



Lubricants Primer

May 2017



Forward Looking Statement

The following is a “safe harbor” statement under the Private Securities Litigation Reform Act of 1995: The statements made during the course of this presentation relating to matters that are not historical facts are “forward-looking statements” based on management’s beliefs and assumptions using currently available information and expectations as of the date hereof, are not guarantees of future performance and involve certain risks and uncertainties, including those contained in our filings with the Securities and Exchange Commission. Although we believe that the expectations reflected in these forward-looking statements are reasonable, we cannot assure you that our expectations will prove correct. Therefore, actual outcomes and results could materially differ from what is expressed, implied or forecast in such statements. Any differences could be caused by a number of factors, including, but not limited to, risks and uncertainties with respect to the actions of actual or potential competitive suppliers of refined petroleum products in HollyFrontier’s markets, the demand for and supply of crude oil and refined products, the spread between market prices for refined products and market prices for crude oil, the possibility of constraints on the transportation of refined products, the possibility of inefficiencies, curtailments or shutdowns in refinery operations or pipelines, effects of governmental and environmental regulations and policies, the availability and cost of financing to HollyFrontier, the effectiveness of HollyFrontier’s capital investments and marketing strategies, HollyFrontier’s efficiency in carrying out construction projects, the ability of HollyFrontier to acquire refined product operations or pipeline and terminal operations on acceptable terms and to integrate any recent and future acquired operations, including PCLI, the possibility of terrorist attacks and the consequences of any such attacks, general economic conditions and other financial, operational and legal risks and uncertainties detailed from time to time in HollyFrontier’s Securities and Exchange Commission filings. The forward-looking statements speak only as of the date made and, other than as required by law, we undertake no obligation to publicly update or revise any forward-looking statements, whether as a result of new information, future events or otherwise.

