first attendee and $730 for additional attendees. After August 29, 2014, registration for NORA members will be $860 for the first person and $760 for additional attendees, so submit your registration today. Trade Show exhibitors should register using the Exhibitor Agreement found at www.noranews.org.

Sponsorships and Advertising Available
Sponsorships and advertisements are available for the 2014 NORA Annual Conference and Trade Show. For as little as $200, you can support your industry and promote your business to the entire industry. All sponsors and advertisers will be thanked in Liquid Recycling, on signage at the event, and in the conference book given to all attendees and published on the NORA website. Additionally, the thank you page on www.noranews.org links to your company’s website. Contact Casey Parker at casey@noranews.org or (703) 753-4277 to reserve your sponsorship today!

Hotel Information | El Conquistador Resort
1000 El Conquistador Avenue Fajardo, 00738 Puerto Rico

NORA has secured a block of hotel rooms at this four-diamond property for $189/night. There is a reduced resort fee of $15/night, a room attendant fee of $3.00/room, and a one time porterage fee of $10/person roundtrip.

Book Your Room Now | Room Block Over 50% Sold
Reservations in the NORA group block must be made by October 14, 2014; however, rooms may sell out early. Most attendees will arrive mid-day on Wednesday, November 5 and leave Saturday, November 8.

Exhibitors may want to arrive on Tuesday, November 4 to allow time for exhibit set up. To make your reservation, call 888-579-2701 and reference the code “NORA 14” or book online at www.noranews.org/2014ConfHotel. For Puerto Rico Travel FAQs, visit www.noranews.org/?page=PRTravel.

Airport Information
The closest airport is Luis Marin Airport (SJU).

Speakers and Presenters
If you are interested in presenting at the 2014 NORA Conference and Trade Show, contact sparker@noranews.org or call (703) 753-4277.

Tentative Agenda

| Wednesday, November 5th | 10:00 AM - 2:00 PM | Exhibitor Set Up |
|                      | 10:00 AM - 2:00 PM | Tour of Olein Recovery Corporation Plant |
|                      | 2:00 PM - 7:00 PM | Conference Check-in |
|                      | 4:00 PM - 4:30 PM | New Member/Board Member Reception |
|                      | 4:30 PM - 7:30 PM | Grand Opening Reception in Trade Show |

| Thursday, November 6th | 7:00 AM - 7:45 AM | Board Member Meeting/Breakfast |
|                       | 7:00 AM - 8:00 AM | Continental Breakfast in Trade Show |
|                       | 8:00 AM - 9:55 AM | Conference Sessions Open |
|                       | 9:55 AM - 10:20 AM | Refreshment Break in Trade Show |
|                       | 10:30 AM - 11:30 AM | Spouses’ Brunch |
|                       | 10:20 AM - 11:45 AM | Conference Sessions |
|                       | 12:00 PM - 7:00 PM | NORA Annual Golf Tournament, El Conquistador Resort’s Arthur Hills Golf Course |

| Friday, November 7th   | 8:00 AM - 9:00 AM | Continental Breakfast in Trade Show |
|                       | 9:00 AM - 10:30 AM | Conference Sessions |
|                       | 10:30 AM -11:15 AM | Refreshment Break in Trade Show |
|                       | 11:15 AM          | Exhibitor Tear Down |
|                       | 11:15 AM - 12:00 PM | Conference Sessions |
|                       | 6:45 PM -10:00 PM | NORA Closing Party |

| Saturday, November 8th | 9:00 AM - 3:00 PM | NORA Annual Fishing Expedition |
|                       |                  | Activities on your own (golf, spa, shopping, sightseeing) |
Secure Your Space Before it Sells Out!

This year’s annual Conference & Trade Show will be the largest in NORA history, featuring 59 exhibitor spaces. This premier networking event, that will attract over 400 industry leaders involved in responsibly recycling used oil and related materials, will be held November 5-8 at the El Conquistador Resort in Fajardo, Puerto Rico.

70% of the trade show exhibitor spaces are already reserved. Booth reservations are now on a first come first served basis, so reserve your space today! To see a list of current exhibitors and booth location, visit www.noranews.org.

You may reserve a booth by simply contacting Casey Parker at casey@noranews.org or (703) 753-4277.

You may reserve your space online at www.noranews.org. The NORA website also includes additional exhibitor information such as the trade show floor plan, list of current exhibitors, conference attendee type chart, testimonials, and more.

Save the date

2015 NORA Winter Meeting

The 2015 NORA Winter Meeting will be held in New Orleans February 18-20, 2015 at The Roosevelt New Orleans Hotel. The room rate is $219/night. An EH&S Forum will be held on Wednesday, February 18, 2015.
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Liquid waste recycling facilities operate many different processes and unit operations. These could be broadly classified into tank-farm and processing plant operations. These operations generate off gasses or vent gases which contain one or more of odor causing components, volatile organic compounds (VOC) and potentially hazardous compounds of sulfur (S), chlorine (Cl) and nitrogen (N). In summary, process and tank vents from liquid recycling facilities must be disposed properly and safely to avoid environmental hazards, and also to meet permit limits for pollutants (criteria and VOCs).

The Schematic drawing presents typical safe off gas disposal scheme at a used oil re-refining facility. The gases generated in an oil recovery unit (such as distillation), and a polishing unit (such as hydrotreating or solvent extraction) may be preferentially routed to plant heat requirements.

