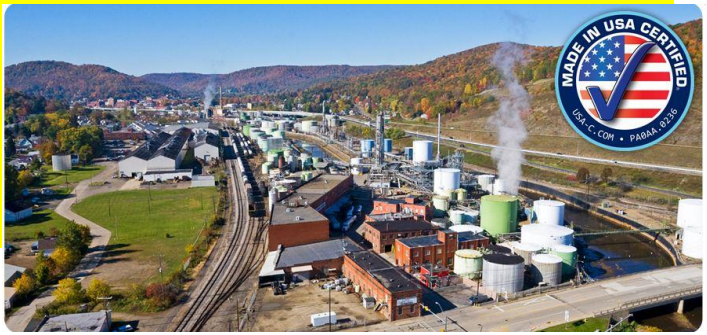
Performance Engineered Lubricants Since 1919

-D-A Lubricant Company, Inc. owns the BRAD PENN® brand. The purchase of BRAD PENN® is simply an ownership change.

-D-A has enjoyed a long history with American Refining Group (ARG) and expects to maintain its strategic alliance.

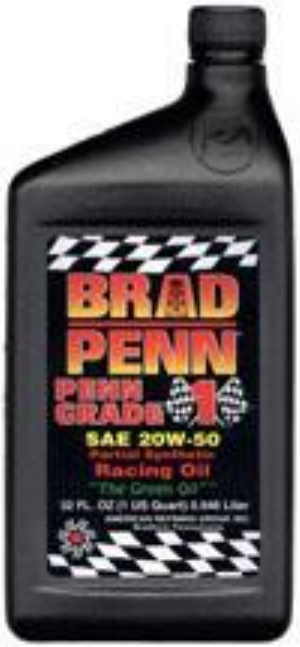
-Acquisition official December 31, 2014.

-PENN GRADE 1® product formula will not change and will continue to be manufactured in the same plant it always has.



BRAD PENN®

"The Green Oil"®



D-A LUBRICANT COMPANY®

PENNGRADE

HIGH PERFORMANCE OIL

"The Green Oil"®

New look....

Same product....

Still AWESOME....

D-A LUBRICANT COMPANY®

-Former Kendall Refinery founded in 1881

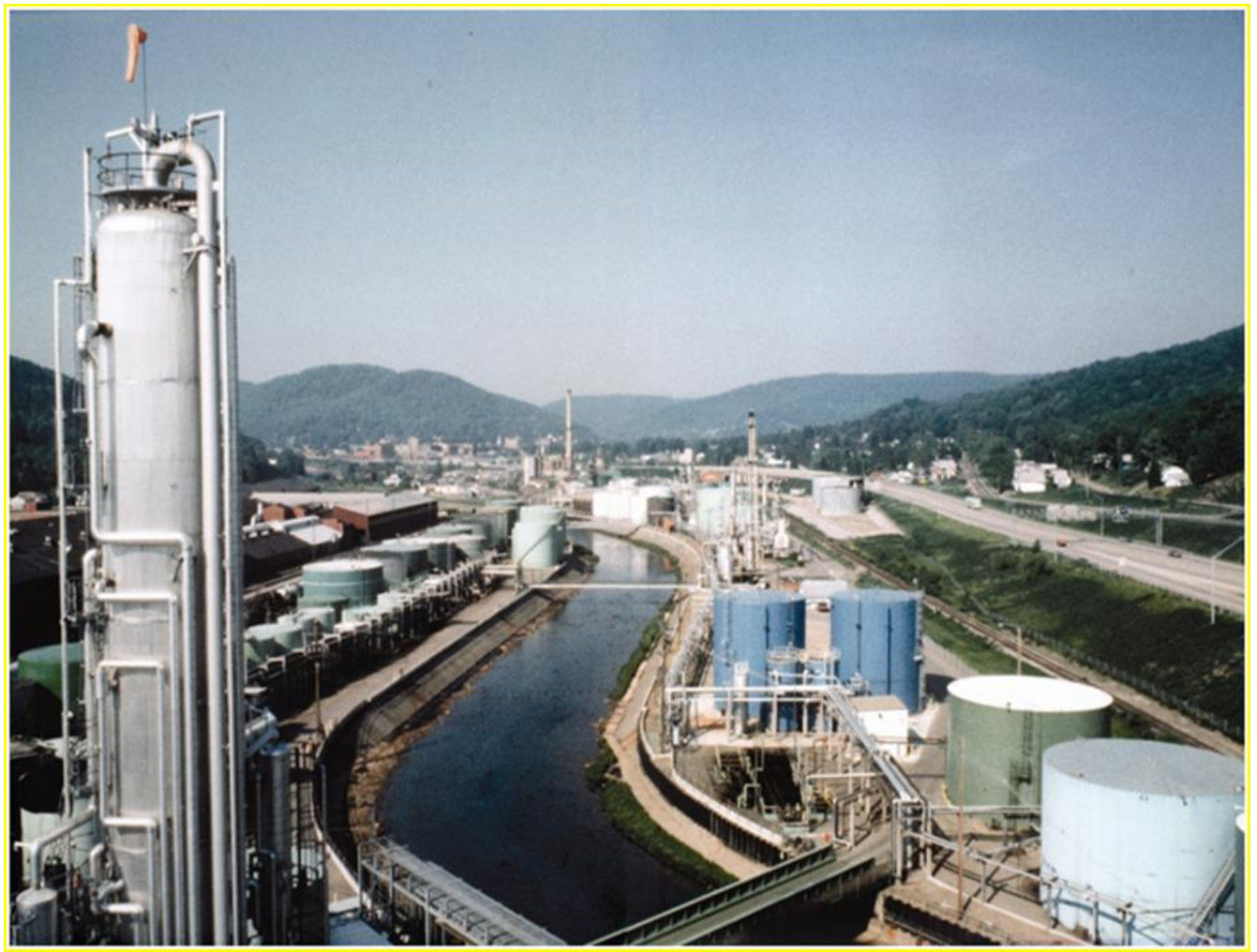
-Oldest, continuous running lube refinery in the world

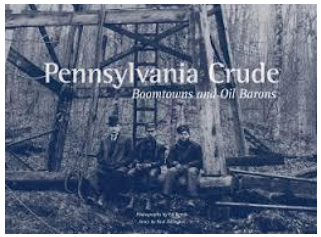
-Processes only 100% Pennsylvania Grade Crude Oil

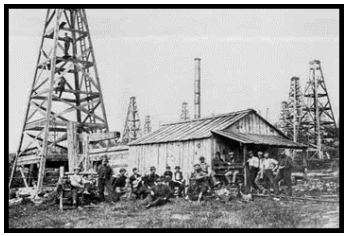
-First refinery in the world to be ISO* 9000 certified (quality management system standard)

-October, 2009 obtained ISO 9001:2008 certification

*International Organization for Standardization







1995 - Witco Corporation resolved to divest its Lubricants Businesses

1996 - Sold Kendall\Amalie brand names and private labels to Sun Oil Company

1997 - ARG purchased Bradford refinery

1998 - ARG started up the lubricants, blending and packaging plants.