Integrated Lubricants Producer

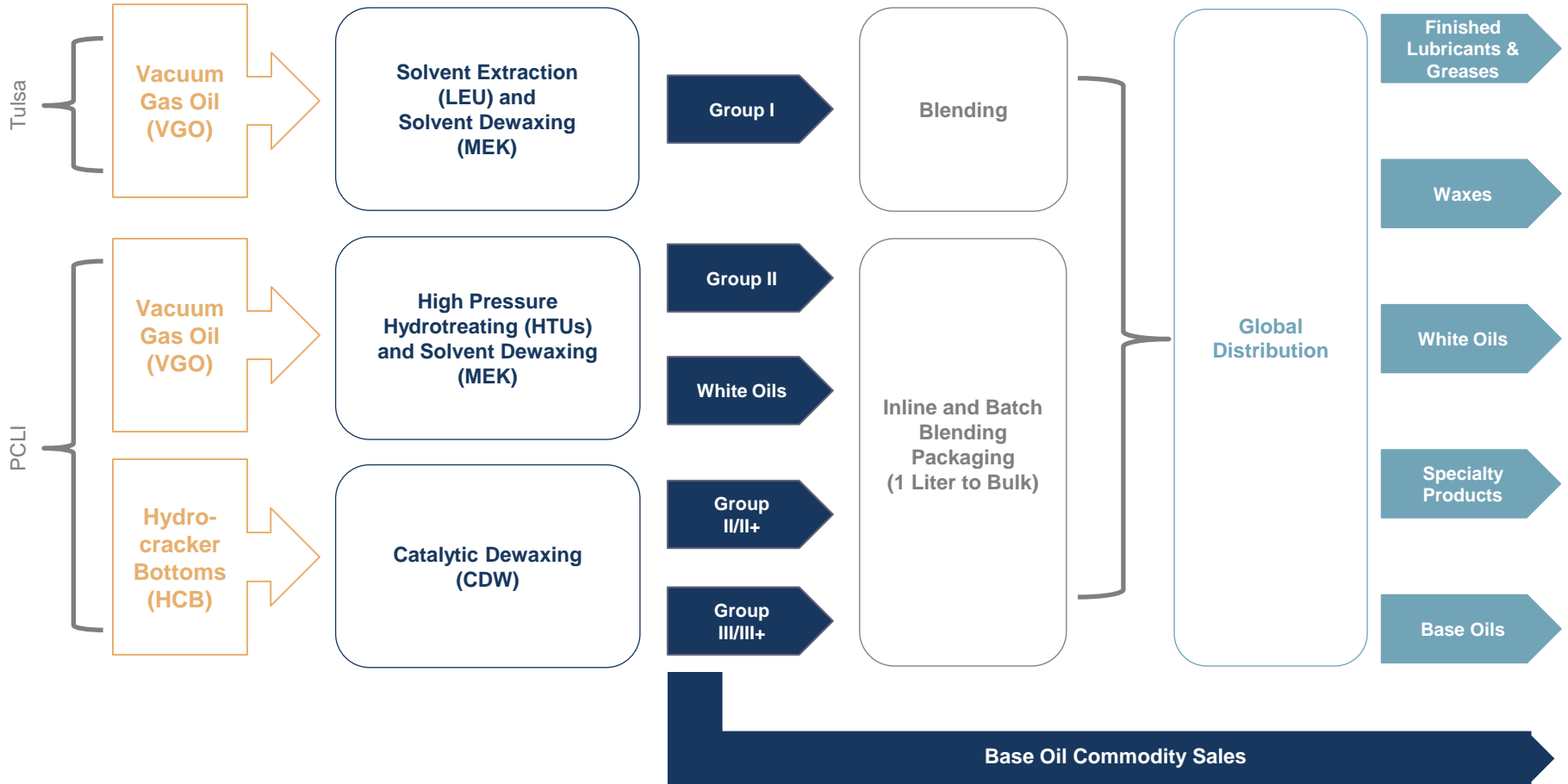
FEEDSTOCKS

BASE OIL PRODUCTION

BLENDED AND PACKAGING

GLOBAL DISTRIBUTION

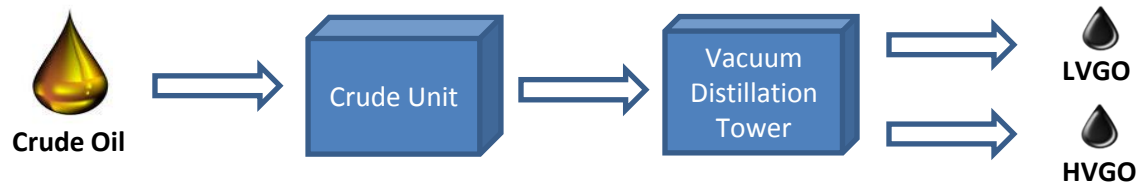
R&D and Product Development



Feedstocks

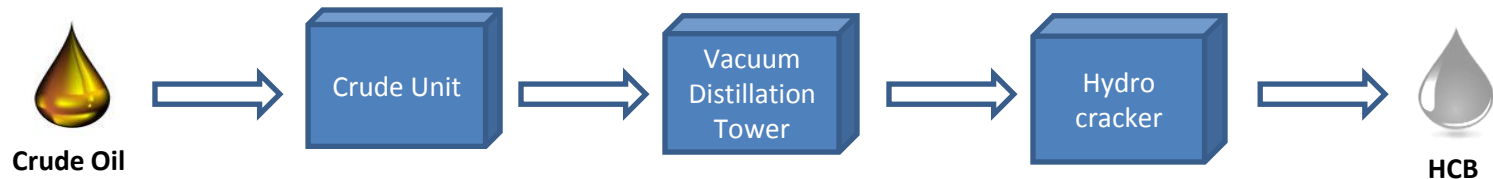
Vacuum Gas Oil (VGO)

- Intermediate stream produced by Vacuum Distillation Unit
- VGO is a dark colored, viscous material
- Light vacuum gas oil (LVGO) and Heavy vacuum gas oil (HVGO) are common streams from fuel refinery
- VGOs further processed through Hydrotreating Unit (HTU) → which removes wax by physical solvent dewaxing process
 - **Sourcing:** intermediate stream from domestic and international refineries
 - **Pricing:** VGOs generally price off of Gulf Coast gasoline crack



