

**CleanHarbors**  
TECHNICAL SERVICES

**Kleen**  
PERFORMANCE PRODUCTS  
OIL PRODUCTS



**CleanHarbors**  
OIL, GAS AND  
LOGGING SERVICES

**safety-kleen**  
ENVIRONMENTAL  
SERVICES

**CleanHarbors**  
INDUSTRIAL AND  
FIELD SERVICES

Sustainable Recycling of Used Oil  
and the Re-Refined Oil Process  
November 29, 2018  
Brian McManus

**CleanHarbors**

# Safety-Kleen's Closed Loop Re-refined Oil System

- Since 1978, our unique closed-loop system starts with the collection of more than 200 million gallons of used oil **per year** collected from over 80,000 customer locations
- Performance Plus Products return more than 140 million gallons of twice-refined oil to North American marketplace annually
- Our facilities remove contaminants and restore oil to its original purity while refining it again to an even higher quality
- Our process is environmentally-friendly and results in premium products sold at an attractive price

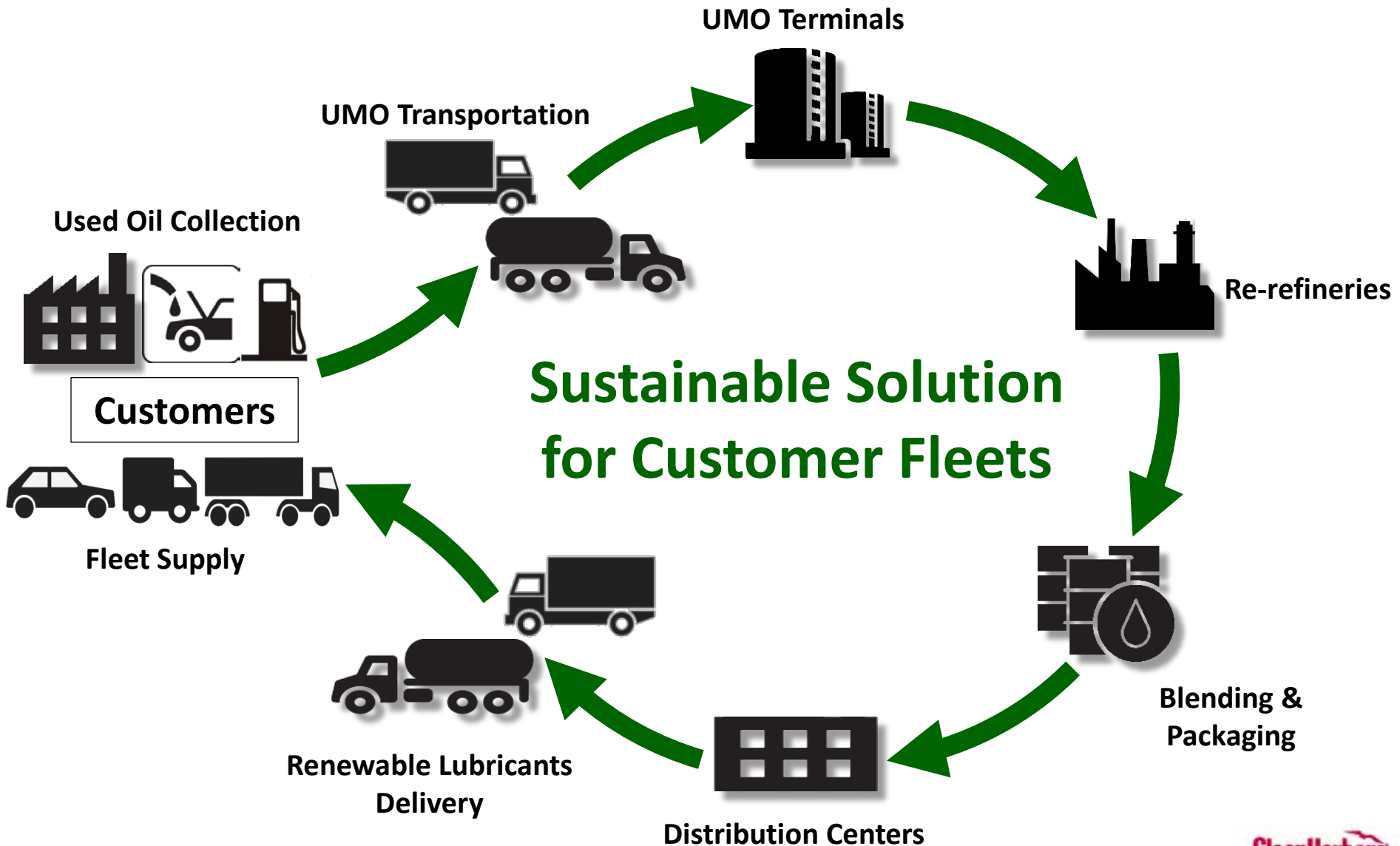


# What is Re-Refining?

- The process of repeating the basic oil refining process to return base oil a usable condition.
- These oils are first cleansed of their contaminants
  - Removing insoluble contaminants, dirt, water, fuel, etc. through vacuum distillation
  - Removing soluble contaminants, spent additives and original remaining additives and other chemical compounds via Hydro-treating
- This process is very similar to what traditional oil refineries do to remove base oils from crude.
- The re-refined base oil is combined with a fresh additive package and returned back in to the marketplace.