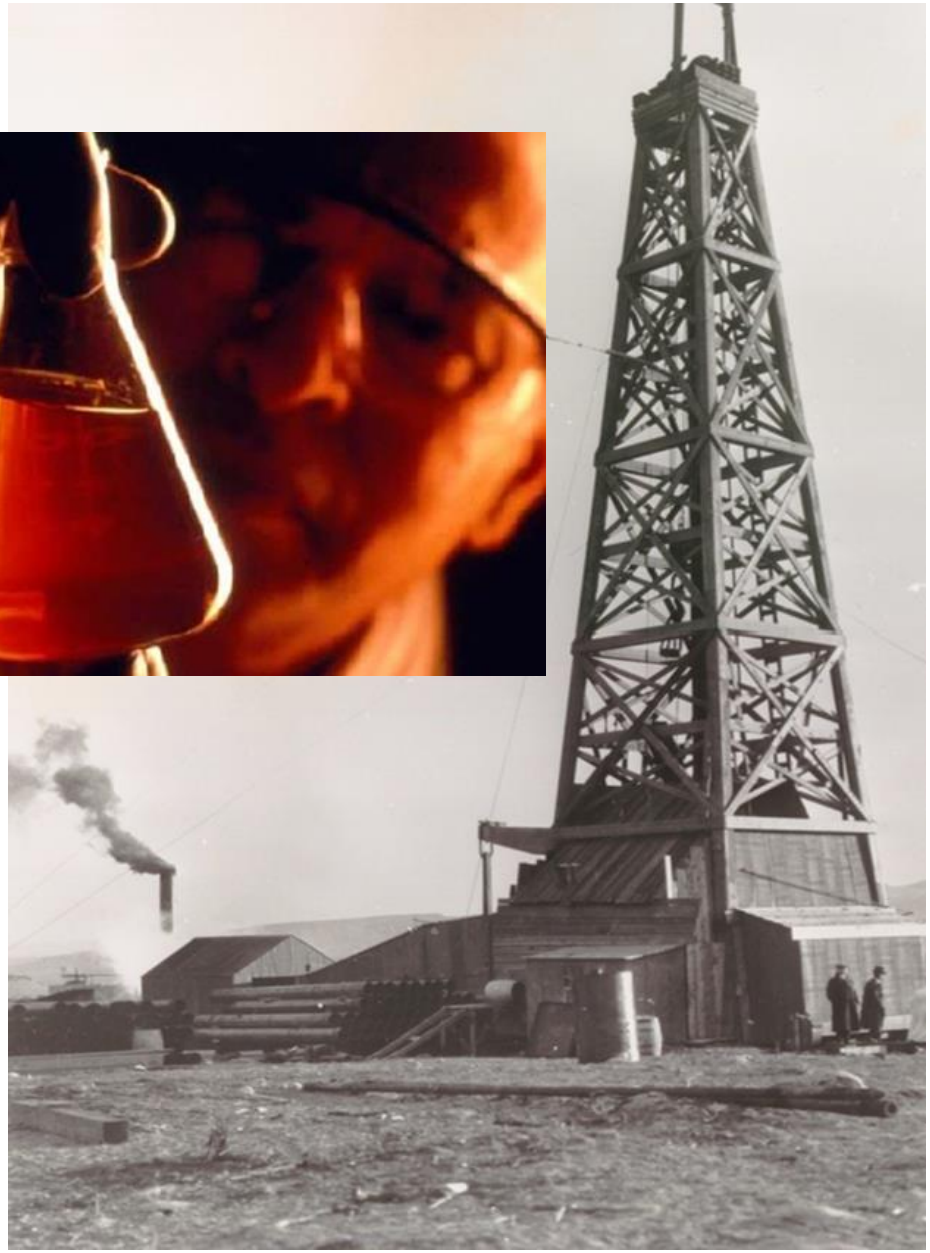
2014 – Brad Penn Brand Acquisition

Penn-Grade Oil

-PENN-GRADE crude oil is a superior quality crude oil that is

free of asphaltic constituents, contains only trace amounts of sulfur and nitrogen, and has excellent characteristics for refining into lubricating base stocks.

-Lubricants made from refined Pennsylvania 'Sweet' Crude Oil have been the choice of equipment manufacturers and consumers for well over 100 years.



Where does it come from?

The Pennsylvania grade crude oil region comprises approximately 35,000 square miles, covering a geographic area running from Southwestern *New York*, through Western *Pennsylvania*, and into *Eastern Ohio* and *West Virginia*. ARG purchases over 3.0 million barrels of PA Grade Crude Oil annually.

-1/3 of crude from OH, NY, WV

-2/3 from local producers w/in *125 mile radius of refinery!*

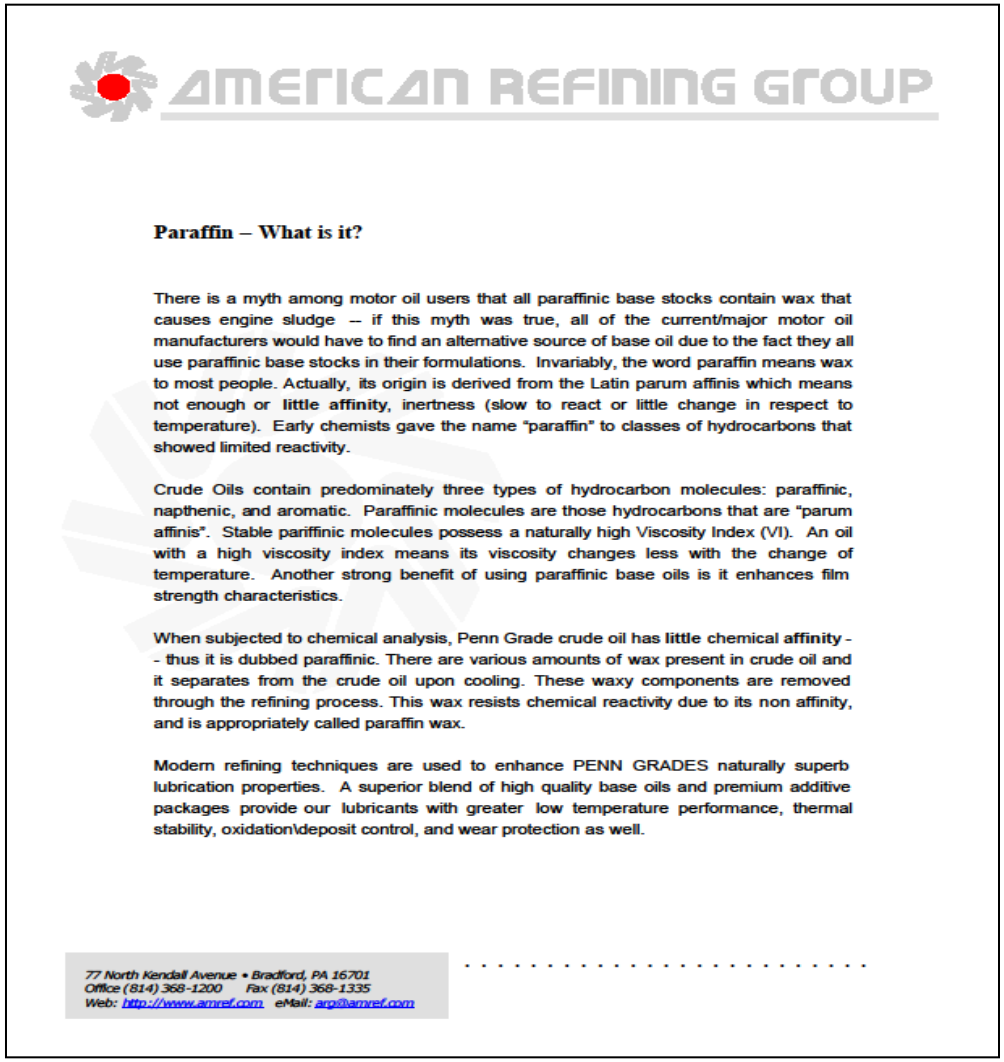
FYI… 70% of the known PA Grade Crude reserves are still underground!