Hydrocracker Bottoms (HCB)

- Byproduct of hydrocracking Vacuum Gas oil, HCB is a waxy yellow viscous oil
- HCBs further processed through Catalytic Dewaxing Unit (CDW) → which transforms wax by catalytic process
 - **Sourcing:** European and North American imports & domestic refinery by-product
 - **Pricing:** HCBs generally price off of European diesel crack



Purchased 3rd Party Base Oils and Additives

- Used in blending & packaging process
- Ability to process and upgrade 3rd party Base Oils to extend the production pool

Base Oils

HollyFrontier & PCLI provide the broadest and purest slate of Base Oils for finished products and end customers



PURPOSE OF BASE OIL

- **Base Oil is the foundation** on which all lubricants are built
- **80% of a lubricant** is made up of Base Oil
- **Additives are blended with Base Oils** to make finished lubricants
- **In finished lubricants, Base Oil provides:**
 - Lubrication, typically measured by viscosity
 - A medium in which performance-enhancing additives can either dissolve or suspend
- **Impurities hinder the performance of the final lubricant, not allowing the additives to work at their best**
 - Impurities reduce life of lubricant
 - Impurities cause more wear on parts
- **The purer the Base Oil**, the better the final lubricant performance

BASE OIL CATEGORIES

- **Group I:** Produced by separation processes such as distillation, solvent extraction, and solvent dewaxing. This process produces Base Oils of superior innate solvency as well as the much-coveted bright stock. HollyFrontier produces a higher quality Group I Base Oil slate, as compared to industry standards¹
- **Group II & II+:** Processed through severe hydrotreating and hydrocracking to make Base Oils which contain lower levels of aromatics, sulfur, and nitrogen compared to Group I stocks
- **Group III & III+:** Highest quality Base Oil, severely hydrocracked under higher pressure and temperature. Viscosity Index above 120 allowing formulated lubricants to maintain properties longer, enabling improved fuel efficiency in low viscosity motor oils and providing energy efficiency in multi-grade industrial lubricants

1) HFC Group I Base Oil has 85%-89% saturate content vs. industry standard range of 69%-89%

HFC & PCLI Base Oil Quality

KEY CHARACTERISTICS OF BASE OILS

Viscosity:

Measures a fluid's resistance to flow

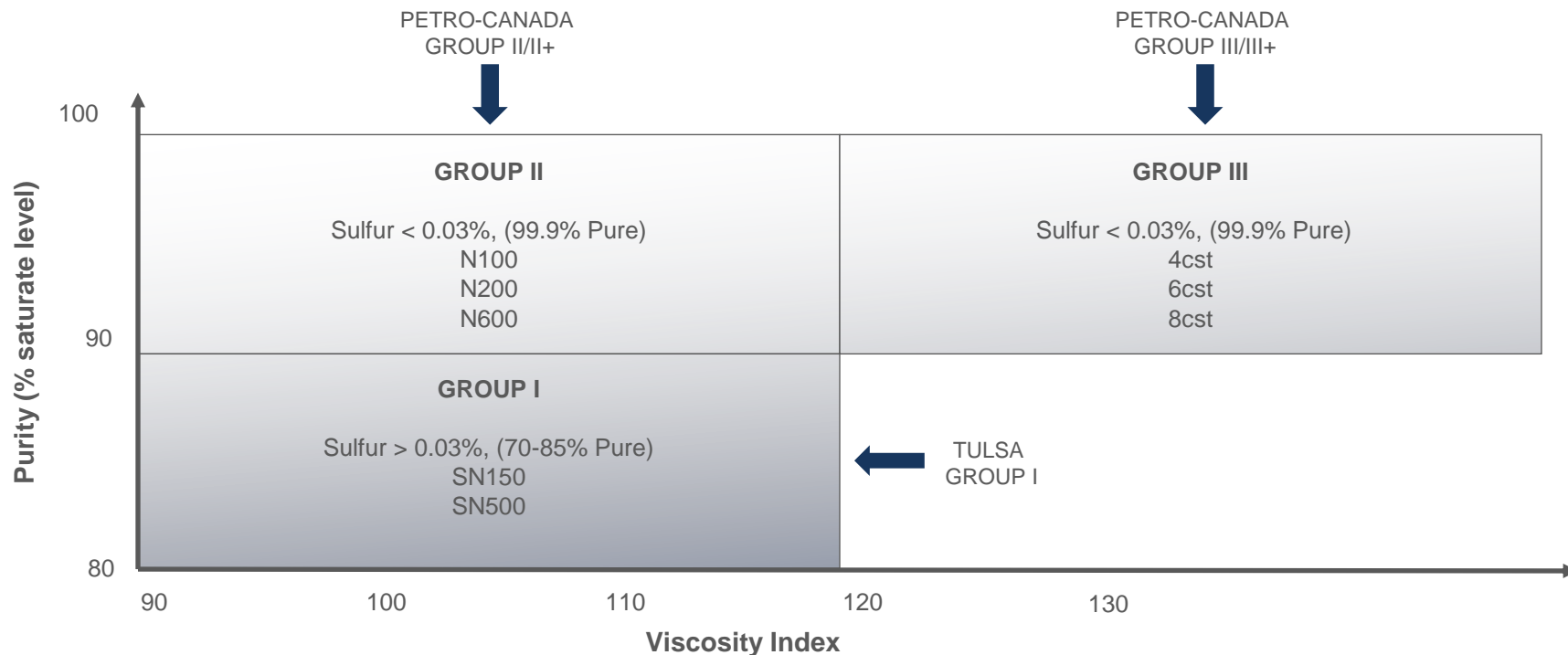
Viscosity Index (V.I.): Describes a fluid's tendency to thin as the temperature rises

- Higher the V.I., the less the viscosity changes due to temperature change

Purity:

Level of saturates in a Base Oil vs. impurities (aromatic molecules including sulfur and polar compounds)

- Higher the Purity, the longer the Base Oil will last



Research & Development

MISSION

Develop, implement and promote high value innovative products that go beyond today's standards

- Over 300 years of combined experience with 7 Ph.D. and 3 Professional Engineer team members
- Received international business “Stevie Award” for best new business-to-business product (SENTRON LD8000) in 2014



ULTRA PURE GROUP II, II+, III & III+ BASE OILS

- 99.9% pure – virtually no impurities
- Highly stable in intense engine and equipment environments
- Handles temperature extremes
- Superior resistance to oxidation



SPECIALLY SELECTED ADDITIVES

- Anti-wear and protection
- Rust and corrosion protection
- Thermal and Oxidation stability
- Viscometric control

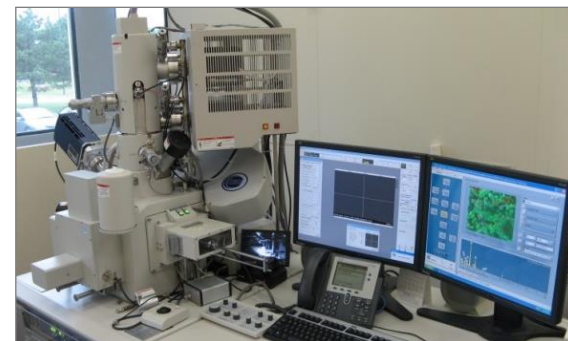


PRODUCT POINTS OF DIFFERENCE (PODS)