# Safety-Kleen's Closed Loop System

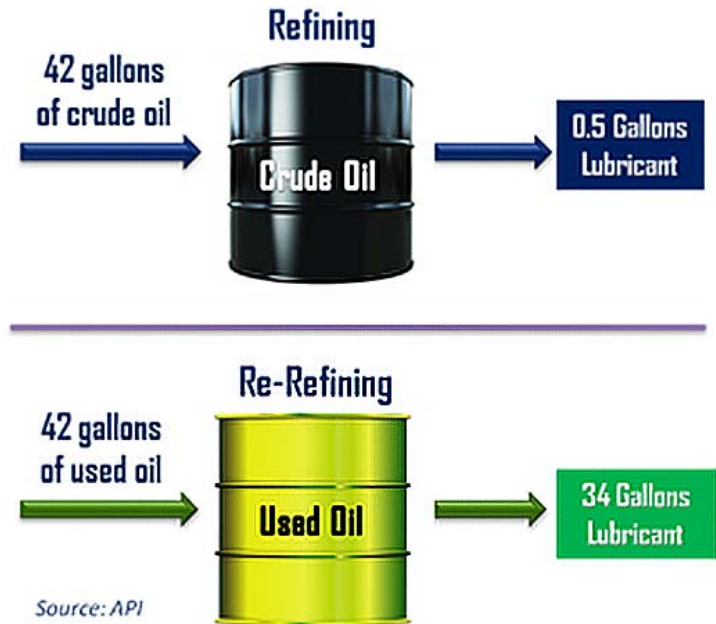


# The basics of re-refining

## A simple concept



## With great benefits



# Re-refined Oil Reduces Need For Fossil Fuels

- Re-refining uses up to 80% less energy to produce than oil made from virgin crude
  - Since already refined once, it takes a great deal less energy to refine it a second time
  - Refining removes impurities and returns used oil to its original base oil state





# Sustainability in Action

*Re-refined oils use 80% less energy to produce – lowering our carbon footprint. Since inception, Safety-Kleen has re-refined more than 3 billion gallons of used oil. Our studies show this has avoided over 23.3 million metric tons of greenhouse gas. This is the equivalent of growing 600 million trees for 10 years in an urban environment, or taking over 4.4 million passenger cars off the road for a year.\**

*\*<https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator>*



# Additional Details

- **Sustainability:**
  - Protection for both your engines and the environment
- **Characteristics:**
  - Lube properties that are equal to or better than base oils from crude oil
  - Virtually no impurities with low aromatics
  - Low volatility and improved demulsibility
  - Uniform composition and high color stability
- **Exclusive Manufacturing Process:**
  - World's largest provider of twice-refined oil products





# Re-refined Sustainable Oil Is Available For All Applications

- **Automotive Lubricants**

- 5W-20, 5W-30 and 10W-30 synthetic blend range
  - Synthetic Blend High Mileage 5W-30 and 10W-30
  - 0W-20, 5W-20, and 5W-30 full synthetic range
  - 0W-20 and 5W-30 full syn dexos1™ Gen 2 licensed products

- **Hydraulic Fluids**

- AW-32; AW-46 & AW-68

- **Heavy Duty Diesel Engine Oils**

- 10W-30 & 15W-40 CJ-4/SN
  - 10W-30 & 15W-40 CK-4 & CK-4/SN
  - 5W-40 full synthetic CK-4
  - Natural Gas 15W-40 CJ-4

- **Heavy Duty Transmission Fluids**

- Full Synthetic Heavy Duty ATF (suitable for Allison TES 295)
  - Full Synthetic 50W ATF
  - Heavy Duty T-04 Fluids (10W, 30W, and 50W)
  - Universal Tractor Fluid