Made in the USA

Paraffinic stock…wax in the oil?

Myth exists that paraffinic base stocks contain wax that causes engine sludge

Fact is, waxy components are removed through refining process



AMERICAN REFINING GROUP

Paraffin – What is it?

There is a myth among motor oil users that all paraffinic base stocks contain wax that causes engine sludge -- if this myth was true, all of the current/major motor oil manufacturers would have to find an alternative source of base oil due to the fact they all use paraffinic base stocks in their formulations. Invariably, the word paraffin means wax to most people. Actually, its origin is derived from the Latin parum affinis which means not enough or **little affinity**, inertness (slow to react or little change in respect to temperature). Early chemists gave the name "paraffin" to classes of hydrocarbons that showed limited reactivity.

Crude Oils contain predominately three types of hydrocarbon molecules: paraffinic, napthenic, and aromatic. Paraffinic molecules are those hydrocarbons that are "parum affinis". Stable pariffinic molecules possess a naturally high Viscosity Index (VI). An oil with a high viscosity index means its viscosity changes less with the change of temperature. Another strong benefit of using paraffinic base oils is it enhances film strength characteristics.

When subjected to chemical analysis, Penn Grade crude oil has **little chemical affinity** -- thus it is dubbed paraffinic. There are various amounts of wax present in crude oil and it separates from the crude oil upon cooling. These waxy components are removed through the refining process. This wax resists chemical reactivity due to its non affinity, and is appropriately called paraffin wax.

Modern refining techniques are used to enhance PENN GRADES naturally superb lubrication properties. A superior blend of high quality base oils and premium additive packages provide our lubricants with greater low temperature performance, thermal stability, oxidation\deposit control, and wear protection as well.

77 North Kendall Avenue • Bradford, PA 16701
Office (814) 368-1200 Fax (814) 368-1335
Web: http://www.amref.com eMail: arg@amref.com

D-A LUBRICANT COMPANY

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Additive Basics / Definition

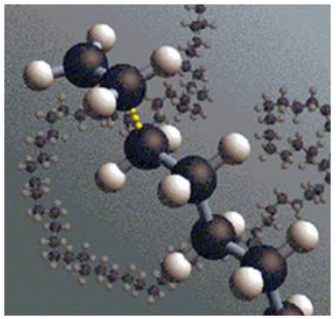
-An <u>additive</u> is a material that is added to a base oil in order to change its physical properties and/or performance characteristics. Additive(s) turn base oil into <u>lubricant.</u>

Additive Basics/Component Types

Chemically Inert (improve the physical properties of a lubricant)

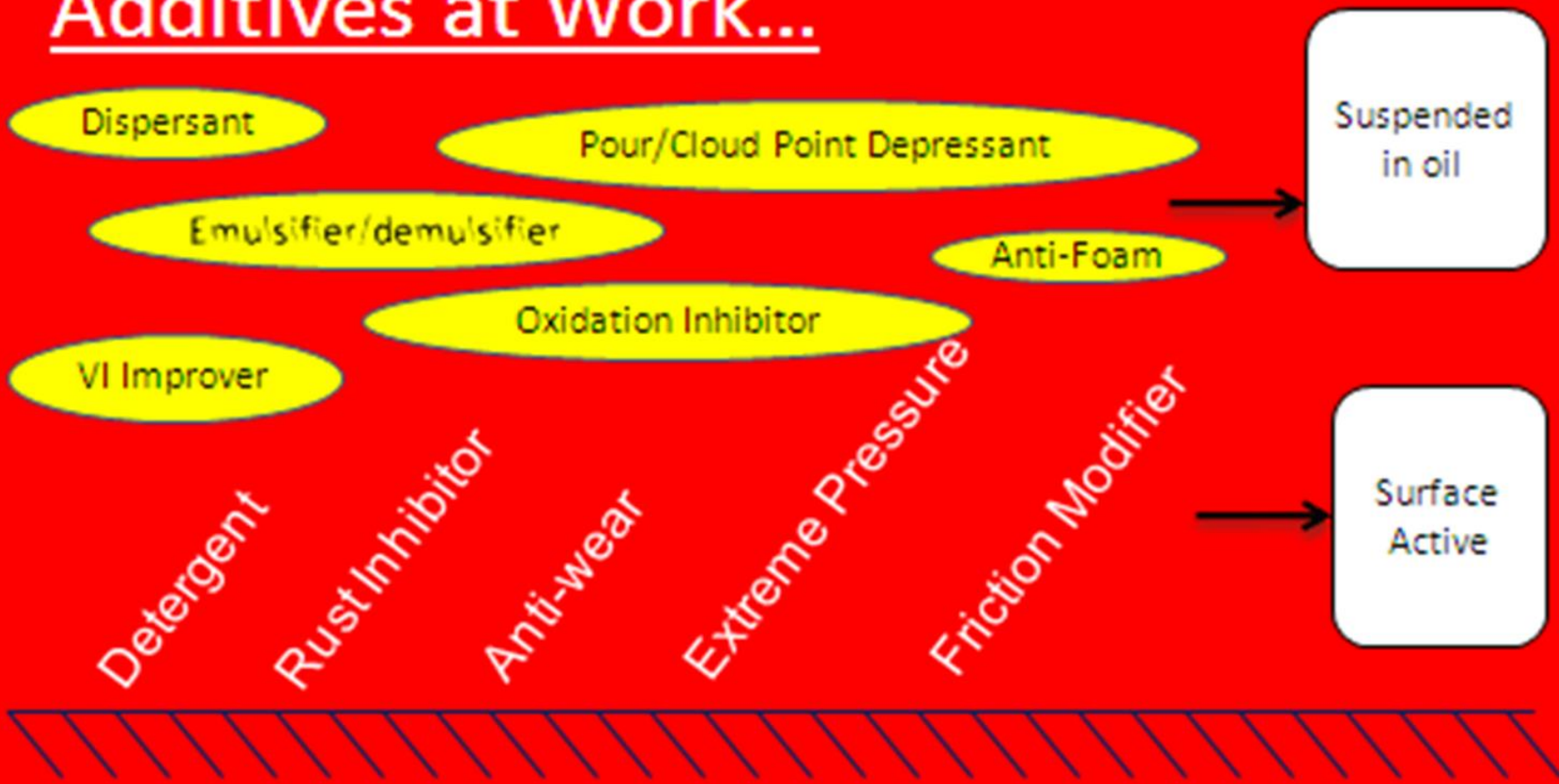
- Emulsifier/demulsifier
- Foam inhibitor
- Pour point depressant
- Viscosity modifier