These sources are steam boiler units, hot oil (thermic fluid) heaters or any fired heater which is used for heating of process liquid. Off gases are directly routed to combustion zones in these heaters. Alternatively, the gases can be mixed with primary gaseous fuel such as natural gas or LPG and combusted in a regular or customer-designed burner. Hydrocarbons, VOC and other pollutants get converted into oxides (SOx, NOx, CO, CO2, etc.) in the radiant zone of the heater. When permitted, heat recovery from process and tank vents can help reduce the energy bill by 5-20% in a typical used oil processing facility.

In situations where heat recovery is not permitted, off gases may be routed to a thermal oxidizer. The Thermal oxidizer converts pollutants into respective oxides in much the same way as in a thermic fluid or process heater but it is custom designed for proper combustion of the pollutants being disposed off. The EPA and state air permit agencies specify the minimum temperature and residence time needed for oxidation of one or more target pollutant(s) in the vent gas. Typically, the thermal oxidizer must allow a residence time of one (1) second at 1400-1500°F for safe destruction of benzene or similar simple aromatic VOCs. If the vent gases contain more recalcitrant compounds such as pesticides, stricter conditions may be specified for the thermal oxidizer. Generally, for non-RCRA liquid recycling facilities, a thermal oxidizer specified with a residence time of 2 seconds at 1600°F would be a sound investment.

Evaporation of light hydrocarbons and potentially hazardous species during tank operations and their breathing cause odor, unsafe working conditions and requires proper handling. The same thermal oxidizer may be used for disposal of gases from tank farms and terminals, especially from the hoods used for loading hot distillation bottoms (asphalts) and light fuel byproducts. In some cases, a thermal oxidizer unit may be installed as a backup source for off gas disposal when the process heaters are not running or running purely on primary fuel source (see schematic).
An absorber utilizing granular activated carbon (GAC) or any special carbons such as those impregnated with potassium hydroxide (KOH) may be used as an abatement device for process and tank vents. Economic feasibility of these carbon units must be balanced against their ease of use. It must be noted that activated carbon beds can be all the more flammable once they are laden with pollutants and therefore proper flame arrestors and water-seals must be used to prevent flame travel and air entry respectively. GAC or similar absorbents can be installed as back-ups to primary or secondary abatement devices such as the waste-heat recovery units and/or thermal oxidizers (see schematic).

As mentioned above, the flue gas leaving a combustion unit contains inorganic oxides, hydrogen chloride (HCl) and particulate matter (PM). The concentration of these species varies with composition of vent gases. The hourly and annual emission limits for these compounds are regulated by state agencies. To stay below the permitted limits, the inorganic (acidic) and particulate contaminants can be removed from heater flue gas stream(s) by using a wet gas (such as caustic) scrubber. A gas scrubber usually has two parts. The ventury scrubber section cools down the flue gasses and helps remove particulate matter. The cooled flue gas is then contacted with a stream of alkaline solution. Sulfur (S) and chlorine (Cl) compounds react with sodium hydroxide (NaOH) or similar alkaline compound in water and form salts of sodium (Na2SO3, NaCl) or calcium. The salts are carried away with spent alkaline solution stream and the gas, substantially free from inorganic, acid and particulate pollutants, is released to the atmosphere. The alkaline solution is kept under circulation and a small amount is purged out to avoid built up of salts in the circulating solution.

In a manner similar to the vent gases, liquid by-products such as fuels from recycling facilities may be combusted in waste recovery units working in conjunction with a wet gas scrubber. However, it's the handling of vent gases from the process units and tanks that misses attention of facilities and causes odors, unsafe conditions and problems with permitting authorities. Handling and disposal of vent gases of your facility is not technically difficult and makes business sense in the long-term.

For more information, please contact Rohit Joshi at: rohit.joshi@sequoia-global.com

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Lube base oil is one of the most valuable components in a barrel of crude oil. Therefore, this valuable resource must be recycled. Today, there are several ways of recycling used oil. Burning used oil as a fuel is a common way to recycle used oil. Generally, used oil is combusted in space heaters, boilers, furnaces, and kilns. However, combustion of used oil is irreversible and the valuable base oil is lost forever. In addition, the burning of used oil poses many severe threats to the environment. In 2013, a Life Cycle Assessment of Used Oil Management in California was conducted by the University of California at Santa Barbara (UCSB). When compared against other used oil recycling methods, burning of used oil contributes the highest to Global Warming Potential (GWP). This means that burning of used oil produces the most greenhouse gases. In addition, other than dumping in landfills, burning of used oil as fuel is the worst in Ecotoxicity Potential (ETP) and Human Health Criteria Air Potential (HHCAP). This is expected because used oil contains high level of metals and contaminants that are toxic to the natural environment. Therefore, burning used oil will effectively release high levels of toxic substances into the atmosphere.

Furthermore, with the abundance of low cost natural gas across the United States, selling used oil as a fuel is becoming a less viable option. Natural gas production continues to increase, which keeps the price low. This makes natural gas a cheap and clean fuel, lowering the value of used oil. Therefore, burning used oil as fuel is becoming less profitable. If a stable used oil collection is available, it is much more sensible, in the long run, to re-refine the used oil into high quality base oil.