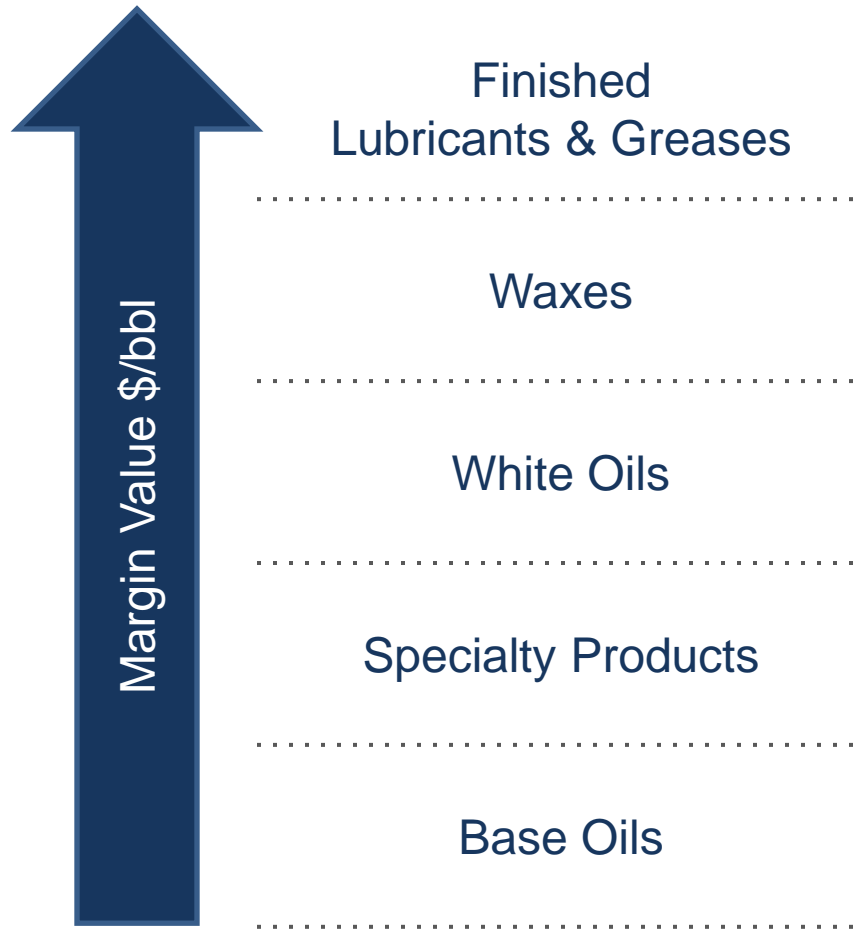
- Better wear protection – longer engine and equipment life
- Superior resistance to high temperature thermal breakdown resulting in lower maintenance costs
- Outstanding low temperature fluidity – smoother engine and equipment startups
- Energy efficiency – products stay in grade longer

EQUIPMENT AND FACILITIES

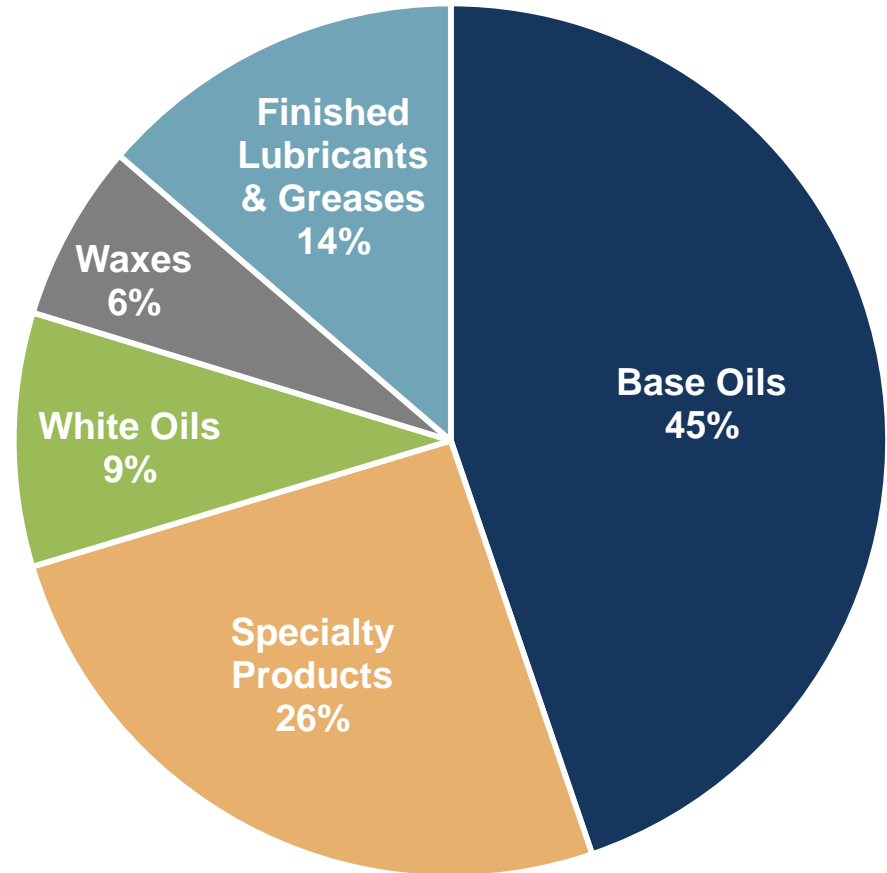
- We continue to invest in state-of-the art equipment at our research and development facility
- On-site analytical and bench test facility
- We leverage with a network of institutions and experts at selected universities, ISO accredited external labs and testing facilities and utilize partnerships with our additive suppliers