Chemically Active (Interact chemically with metals forming protective films or with oxidation/degradation products rendering them harmless)



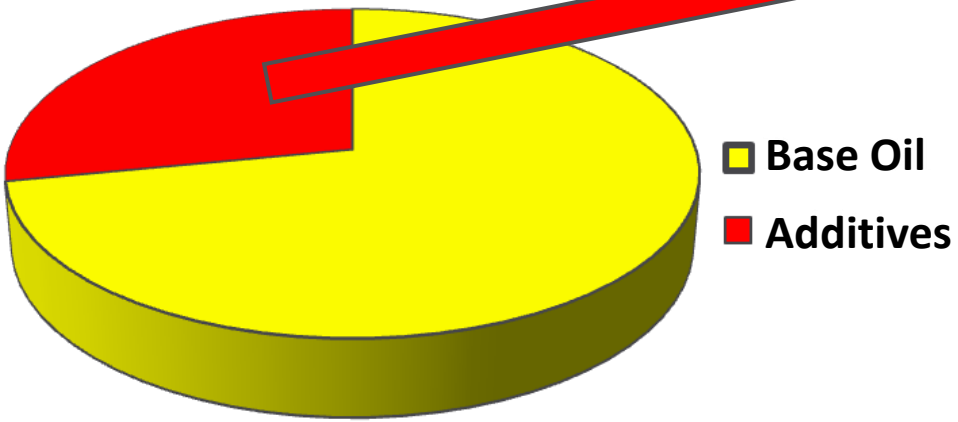
- Anti-wear agent
- Detergent
- Dispersant
- Extreme pressure agent
- Oxidation inhibitor
- Rust and corrosion inhibitor

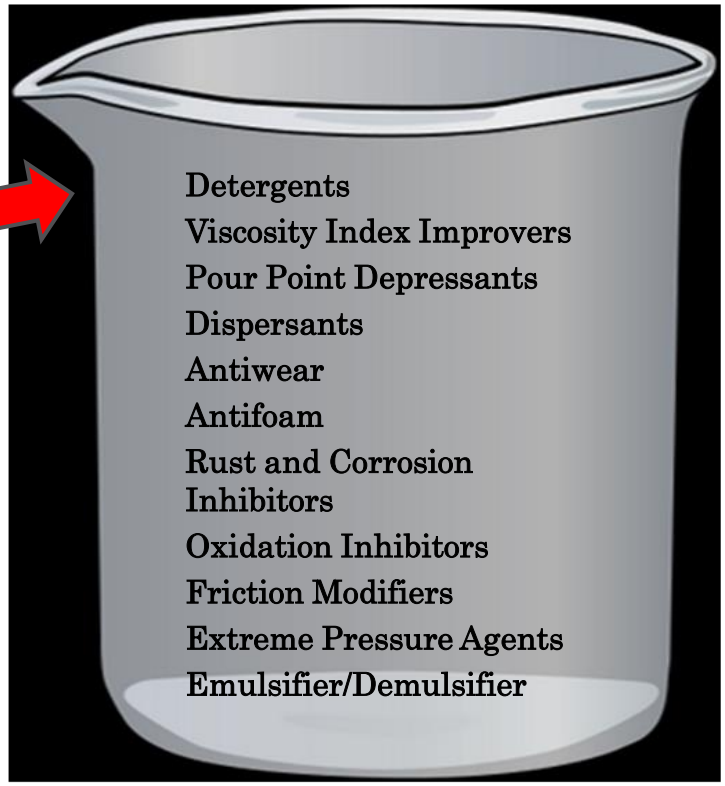
Additives at Work…



Additive Basics / Lubricant Formulations

- Base Oil (70-85%)
- Additives (15-25%)





FYI…Treat rate on these go down in non-engine applications

FYI…

Motor Oils are the biggest application for lubricant additives, accounting for most of the volume used in auto applications…why?

-Internal combustion engines generate a large amount of contamination.

-Most automotive applications are mobile and come into contact with a wide range of contaminants

-Automobile applications experience a wide range of operating temperatures.

COA

What's Happening Inside your Engine?

Burning 100 gallons of gasoline produces:

1. 90 to 120 gallons of water
2. 3 to 10 gallons of unburned fuel
3. ½ to 2 lbs. of soot and carbon

4. ¼ to 1 lb. of varnish
5. 1 to 4 lbs. of sulfuric and nitric acid

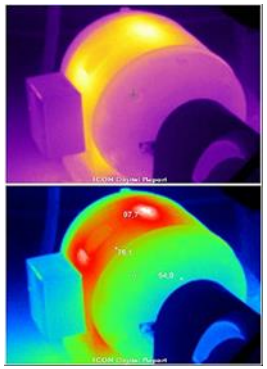
FUNCTIONS OF A MOTOR OIL

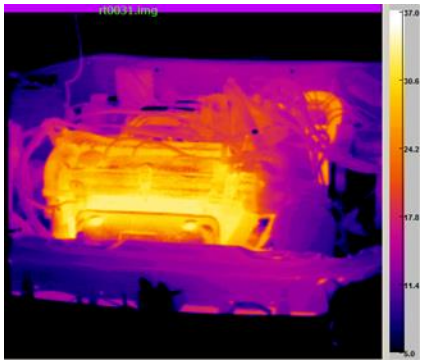
-Lubricate – Reduce friction and wear

-Cool – Redistribute heat from hot areas within the engine to cooler areas

-Protect – Critical engine parts

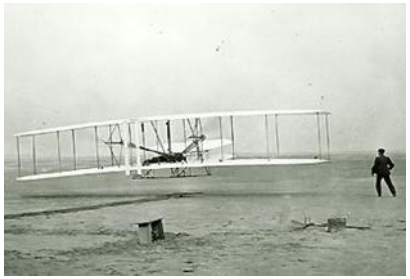
-Keep engine interiors clean – Hold contaminants in suspension until removed by an oil change.