With the trend to move away from burning due to market and environmental reasons, used oil re-refining is getting the attention of many used oil collectors. In the past few years, there have been several announcements of new projects being designed. There are two approaches that have been taken by companies looking to move away from burning the used oil. One approach is to do as little as possible to improve the quality of the used oil to make a higher value fuel. The other approach is to do as much as possible to improve the quality of the used oil to produce high quality base oil. Lube base oil can be recovered from used oil and “regenerated” to the quality equal to or better than its original virgin form by using a proper re-refining process. Compared to burning used oil as fuel, re-refining is a much more attractive business venture. In addition, re-refining is a much more environmentally responsible way to recycle used oil. According to the study conducted by UCSB, when compared to other used oil recycling methods, re-refining is the most environmentally friendly in several categories including: GWP, ETP, HHCAP. Furthermore, since the base oil is regenerated and reused over and over again, the need for base oil from crude processing is displaced, which can help reduce our dependence on crude oil.

The current U.S. base oil market is going through a shift with the improvement in fuel economy requirements in cars. The new engines put a harder strain on the lubricants, requiring higher quality base oils. We are observing a shift away from Group I base oil as shown by the shutdown of several crude oil Group I base oil plants. With the shutdown of the Group I plants, the price for Group I has gotten very close to Group II, due to the reduction in supply. This is however, a short term pricing effect of low supply until all the base oil consumers move to Group II and later on to Group III. With the shift to higher quality base oil, re-refineries should be looking to get into the best technology. Currently, the best technology for re-refining uses hydrotreating to produce Group II base oil. In the past several years with the increase in base oil quality, there has also been a corresponding increase in used oil quality. One of the major U.S. re-refineries was designed to produce a high quality Group I base oil using hydrotreating. For many years, it produced the high quality Group I base oil, however with the recent improvement in used oil quality, they have been able to produce Group II base oil without any modifications to their process. This increase in used oil quality has also enabled companies to be able to move from Group II production to Group II+ base oil, which has a higher selling price. As this trend continues, it will allow companies with the latest hydrotreating technology to eventually produce Group III base oil, without any process improvements. However, it is difficult to determine how long is required for the used oil quality to improve to produce Group III. In order to push the quality of base oil produced by re-refineries, R&D is occurring to make Group III base oil production as soon as possible.

Chemical Engineering Partners can be reached by phone at (949) 757-7555 or e-mail at cepinfo@ceptechnology.com

NORA’s unrelenting effort to obtain a sensible policy on PCB remediation is making headway with EPA. In a series of meetings with EPA over the past several months, NORA’s representatives including Scott Parker, Steve Shimberg and Jack Waggoner have presented NORA’s proposal for replacing the draconian TSCA clean-up requirements with a much more logical approach. The basic element of NORA’s proposal is this: NORA members who implement “Best Management Practices” in testing and isolating used oil potentially contaminated with PCBs will not have to incinerate used oil with a concentration below 50 parts per million – even if the original source of the PCBs had a concentration above 50 ppm.

EPA’s TSCA regulations require that when the original source of the PCB had a concentration that exceeds 50 ppm all of PCBs in subsequent concentrations must be incinerated – a very major expense. This is known as the “anti-dilution rule” and it was originally intended as a major deterrent to intentional mixing for the purpose of diluting the concentration of PCBs to below 50 ppm. Unfortunately, EPA has consistently applied this rule to unintentional mixing. Consequently, when a PCB hit is discovered after normal blending has occurred, all of the used oil containing any quantity of PCBs (even below 2 ppm) must be incinerated. Normally, used oil containing less than 2 ppm of PCBs would be considered on-specification used oil (if the other standards such as heavy metal and total halogens are also met). Obviously, EPA’s anti-dilution rule results in the unnecessary and wasteful destruction of significant quantities of valuable fuels.

NORA’s proposal would exempt those NORA members who have implemented the Best Management Practices from the harsh results of the anti-dilution rule. So, what are the Best Management Practices? Essentially they are sensible precautions for (1) preventing and minimizing PCB contamination of used oil; and (2) identifying the “culprit generator” who transferred the PCB-contaminated used oil to a transporter or processor. The Best Management Practices include retaining used oil samples and certifications from generators, reporting PCB hits to EPA and training employees to properly implement the Best Management Practices.

However, the most important feature of the Best Management Practices is the “guard tank.” Under NORA’s proposal, all used oil received at a used oil processing facility must be tested for PCBs. This can be done by the used oil generator or from a sample taken from a tanktruck or rail car before it is unloaded. All used oil that has not been previously tested must be transferred to a guard tank. All used oil in the guard tank must be tested for PCBs (and proven not be contaminated with PCBs) before being processed. If the used oil in the guard tank is contaminated with PCBs it must be locked down.

What happens to the PCB-contaminated used oil in the guard tank? This depends on the source and concentration of the PCBs. As set forth in a second document prepared by NORA and presented to EPA, the heavy-handed anti-dilution rule would not apply. Consequently, to take the most usual situation, where the original source of the PCBs exceeded 50 ppm but the concentration in the guard tank was below 50 ppm, the used oil in the guard tank could be sent to a qualified re-refiner using an EPA-approved hydro-treatment process that destroys PCBs or it can be burned as off-spec used oil in an industrial furnace. This approach preserves the value of the used oil – rather than condemn it to expensive destruction by an incinerator.

Two other documents being transmitted to EPA involve the “approval” process for facilities that can destroy PCBs while preserving the used oil. One addresses the requirements for a facility that uses a hydro-treater to destroy PCBs in used oil; the other deals with any other technology that would meet the same PCB destruction performance standard. The approval process is intended to streamline the normal (and very lengthy) TSCA permit process while retaining all of the necessary safeguards to protect human health and the environment.