- **Gear Oils & Greases**

- 75W-90
  - 80W-90
  - 85W-140



# Certifications and Approvals

API Schedule A License Agreement	Cummins CES20086	General Motors LS2	MERCON® LV
API Schedule A License Agreement – Canada	Cummins CES20087	Global DHD-1	Meritor O-81
Dexos1™ Gen 2 Certificate of License 2013	Cummins ISL G (8.9L)	Hino CNG	MIL Spec. MIL-PRF-2105D, PRF 2105E
Dexos1™ Gen 2 License Agreement	Cummins ISX12 G	Honda DW-1	MIL-PRF-2104G
Detroit Diesel Approval Letter for EP 15W-40	Cummins ISX15 G	Honda Z-1	MTU Category 2.1
Detroit Diesel Approval Letter for EP 10W-30	Dana Corporation SHAE-256 Rev. C (75W-90)	Hyundai CNG	MTU Category Type I
Cummins CES20081 Conformance Letter for EP 15W-40	Detroit Diesel DFS 93K214	Hyundai SP-IV	MTU Category Type II
Cummins CES20081 Conformance Letter for EP 10W-30	Detroit Diesel DFS 93K215	International TMS-6816	Navistar LNG Maxxforce 13L
Mack EO-0 Premium Plus + Volvo VDS-4 Approval Letter for EP	Detroit Diesel DFS 93K218	ISO 11158	Navistar LNG Maxxforce® DT 7.6L
TC-W3 Certified Oil Registration Program 2012	Detroit Diesel DFS 93K222	ISO 11158 HM	Navistar/International TMS 6816
Volvo Approval Letter for 10W-30	Detroit Diesel DFS 93K233	ISO 20763 vane pump test	Nissan Matic J
Allison Transmission Approval Letter - 2281540	Detroit Diesel Series 50G	Isuzu CNG	Nissan Matic S
Allison Transmission Approval Letter – 22915MH	Detroit Diesel Series 60G	JASO DH-2	Parker Hannifin HF-0, HF-1, HF-2
Mack Truck GO-G, GO-H, GO-J approved (80W-90)	DEXRON®	John-Deere J20A, J20C	Power shift transmissions specifying Cat TO-2
Allison C-3   C-4	DEXRON®IIE	Kubota B6 (UTD)	Renault RGD
Allison TES-295 & TES-389 comparable	DEXRON®III	M2C86C   M2C134D	Renault RLD-3
Arvin Meritor - O-76E (75W-90)	DEXRON®VI	Mack CNG	Renault RLD-4
ASTM D6158	DIN 51524 Part 1 and 2	MACK EO-0 Premium Plus	SAE J2360 approved (80W-90)
Caterpillar ECF-1A	DIN 51524-2	MACK EO-M Plus	SAE MS 1004
Caterpillar ECF-2	Eaton 35VQ25 pump test	MACK EO-N	Suitable for gearboxes specifying US Steel 224
Caterpillar ECF-3	Eaton Brochure 03-401-2010	MACK EO-N Premium Plus 03	Vickers 35VQ25   35VQ25A
Caterpillar TO-2, TO-4	Eaton Roadranger PS-164 Rev. 7	MACK EO-S 4.5	Volvo 97305
Chrysler/Fiat MS-10902	Eaton/Vickers M-2950-S, I-286-S	Mack TO-A Plus	Volvo CNG
CID A-A-52306	Ford WSL-M2C192-A (75W-140)	Mack Truck GO-G, GO-H, GO-J, GO-J Plus	Volvo I-Shift
Cincinnati Fives P-68, P-69, P-70	Ford ESP-M2C138-CJ	MAN 270	Volvo VDS 2
Cincinnati Milacron	Ford ESP-M2C166-H	MAN 3275	Volvo VDS 3
Cummins B5.9G	Ford M6C32	MAN 3575	Volvo VDS 3
Cummins C8.3G	Ford New Holland: M2C41B   M2C48B   M2C48C	MB 226.9	Volvo VDS 4
Cummins CES20076	Ford Type A Suffix A	Mercedes Benz 228.3	Volvo VDS 4.5
Cummins CES20077	Ford WSS-M2C171-E	Mercedes Benz 228.31	ZF Freedomline (ZF-AS Tronic)
Cummins CES20081	Ford WSS-M2C171-F1	MERCON®	

# ISO Certification for Quality Management



QUALITY SYSTEMS  
REGISTRARS, INC.

## CERTIFICATE OF REGISTRATION

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This is to certify that the management system of

**Safety-Kleen Systems, Inc.**

601 Riley Road  
East Chicago, IN 46312-1638

has been assessed and certified as meeting the requirements of

**ISO 9001:2008**

This certificate of registration remains valid subject to satisfactory surveillance audits for the following activities:

**Supply lubricating oils, asphalt extenders, and both distillate and non-distillate fuels per internal and external standards and customer requirements.**

<b>Certificate Number:</b>	<b>QSR-090</b>
Certified since	March 30, 1993
Date issued	September 28, 2015
Date of certification	December 21, 2015
Valid until	December 20, 2018

# Video

<https://www.youtube.com/watch?v=AlcMze5Gn7M&feature=youtu.be>



# Contact Info

Brian McManus

(508) 207-8332

[brian.mcmanus@safety-kleen.com](mailto:brian.mcmanus@safety-kleen.com)