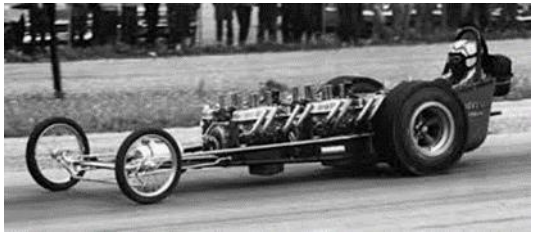
As Applications Change….

-Throughout the years, lubricants have changed (evolved) to meet the specific needs of their intended applications.



The "just use any oil" or "as long as it's slippery" days are long over. Much has to be **considered** before selecting the appropriate oil/lubricant.

Memories of Yesteryear……



Today……

Long Term Storage?

HOW ABOUT OIL SUPPLEMENTS?

-Motor oils are a very precise balance of components that must work together in order to provide the required engine lubrication.

The addition of any type of supplement or additive changes that precise component balance.

Zn…How much is too much?

-Zn is surface aggressive, too much can be a detriment.

-Zn fights for the surface, blocking other additive performance.

-Hydrolytic stability. In contact w/ moisture and high temps can disassociate and create acids (phosphoric acid), accelerating oxidation and corrosive wear.

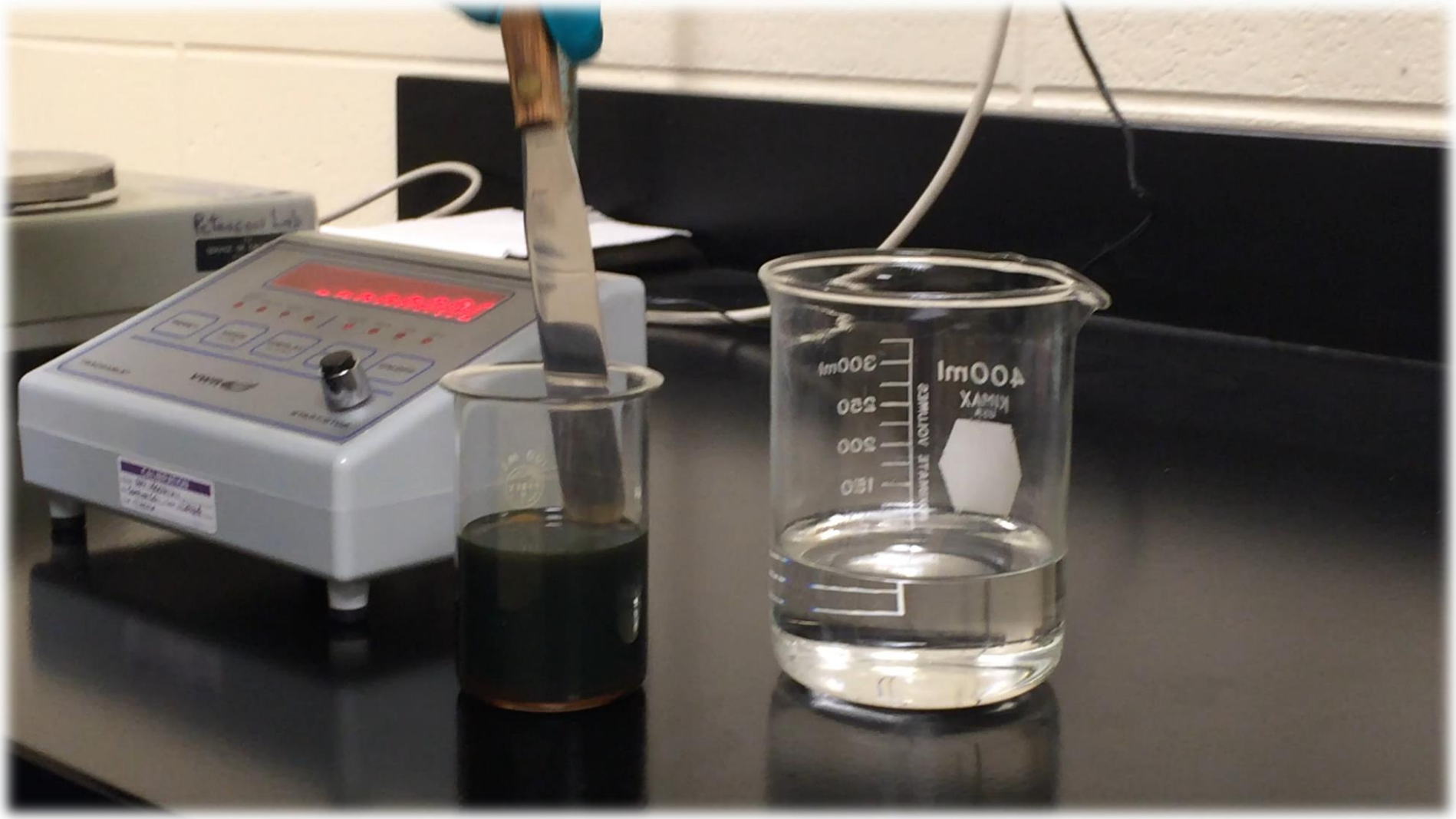
-Zn effectiveness plateaus…more does not translate into more protection. Only so much is utilized…ends up "floating" around.

-We don't need to saturate our oil w/ Zn

-Break-in issues

- Enhanced ZDDP Package / Typical 1500 ppm Zn
- Multiple detergent system critical to piston deposit control, neutralization of acids and rust control
- Unique Cut off our tower that adheres to critical engine parts/ protection from ‘dry start’.

-PA Grade Crude has its own unique metal wetting characteristics. A natural affinity to metal surfaces.