What’s the reaction at EPA headquarters? In the discussions thus far, EPA has been quite receptive to NORA’s proposals. This may come as a surprise. EPA, however, has come to realize that there is a PCB epidemic in the United States that has hit the oil recycling industry in recent years -- even though PCBs were prohibited from manufacture more than 35 years ago and the stringent TSCA rules on PCB disposal were adopted. In other words, the PCB epidemic has become a crisis that is unfairly being inflicted on the used oil recycling industry – an industry that is at the forefront of battling the epidemic. EPA is beginning to understand that punishing the victims of the epidemic is not the right way to solving the problem.

NORA’s Best Management Practices and the PCB Epidemic
by Chris Harris, NORA General Counsel
Hydrotreating in Re-Refining Applications: Catalyst Selection Options
by Peter Douvry, Business Development Manager, Porocel

Hydrotreating is a common technology used by re-refiners to produce high quality Group II and III base oils from used motor oil. At the heart of the process are the metal traps and catalysts that fill the hydrotreaters. Proper selection of these items can have a tremendous impact on cost, product quality and cycle length.

Metal Traps
The additive packages used in motor oil contain several elements, such as silicon, phosphorus, and zinc, which can poison hydrotreating catalyst and substantially reduce its effective life. The most efficient way to deal with these impurities is with the proper selection of metal traps. These grading materials, placed in front of the catalyst, can selectively remove these catalyst poisons, thereby protecting the main catalyst bed and in some cases significantly prolonging its life.

Catalyst
Hydrotreating catalyst performs hydrodesulfurization and hydrodenitrogenation on the used oil stream. The process reduces the sulfur content of the stream to within specification, eliminates most color bodies, and performs some hydrogenation of active olefinic compounds, which untreated could contribute to unwanted polymerization. There are a wide variety of shapes, sizes, and compositions of hydrotreating catalysts available, often making the catalyst selection process a challenge.

Many re-refiners still use fresh, never-before-used catalyst, but a large percentage of the market has shifted to regenerated and rejuvenated catalysts. These are catalysts that have been used once before in conventional refining applications, then reprocessed to restore most of their original catalytic activity. The catalyst must be low in adsorbed impurities (e.g., silicon, arsenic, vanadium, sodium) to be a candidate for reprocessing. In most cases an appropriate regenerated and/or rejuvenated catalyst can replace fresh catalyst. Replacing fresh catalyst with these options can potentially reduce a re-refiner’s catalyst costs by over 60% without any loss in performance. Regenerated catalyst has been oxidatively regenerated to burn off the carbon and hydrocarbons that accumulated on the catalyst during its earlier cycle. Depending on the specific catalyst, this can restore 70-95% of the original catalytic activity. Rejuvenated catalyst undergoes an additional reprocessing step which can improve the catalyst’s activity in some cases to over 100% of the original catalytic activity.

Catalyst Activation
Hydrotreating catalyst is activated by the presence of sulfur during the start-up process. The sulfur can be added “in situ” using various sulfur dopants, or “ex situ” by a third party. Today most of the industry has migrated to ex situ solutions due to the inconvenience and potential HSE issues surrounding the use of sulfur dopants. Ex situ solutions fall into two categories – presulfurization and full activation. Presulfurization involves the application of a sulfur-containing compound to the catalyst by a vendor. The catalyst is partially activated during the application process, and the remaining activation takes place during the start-up of the catalyst. Fully activated catalyst is completely activated by the vendor. The start-up processes are almost identical for both options, and for re-refiners the significant cost advantage of presulfurization makes it the preferred sulfiding solution.

Technical Support
Selecting the right regenerated and/or rejuvenated catalysts is not a trivial matter. The re-refiner should choose a catalyst vendor that can provide technical guidance during the selection process as well as during the start-up and use of the catalyst. The technical support engineer should be able to assist the unit engineer with unit monitoring, thereby continuously assessing the performance of the catalyst. This can provide invaluable information for future metal trap and catalyst selection and potentially allow the re-refiner to improve their unit performance and cycle length from run to run.

Summary
Catalyst selection and the appropriate use of metal traps can have a huge impact on hydrotreating unit performance. A variety of high performance regenerated and rejuvenated catalyst options exist, all priced well below fresh catalyst. Each hydrotreating unit is unique – there is no “one size fits all” solution. However, with the help of an experienced vendor technical support engineer low risk customized solutions can be identified and implemented, potentially leading to substantial cost savings.

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Environmentally Sound Strategies for Polishing Re-Refined Lube Oil Distillate

by Luke Staengl, PESCO-BEAM

In the past several years Used Lube Oil “re-refining” has become a more widely accepted and utilized technology for gaining additional value from used crankcase lube oil. What follows is a brief description of the most common technologies used to produce “base lube”, with comments on some of the advantages and disadvantages of each.

1. “Acid Clay” technology which combined heat, sulfuric or other acids, activated clay and agitation in a vessel followed by filtration of the mixture to remove the clay and contaminants. This produces a “Group 1” base lube of questionable quality, and a major problem is that the resulting sludge is highly polluting. This technology has been declared illegal in many countries – though it is still in use in many areas of the world. In some cases this has been combined with vacuum distillation which produces a somewhat better “Group 1” base lube. However the sludge problem still remains.