Product Overview



Consolidated Product Sales 2016



Finished Lubricants/Greases

Finished lubricants and greases are blended from Base Oils and exhibit superior performance in many key properties, including:

- Viscosity Retention
- Oxidation Resistance
- Thermal Stability
- Reduced Environmental Impact

HFC & PCLI produce over 350 different finished lubricant products with various applications such as motor oil, hydraulic fluids, turbine fluids, mining & specialty greases, gear oil and food-grade lubricants



DURON™

- Our flagship line of heavy duty engine oils
- Specialty formulated diesel engine oils provide exceptional protection against engine wear
- Engineered to succeed in extreme off- and on-road conditions
- Improve reliability, extend drain intervals and cut fuel costs



HYDREX™

- Fluids used for the lubrication in high-performance hydraulic systems such as industrial plants, utility trucks and construction equipment
- Protects against accelerated oil degradation and oxidation, extending equipment life
- Made for applications operating at high pressures and in wide temperature ranges



PRECISION™

- Greases are solid to semi-solid materials designed to lubricate where a continuous supply of oil cannot be maintained
- Provides protection in a wide range of automotive and industrial applications – used in wheel bearings on race cars



Specialty Products

Finished lubricant products sold in commercial quantities by rail car or truck loads

- PCLI does not offer many of these specialty products in retail package sizes, but sells to other companies that package and distribute these products



PureDrill™

- Synthetic drilling mud base fluid developed for onshore and offshore drilling
- Maximizes drilling efficiency while improving health, safety and environmental practices due to purity level of base oil in product
- Clear like water and biodegradable
- Provides exceptional temperature fluidity for deep and horizontal well applications



SunSpray® MLO

- Product used to control mosquito larvae
- Mosquito larvicide oil is applied via ground, aerial and airblast methods



CIRCOSOL®

- Aromatic process oil designed for wide variety of applications in the rubber industry
- Used as a process oil in tire tread formulations
- Proven to shorten stopping distances and provide additional tire wear protection



White Oils

Sourced from our own base oil supply and produced using the HT PURITY Process

- Food grade white mineral oils are specifically designed for agricultural and food processing industries
- Among the most versatile petroleum products with a wide array of applications

PURETOL™

- Line of white oils that meet rigorous food, cosmetic and pharmaceutical industry safety standards for both direct and indirect food contact
- PURETOL 7: Primary ingredient in baby oil to create a barrier between skin and the air to prevent skin from drying out
- PURETOL 9: Used in denture adhesives & pharmaceutical capsules
- PURETOL 19: Used in topical creams (i.e. antibiotic ointment)
- PURETOL 35: Used as a coating on confectionary “gummy-candies” to eliminate adhesion