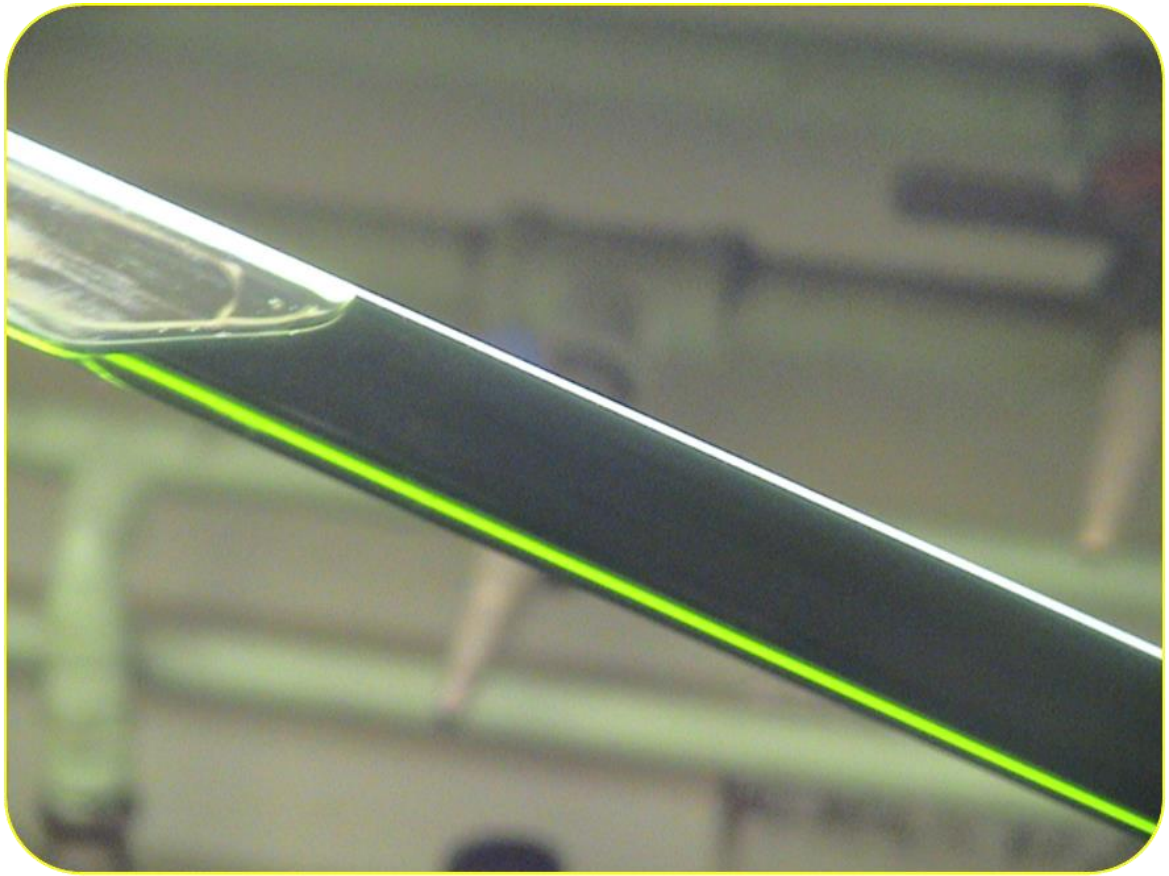
Bench test

Penn Grade 1 High Performance Oils

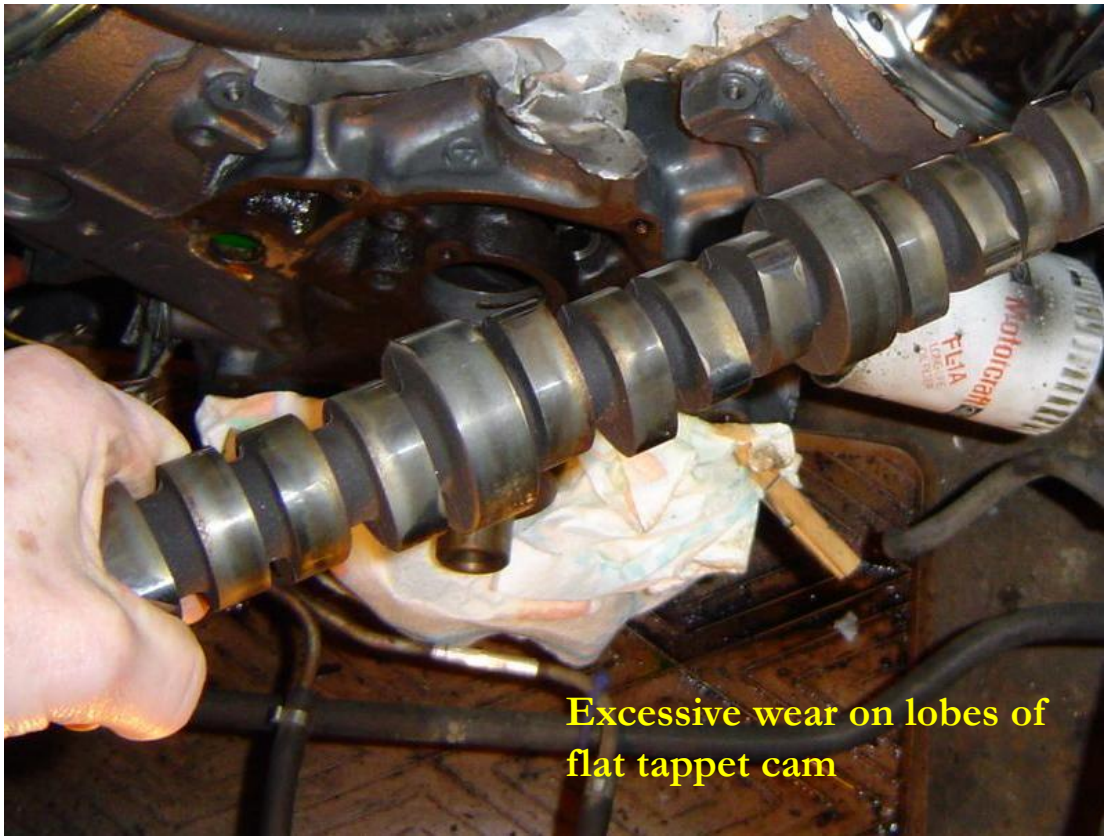
INTRODUCED IN 2001 as PENN GRADE 1 Racing Oil

"THE GREEN OIL" fast became its nickname

- INITIAL FOCUS – Engine Builders/Cam Manufacturers
- TRADE SHOWS (PRI, SEMA, Hot Rod & Restoration, Goodguys) /ADVERTISING
- INTERNET – Chat Rooms/Web Site/Word of Mouth/Grassroots following



FLAT TAPPET CAM



ROLLER CAM

Recommended by a majority of Cam Manufacturers' such as:

Crower Cams, Crane Cams, ISKY Cams, Schneider Cams, Chet Herbert Cams, Bullet/Ultradyne Cams, Lunati Cams, Koerner Cams, Howards Cams, Cam Motion, Cam Technique, Web Cams and others……

Mustang

Carroll Shelby's DenBeste Group

ROBERT YATES RACING ENGINES

Recently tested our 15W-40 against competitor synthetic oils. Chris Davy / Co-Owner / General Manager indicated: *“not only were we ‘on par’ with their top two oils, but outperformed all under heavy load*”. NASCAR-Approved Spec engine.

How about HTHS?

-Designed to measure the 'shearing' (loss of viscosity/retention of viscosity) of an oil at high temps and also gives an indication of film strength under highly stressed conditions.

-The higher the oil's HTHS value, the more the oil retains its viscosity AND film strength and the better the oil can protect bearings (moving parts) under these conditions.

Penn Grade 1 High Performance Oils are uniquely formulated for Street Rods, Hot Rods, Muscle Cars, Legacy/Vintage Cars, Classic Cars, Historic Cars and High Performance Race Engines.

Blending racing lubricants since 1967

D-A LUBRICANT COMPANY

Targeted/Intended Applications……

……Street Rods/Muscle Cars/Classic/Legacy

Rear mounted air-cooled engine

[Poor Man's Porsche]

The phrase refers to the engineering similarities between the low priced Chevrolet Corvair of the 1960s and the Porsche 356.