2. Vacuum Distillation followed by Solvent Extraction, which produces a very acceptable “Group 1” base lube. In this approach, the used lube oil is distilled in at least two stages, with the “gas-oil” or “light ends” being removed first in some type of flash evaporator or vacuum tower, followed by a deep vacuum distillation in which most of the lube fraction is distilled. The residual from the distillation stage would be classified as either a heavy “bunker” fuel or “asphalt flux” for use as an asphalt additive. The lube distillate is then run through a liquid/liquid solvent extraction column with the lube flowing from bottom to top and the solvent flowing from top to bottom.

Various mechanisms are used to create as much contacting of the two streams as possible as they pass each other. The solvent used in NMP, which is a very benign and environmentally safe solvent. As the solvent encounters the oil along the way it strips out most of the contaminants. The oil is subjected to a steam stripping step to remove any traces of the solvent, and ends up with a color of 1 to 1.5 with good stability, and a sulfur of around 500 - 600 PPM. The solvent is sent to two further distillation columns to remove the contaminants so that it can be reused. NMP is quite expensive, so the recovery rate is well over 99%. The contaminants, known as the “extract” can be used as a low quality fuel. Solvent Extraction is a relatively safe technology as there are no high pressure reactions or vessels involved, and it is environmentally very benign also. These systems also are much less expensive than Hydrotreaters, and can be scaled down to fit small plants.

3. Vacuum Distillation followed by Hydrotreatment, which produces a “Group 2” or Group 2+” base lube. In this type of plant, the first step is distillation of the lube fraction as described above in section 2. This is followed by heating the lube fraction up to a temperature of about 300 to 340 degrees centigrade, and it is then introduced into first one reactor (the guard bed) and
then into a second reactor (the hydrotreating reactor). At the same time Hydrogen is introduced into the reactors, and with the aid of certain catalysts, Chlorinated contaminants and nitrogen compounds are converted into ammonium chloride. Sulfur is removed as hydrogen sulphide. The result is an excellent Group 2 or Group 2+ base lube, with color of <1, and sulfur of <300 PPM. This all takes place at high pressure, ranging from 1,000 PSIG to 1,500 PSIG. The major disadvantage of this technology is the danger of operating a system with hydrogen and oil at high pressure, which can give rise to flash fires and major environmental releases if gaskets or seals give way or leaks occur. Another downside is that due to the high pressure and required special metallurgy, the systems are expensive, and therefore are economically feasible only at higher throughputs of 20 million gallons per year or more.

4. Vacuum Distillation followed by Activated Bauxite Filtration. In this technology, the distilled lube oil is flowed through multiple columns which are filled with Activated Bauxite (often referred to as Clay) granules, and the contaminants are adsorbed by the Bauxite Beads, which have a very large surface area. When the Bauxite is saturated with contaminants, the flow of oil is stopped, the oil is drained out, and the “Clay” is then regenerated through a carefully controlled combustion process which “burns” the contaminants out of the clay. This technology is highly applicable to small ULO re-refineries with throughputs of less than 5 million gallons per year. Depending on the number of clay columns a system has compared to the amount of oil to be processed, you can obtain either a Group 1 or a Group 2 Base Lube from this system. The disadvantage of this approach is that it is not useful in plants larger than 5 million gallons per year, as you need a massive quantity of columns, which require a lot of room. It also destroys a significant percentage of lube (more than 5%) during clay regeneration. An advantage is that with a well designed system the clay seems to have almost unlimited life. This system is relatively inexpensive and is completely environmentally benign.

5. Lastly, a combination of Solvent Extraction followed by Activated Bauxite Filtration allows larger plants to obtain Group 2 Base Lube without having to invest in a Hydrotreater. This approach reduces the size of the needed clay system because you are feeding it a much cleaner lube. The systems are safe and environmentally friendly.

For more information, contact Luke Staengl, President and CEO of PESCO-BEAM, at luke@pescobeam.com.
Tech Tools For a More Efficient Office
by David Kroutil, Advantage Route Systems, Inc.

Every NORA member can make use of today’s technology to run their business better and smarter. There are literally hundreds of ‘tech tools’ that will help you run a more efficient office; plant and even on route! Efficiencies can be gained in dozens areas of your operations. Here are just a few:

1. Plant Operations
2. As you collect data in the field
3. Within your office
4. Through your office.

Let’s look at the opportunities in each of these areas.

Plant Operations
Most of you already use computers to monitor your in-plant operations. Whether you have a small tank yard or a complete refinery, computers monitor tank levels, temperature and other key operational conditions. With sensors at a number of critical points, the data is reported back to a central computer which would have a monitor showing your plant with key data points. Alerts are immediately popped to the screen and most likely you will be emailed if something is urgent. If you run multiple sites, they can be connected by a network so you can get a bird’s eye view of your entire operations. No longer are you forced to sit in front of a console to see the data. You can carry a small tablet around with you and no matter where you go, you are connected and able to make critical decisions at a moment’s notice.

Collecting Data from the field
Over the last five years, handheld technology has grown in popularity so you can secure information on how much oil, water and anti-freeze is being picked up at each stop. It will track product levels on your truck and provide your driver with historical data about prior servicing. It also tracks and then transfers back to your desktop all data about the stop including gallons, time serviced, a signature from the party who authorized the pickup, etc. With handhelds you can even record payment for oil on the spot. Some collectors use halogen test kits to take a sample and record their results on a handheld. Portable printers let you give a receipt to the customer at the time of the visit. Newer systems can even email a receipt to the customer allowing you to go paperless.

Another tool that is slowly being adopted is remote tank monitoring. This involves a sensor and transmitter at your collection tank that is connected to a wired or wireless network which will send data back to your office telling you the fill level of each tank. You can arrange pick-ups based upon actual needs, not just guess work. This will help you reduce miles and makes better use of your team. Improving efficiencies helps with employee satisfaction which results in a healthier and happier workplace.

Technology in your office
Hardly anyone goes to work without logging in to your desktop PC. Not only do you check your email, log in to and use your accounting program, but most likely you search the web for commodity prices; check on the news that may affect your business and settle in. You may have a few favorite spreadsheets you have created to monitor key performance indicators in your business. You may even have a direct feed from your customer sites showing you tank levels. Maybe on the wall you have a screen showing you where your trucks are and how long they have been there. You head out for lunch and grab your smart phone (with your email on it) so you don’t miss anything. It has almost everything at your fingertips.

You hired a new employee last Friday. He just grabbed your iPad® and is doing on-line safety training. You know he passed because 2 minutes after he completes the on-line test you get an email showing you his results. Your marketing person just downloaded a list of 328 potential customers from a web site so you can have leads for your salesperson. Your purchasing agent just found a bargain on 10,000 oil absorbing...
pads from a competitor two states away who is going out of business.

Such is the modern office. Who really wants to go back ten years ago to the old way? If you are not using these tools to your advantage, you may not be able to keep up with your competitors who do.

Web Site for customers
Almost all of your customers are Web savvy - as well as most of your prospects. Having a useable and informative Web site can be a huge boost to your marketing and customer service activities. For prospects, you want a Web site that shows clearly what you do; what your service area is and why they should do business with you. Make it easy for them to contact you with colorful, easy-to-follow graphics as well as displaying your phone number (or email address) prominently.

Customers have slightly different expectations from your site. Yes, they may want to quickly find your phone number if they have an emergency; but they also may be interested in seeing their collection history; last checks issued for oil, etc. If you have web-based tank monitors, they may want to go to your site to see current tank levels. This is particularly true if they manage collection sites in several states or over a large region. Tying to your back-end system can let your customers see relevant accounting data in real time.

Finally, if you are unsure what to do with your web site, look at your competitors. Often times they have large marketing departments who specialize on web design and have some good ideas that you may want to use. In addition, you may want to personalize your site with things you know are of interest in your area. Keep your site simple, clean and fresh. Have some friends look at it and give you feedback. The key: Make it useable and inviting.

You don’t need to be a technology guru or ‘propeller head’ to use modern tools in your business. Simple tools will save you time; give your customers a better feeling about your company and make your lives more efficient. The trick is maintaining a balance between proven technology and things that are ‘out there.’ The landscape is constantly changing and what was bizarre two years ago is now the standard today. Secure the help of an expert if you need to make a technology road map for your company. Just don't be shy. You can do it!

For more information, contact David Kroutil, CEO of Advantage Route Systems, Inc. at dkroutil@advantagers.com.
Our industry like many others is experiencing rapid change. We are seeing many mergers and acquisitions taking place. This is happening many times due to one company failing and another company about to fail coming together in hopes that 1+1= maybe 1. However, in a number of cases the industry continues to see company failures at an unprecedented rate and it is the opinion of IUORI this trend will continue for the next few years.

The fundamental causes are somewhat elementary as many companies in our industry have made major investments in re-refining used oil into lubricants. Some experts in the lubricant industry are still forecasting a gross over supply of lubricants in the North America markets for as far out as 2025.

Another key challenge for the industry is the move from Group II base oil to a Group III and Group III+. Experts in the industry are forecasting demands for lubricants to return sometime around the year 2025; however, it will not be the Group II lubricants in demand, but rather Group III & Group III+ lubricants.

Major Technology-Market Challenge for Re-refiner’s Asphalt Flux
As more and more states continue to ban the usage of re-refiners’ asphalt flux in asphalt production, which historically has been an acceptable practice, the industry is faced with a technological or new market challenge: come up with a usage of what amounts to 8% to 15% of most feedstock.

Used Oil Prices at the Generator Level
A key factor that has had a great impact on the economics causing bankruptcies, company failures, as well as increase in mergers and acquisition across the industry the last few years, has been a result of an inflated/unsustainable price that many service providers are paying to generators of used oil. It is the opinion of the IUORI these inflated/unsustainable prices currently being paid for used oil must be corrected over the 3rd & 4th quarter 2014 or further industry failures will be imminent.

Conclusion
Though many challenges exist for the used oil and petroleum fuel reclamation industry the IUORI continues to see new technology emerging that will revolutionize the industry. The research efforts of the IUORI in partnership with the research and development facility located at Aaron Oil Company’s south Alabama processing plant as well the University of South Alabama scientists and staff has resulted in a number of unprecedented technological developments that are sure to bring new efficiencies to the industry. The IUORI has already announced some of these developments and others will be publicized in the near future.

Currently IUORI is working to address the re-refiners’ asphalt flux technology/market challenges. We have almost completed a multi-million dollar process at the Aaron Oil Company facility located in south Alabama. The process has been designed to be fully automated where data and performance results can be monitored continuously. Testing is scheduled to begin in the next 30 days. Along with these efforts we will be utilizing the scientific laboratories at the University of South Alabama and working with other stake holders to respond to the asphalt flux studies which have been used to cause a number of states to ban the use of asphalt flux from re-refiners. It is our intent to determine other suitable and economic markets for the asphalt flux material generated by the industry. This may include new process technologies designed to remove unwanted constituents in order to make other beneficial products from this material.