911 G

1974 - 1989

914

1969 - 1976

911 F

1964 - 1973

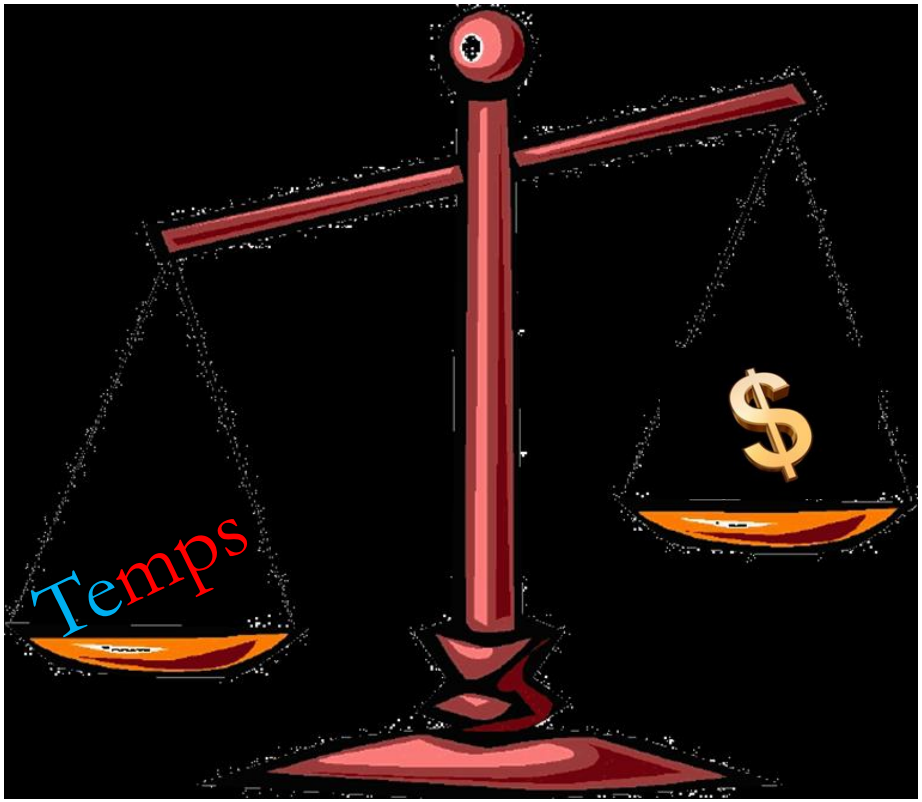
D-A LUBRICANT COMPANY

356

1948 - 1965

How about synthetics???

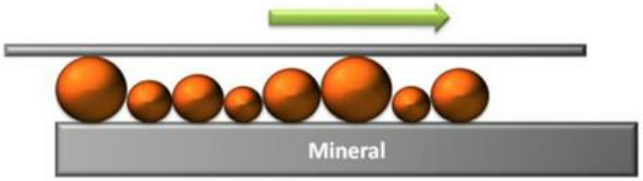
Weigh your options….

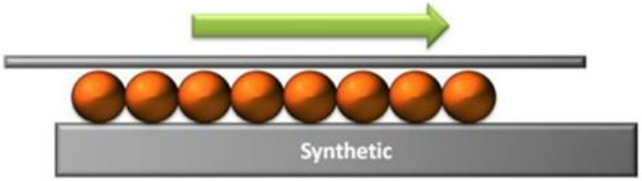


Advantages?

Disadvantages?

Synthetics (cont.)



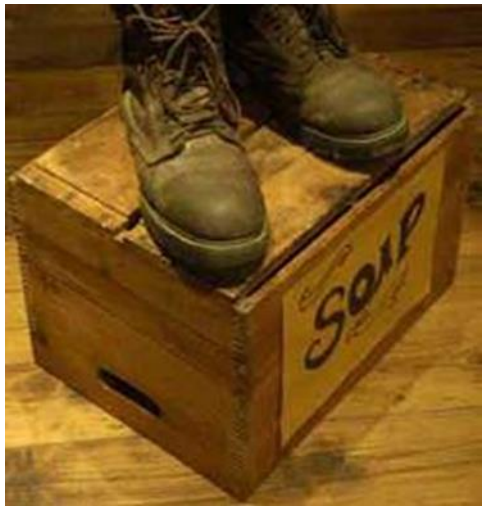


-Refined down to the molecular level, chemically produced, leaving molecules at a more consistent size and shape…planned and predictable properties. Void of any natural contaminants (sulfur, nitrogen, asphaltic constituents). PAOs, Diesters, Polyolesters Temps? Oxidation Stability? Drain intervals?

Government Involvement…

helpful

or harmful??



-Zn/P Percentages in Engine Oils

-Ethanol

High Zn Oils/Cat. Converters

-When an application utilizes pollution control equipment, the oil must be formulated to be compatible w/ the exhaust catalyst.

-High levels of Phosphorous are detrimental to the components of a catalytic converter used in today's modern vehicles to reduce emissions.

Cat. converters have been standard issue on cars since mid 70's.

-Use a small amount of catalyst to convert harmful engine emissions (nitrogen oxides/carbon monoxide) into less harmful ones (nitrogen/carbon dioxide).

-Platinum, being a precious metal, getting $$$ a troy ounce.

-Each cat. converter contains between 3 – 7 grams.

GM started to put catalytic converters on their vehicles and had to use unleaded fuel. They or not too many people didn't realized that the lead in the fuel also had a lubricating quality. Without the lead the valve stems were being chewed out at relatively low mileage of 30 to 50K.

FYI…E85

Back in 2011, when asked about E85, we were quick to recommend engine oils meeting API SN / ILSAC GF-5 requirements for FFVs. We were just as quick to recommend against E85 utilization w/older chemistry oils….oils like the PennGrade 1 High Performance. After considerable research and end user feedback, our stance on E85 has considerably 'softened' over the years. We are well aware of many end users (domestic / global) that utilize E85 w/ PennGrade 1 High Performance Oils without any issue whatsoever. It is NOT an issue to utilize E85 fuel with the Penn-Grade 1 oil(s)…..but one should always recognize that long, extended service / drain interval and poor idle static period maintenance will likely lead to gumming and/or deposit issues. A typical recommendation made for anticipated storage periods is to change the oil / filter and run regular unleaded gasoline…. not E85. Allow for this fresh oil and regular unleaded gasoline to acclimate and reside in system throughout storage. This is just good maintenance and will aid in the overall longevity of the engine

Cash for Clunkers Program

-Began July 24, 2009 with a budget of 1 billion. By July 30th was out of money. Another 2 billion was allocated but lasted until end of August. $3 billion in under a month!!

-By encouraging people to "junk" older vehicles, they lowered the supply of cheap used cars. When you lower supply and keep demand stable, the price goes up. With fewer used cars on the market, the prices for remaining used cars increases, making it difficult for younger drivers/low income drivers to buy cars to get to work and school.

-Salvage/Junk Yards…engines destroyed.