IUORI will report its findings as we develop solutions for this critical industry challenge.

For more information, contact Dan Cowart at danc@aaronoil.com
The new UsedOil-Stik™ is Titan’s solution for used oil transportation. It is safer, quicker, and more accurate to use than manually dipping the tank. The display mounts at eye-level on the truck, removing the need to climb the tank to measure fluid levels. This keeps the driver safely off the top of the tank, and allows them to check the volume more quickly. The gauge uses Guided Wave Radar to report liquid level or volume to an accuracy of 0.1 inches.

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1. How is your company connected to the industry?

Chemical Engineering Partners has been providing re-refining technology to the used oil industry since 1988. We are the leaders in providing hydrotreating re-refining technology to used oil collectors throughout the world. Our company is committed to the recycling of used oil through re-refining into base oils, in order to preserve the lube oil, which is the most valuable component of crude.

2. What products/services does Chemical Engineering Partners provide to the industry?

Chemical Engineering Partners provides:
A. Re-refining technology with hydrotreating to produce Group II and Group II+ base oils (or Group I if requested)
B. Catalyst (CEP-HRX TM) specifically designed for the re-refining of used oils and to maintain the longest possible run times between shutdowns of the re-refinery
C. Clay Finishing Treatment technology through our technology partners to produce Group I base oil
D. VGO Recovery process

3. What value do you find in NORA Membership?

NORA membership provides valuable news and information about the used oil industry. It allows us to participate in key industry and political developments while providing a forum for members to meet to discuss and develop strategies to protect our industry. NORA also allows technology companies like ourselves to present our technology and developments to potential clients.

4. What changes have you witnessed related to used oil processing technology over the last 10 years?

Over the past several years, there have been a significant movement to build and operate used oil re-refineries using a high tech process such as Chemical Engineering Partners’ technology. In the past, most used oil collected was processed using a low tech process such as acid clay treatment or the oil was just simply burned as fuel. With the more strict environmental regulations, the amount of used oil being re-refined has increased. About 5 years ago, Chemical Engineering Partners was the first speaker ever at the ICIS base oil conference to present about the used oil re-refining. Now, used oil re-refining has become common knowledge for most of the base oil suppliers and producers.

5. What advances/trends in used oil processing technology do you anticipate in the next 5 years?

In the coming years, the market for base oils will continue to move toward higher quality products. Chemical Engineering Partners is in the process of developing our technology to produce Group III base oils. In addition, the industry has accepted re-refining as not only an environmentally friendly business, but an profitable business as well. As countries continue to support re-refining, the market will continue to develop in smaller countries who may not have considered re-refining in the past.

We predict that re-refiners will need to invest in re-refining processes that allow for flexibility in production to take advantage of market pricing. In the last few years, we have seen significant fluctuation in pricing of base oils and fuel oils. Chemical Engineering Partners’ process can allow for customers to take advantage of these changes in product pricing. Chemical Engineering Partners’ technology has operational flexibility; without any additional capital investment, our re-refining technology can allow the customers to produce VGO, API Group I base oils or API Group II base oils depending on the market demand.

While re-refining has been around for a long time, the understanding of what re-refining means and that it can be a profitable business needs to continue to be developed to the public. In the past few decades, the industry has had great success in educating the public on the harmful environmental effects of disposing used oil through dumping or pouring into drains that run off into the ocean. As the world moves to a green future, the public will again need to become educated, as collectors in the industry have been, to options of recycling of used oil and environmental impact of burning used oil. Public awareness can allow for additional incentives to re-refineries through government support for green business. As there will always be a market for used oil as a fuel, we are able to provide options to collectors around the world as to how to recycle their used oil. While we wish to provide the option of re-refining to all used oil collectors as a service provider, our top priority is ensuring our customers have a profitable business, which is why it is important to have options.

Chemical Engineering Partners has over 25 years of experience of designing, operating and troubleshooting used oil re-refineries. Chemical Engineering Partners operates 10 re-refineries all over the world, offering a robust and reliable process.
Vertex Energy is a leader in the aggregation, recycling and processing of distressed hydrocarbon streams thereby reducing America’s reliance on foreign oil.

Our focus is on creating value through a variety of strategies and technologies that facilitate the re-refining of used oil and off specification commercial chemical products into higher value commodities.

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972-335-0951
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864-616-6849
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jsc@crandon.com
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Buy, sell and trade petroleum products.

Crystal Flash Materials Solutions
dave@cystalflash.com
800-875-4851
Investment firm

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huang@charlesbank.com
212-903-1880

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alex.richert@chemchamp.com
613-594-3337
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281-465-7900

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barray@desertmicro.net
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281-465-7900

General Combustion Corp
mhoward@gencor.com
407-290-6000

Manufacturer of the HY-WAY brand
thermal fluid heaters and pre-heaters
for recycled oil. Jacketed
piping, pumps, tanks, & burners
for processing industries, terminals
& recycled oil as well as other
products.

Geophobia, LLC
peter.gilmore54@gmail.com
704-5028287

absorption materials

Gulf City Body & Trailer Works, Inc.
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Complete sales and repair facility for
trailer and truck equipment.

Hartz Insurance
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including demulsifiers, water
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NORA Supplier/Vendor Directory

NORA Supplier/Vendor Members in good standing as of 7/10/2014. Companies in bold have an ad in this newsletter.