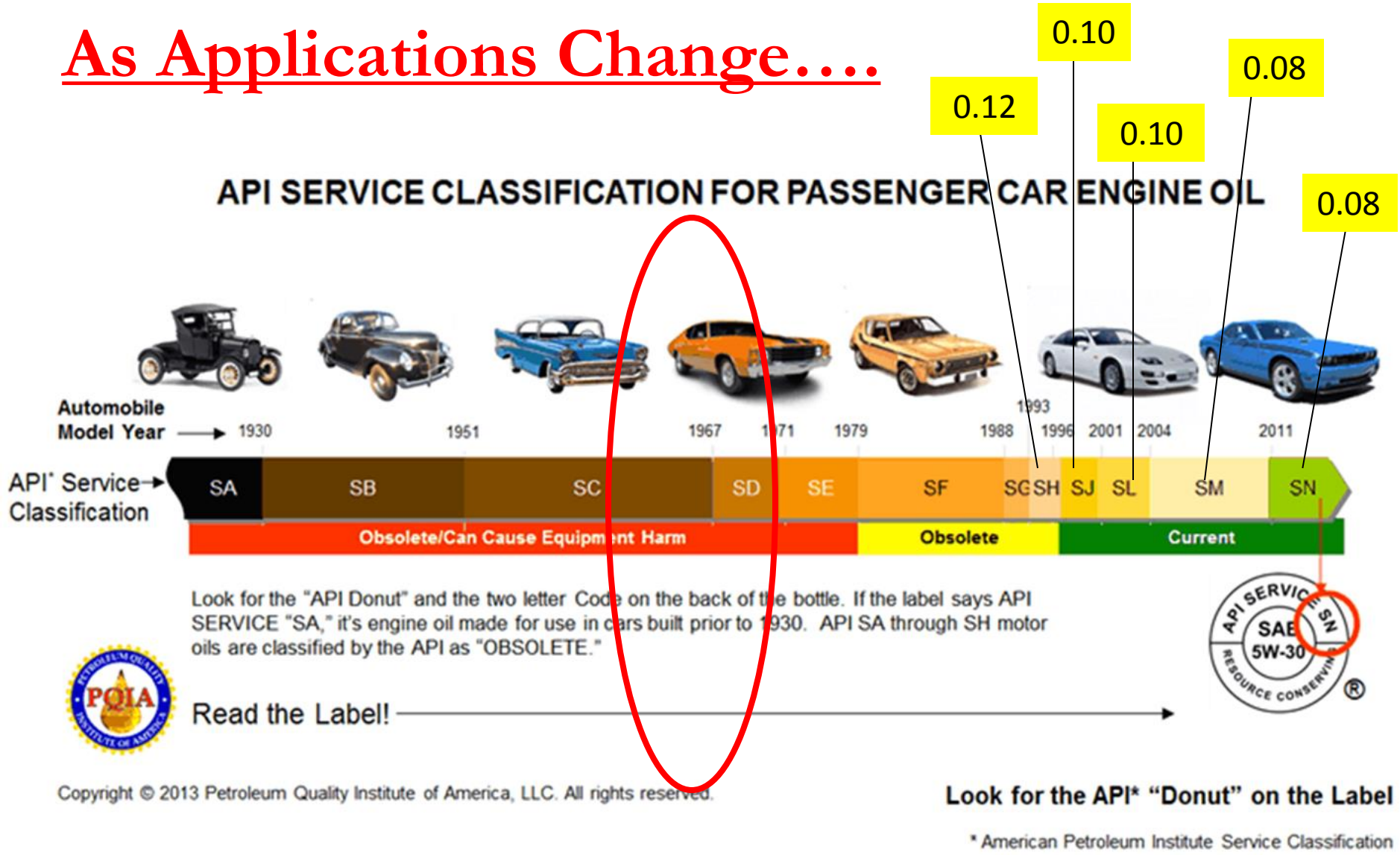
-Cost taxpayers $3 billion – or $24,000 per car sold

-Raised used vehicle prices close to $2000

-Top ten trade-ins: all domestic vehicles… 6 being 1994-99 model Ford Explorers

-Top ten new Cars: 6 imports, but Ford Focus #1

As Applications Change….



Penn Grade 1 High Performance Oils are available in:

Partial Synthetic SAE **0W-30**, SAE **5W-30**, SAE **10W-30**, SAE **10W-40**, SAE **15W-40** and SAE **20W-50.**

SAE **30**, SAE **40**, SAE **50**, SAE **60**, Nitro **70**, SAE **30** Break-In Oil, V2 4 Stroke Motorcycle Oils, Engine Assembly Lubricant, FS Hypoid Gear/Blower Racing Lubricant, Classic GL-4 Gear Lubricant and LS GL-5 SAE 80W-90.

Penn Grade 1 'CLASSIC' MP GL-4 Gear Lubricant:

Designed to be used with 'yellow' metallurgy (brass, bronze, copper) used in synchros, bushings, thrust washers and other soft metal components found in classic manual transmissions and transaxles. 80W-90

(Muncie, Rockwell, Borg-Warner, etc.)

Penn Grade 1 Limited Slip GL-5 80W-90:

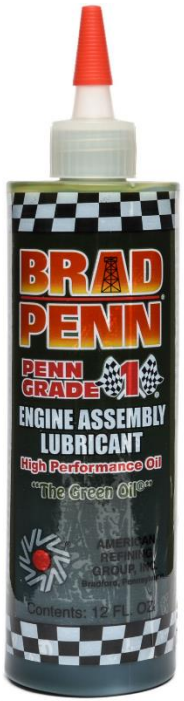
Designed for limited slip differentials in passenger cars, vans, SUV's, etc. Ideally suited for use in 'classic' car limited slip differential systems such as Chevrolet Positraction, Ford Traction-Lok, Pontiac Saf-T-Track, Mopar Sure Grip and similar apps.

Penn Grade 1 Engine Assembly Lubricant:

-Tacky/stringy nature, resistant to run-off, dripping from treated parts (frame rails/chassis). Adheres to internal parts/components

-Solubilizes with our Break In Oil and does not cause filter plugging as it uses no solids.

-AW inhibited / High film strength



Penn Grade 1 Break-In Oil:

-Designed and tailored specifically for one purpose.

-Contains perfect balance of AW/Detergency

-Ring material

-Non-Detergent vs.

Detergent, Varnish buildup

-PennGrade/Penn Grade 1 High Performance Oils are sold through a network of Independent Warehouse Distributors throughout the United States and Canada.

www.penngrade1.com

INDY 500 MAY 29, 2016™
PRESENTED BY: PENNGRADE MOTOR OIL

USA TODAY SPORTS

- PennGrade Motor Oil is the first presenting sponsor of the Indianapolis 500 via a multiyear agreement.
- PennGrade Motor Oil and parent D-A Lubricant Company have deep roots in Indiana. D-A Lubricant's history with the "500" dates to the 1950s.
- Announcement recognizes strength of iconic IMS brand and showcases more momentum for Verizon IndyCar Series.

BRAD PENN®

"The Green Oil"®

PENN GRADE 1®
HIGH PERFORMANCE OIL

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