Companies in red are Exhibitors at the 2014 Annual Conference. Companies with a $ are part of the NORA $ave program by offering discounts/value added services to NORA members. Contact NORA to learn more about the NORA $ave program.

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vitros@tensilecapital.com 415-830-8176 Investment Management

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Urs Corporation
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Wiant Capital
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In 1928 Walter P. Chrysler, the CEO of the Chrysler Corporation, introduced the Plymouth line of vehicles to compete with other low-priced cars including Ford and Chevrolet.

After 40 years some economical Plymouth models were still available as direct competition to Ford and Chevrolet. However, the muscle car era had arrived and muscular models were being offered by virtually every automaker including Plymouth.

One of those powerful Plymouths was a GTX model that had been specifically ordered equipped to the customer’s wishes. The customer evidently wanted a no frills muscle car that could get off the line very quickly.

The base price of the GTX when new was $3,178. A total of 17,914 hardtop coupes were built, most of them with the usual inventory equipment.

This particular GTX left the factory in St. Louis, Missouri equipped with:

- Floor mats.
- Undercoating.
- Power brakes.

- Backup lights.
- Dual exhausts.
- Glove box lock.
- Under hood pad.
- Dyna 60 rear end.
- Heavy duty brakes.
- Sure grip transmission.

- 4-speed manual transmission.
- Floor-mounted gear shift lever.
- AM radio with thumb roller dials.

There is no console on the floor around the gear shift lever.

The spacious interior of the GTX is awash in the color black from the headliner on down to the carpeting. The vinyl on the seats, door panels and dashboard are all black. Even the vinyl covering the outside of the top is black. The Sunfire Yellow body delivers an eye popping contrast. Greg Hendrick bought the car last May 13 and soon took it to a restoration shop in Huntington, Tennessee. There he discovered that the 440-cubic-inch V-8 under the hood was a 1968 engine but was not the original engine that delivered 375 horsepower.

All of the trim on the 16-foot, 10.7-inch-long Plymouth that needed replating was addressed. “The chassis wasn’t in bad shape,” Hendrick says.

“When I got the car,” Hendrick recalls, “there were a few little aggravating problems.” Minor things such as loose bolts and various adjustments were corrected.

Probably the most troubling problem was when Hendrick discovered that the drive shaft required surgery. He shortened the shaft by about two inches.
Ever since Hendrick drove his GTX home to Murray, Kentucky he has found that all is well with his car. The ride home was comfortable thanks to the lengthy 116-inch wheelbase. The odometer indicates that the GTX has recorded 22,174 miles, a total that Hendricks believes to be correct.

“A no frills muscle car that could get off the line very quickly”

He guesses that most of those miles were accumulated a quarter mile at a time or at least from stop light to stop light. “It has the best heater in any old car,” Hendrick reports. When not out on the highway enjoying his car that delivers fuel mileage of 10.7 miles per gallon Hendrick keeps his car beneath a protective cover in his heated garage.

### 6 New Members Join NORA

NORA’s membership has grown to 394 members; 6 companies have joined NORA since July 10, 2014. NORA relies heavily on word of mouth marketing. Please refer NORA to your peers and suppliers.

<table>
<thead>
<tr>
<th>Company</th>
<th>Contact</th>
<th>Location</th>
<th>Phone</th>
</tr>
</thead>
<tbody>
<tr>
<td>Argus Media.</td>
<td>Chloe Bazille</td>
<td>Houston, Texas</td>
<td>713-429-6343</td>
</tr>
<tr>
<td>Axys Industrial Solutions, Inc.</td>
<td>Brian Lamb</td>
<td>Houston, Texas</td>
<td>713-863-8588</td>
</tr>
<tr>
<td>Jensen Environmental Management Inc...</td>
<td>David Jensen</td>
<td>Muskego, Wisconsin</td>
<td>800-529-5758</td>
</tr>
<tr>
<td>Petro-Tech Environmental, LLC</td>
<td>Penny Stelly</td>
<td>Houston, Texas</td>
<td>713-926-9988</td>
</tr>
<tr>
<td>PRTI, Inc.</td>
<td>Brian Laible</td>
<td>Raleigh, North Carolina</td>
<td>919-809-5440</td>
</tr>
<tr>
<td>Santee Cooper</td>
<td>James Absher</td>
<td>Moncks Corner, South Carolina</td>
<td>800-753-2233</td>
</tr>
</tbody>
</table>

### Industry Calendar

NORA maintains relationships with related industry associations. Here is a list of upcoming industry events:

- **2014 ILMA Annual Meeting**  
  October 18-21, 2014 • Indian Wells, CA  
  [www.ILMA.org](http://www.ILMA.org)

- **2014 NORA Annual Conference & Trade Show**  
  November 5-7, 2014 • Puerto Rico  
  [www.noranews.org](http://www.noranews.org)

- **2015 NAPA Annual Meeting**  
  January 25-28, 2015 • Marco Island, FL  
  [www.asphaltpavement.org](http://www.asphaltpavement.org)

- **2015 NORA EH&S Forum**  
  February 18, 2015 • New Orleans  
  [www.noranews.org](http://www.noranews.org)

- **2015 NORA Winter Meeting**  
  February 18-20, 2015 • New Orleans  
  [www.noranews.org](http://www.noranews.org)

- **2015 International Fast Lube Expo**  
  March 9-11, 2015 • Orlando, FL  
  [www.AOCA.org](http://www.AOCA.org)
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