PURITY™

- Lubricants designed to meet food industry safety standards for incidental food contact during the manufacturing process
- PURITY FG WO White Mineral Oil 15: Sprayed on food processing equipment after it has been sanitized to prevent equipment rusting
- PURITY FG WO White Mineral Oil 90: Used in drinking water treatment applications (i.e. well pump lubricant)



KRYSTOL™

- Technical grade white oil generally used in nonfood applications but still meets FDA standards for indirect food contact
- KRYSTOL 20: Oil used in mosquito repellent fuel for tiki torches
- KRYSTOL 350: Used in pressure sensitive adhesives (i.e. sticky notes)



Waxes

Derived from the de-waxing phase in the refining process. Waxes are solid at ambient temperature and become liquid when melted

- Our waxes are solvent-refined at both our Tulsa, OK and Mississauga, Ontario refineries, and imported into our terminal in Brownsville, TX
- We have the capability to custom blend waxes to meet customer specific requirements
- HFC has become the go-to source for high performance waxes differentiated by their varying degrees of melting points:

Paraffin Wax

- Used as the main ingredient in the manufacture of candles
- Used in hot melt adhesives for food packaging sealants
- Low oil content and high percentage of normal paraffin gives the waxes superior moisture barrier properties



Microcrystalline Wax

- Used in high-gloss printing inks
- Used in rust prohibitive coatings for steel and automotive materials
- Can also be sold to other downstream processors for further refining into FDA approved products in the cosmetic, home care, and pharmaceutical industries



Slack Wax

- Used in resin for the manufacture of composite boards such as particleboard
- Used in weather protection coatings for wood-based building materials
- Higher oil content, but lower melting point compared to paraffin and microcrystalline wax



Lubricants Index



HOLLYFRONTIER
CORPORATION

Lubricants Index

VGO Based Base Oil Crack	1Q 2017				2Q 2017				3Q 2017				4Q 2017			
	Jan	Feb	Mar	1Q17	Apr	May	Jun	2Q17	Jul	Aug	Sep	3Q17	Oct	Nov	Dec	4Q17
Group I	\$10.13	\$11.56	\$22.51	\$14.73												
Group II	\$18.73	\$20.19	\$29.85	\$22.92												
Group III	\$56.21	\$56.41	\$70.44	\$61.02												

The preceding data is for informational purposes only and is not reflective or intended to be an indicator of HollyFrontier's past or future financial results. This data is general industry information and does not reflect prices paid or received by HFC. The data was compiled from publicly available information, various industry publications, other published industry sources, including OPIS and Argus, and our own internal data and estimates. Although this data is believed to be reliable, HFC has not had this information verified by independent sources. HFC does not make any representation as to the accuracy of the data and does not undertake any obligation to update, revise or continue to provide the data.

Lubricants Index Appendix

HFC's actual pricing and margins differ from benchmark indicators due to many factors. For example:

- Retail- HFC and PCL use commodity base oils to produce finished lubricants, specialty products and white oils that are sold into the retail market worldwide and have a wide variety of price ranges.
- Feedstock differences – HFC runs a variety of vacuum gas oil streams and hydrocracker bottoms across its refining system and feedstock slate may vary quarter to quarter.
- Product Yield differences – HFC's product yield differs from indicator and can vary quarter to quarter as a result of changes in economics and feedstocks.
- Other differences including, but not limited to secondary costs such as product and feedstock transportation costs, quality differences and location of purchase or sale. Moreover, the presented indicators are generally based on spot commodity base oil sales, which may differ from realized contract prices.

Market prices are available from a variety of sources, each of which may vary slightly. Please note that this data may differ from other sources due to adjustments made by data providers and due to differing data definitions. Below are indicator definitions used for purposes of this data.

Group I Base Oil Indicator	(50% Group I SN150, 50% Group I SN500)-VGO
Group II Base Oil Indicator	(33.3% Group II N100, 33.3% Group II N220, 33.3% Group II N600)-VGO
Group III Base Oil Indicator	(33.3% Group III 4cst, 33.3% Group III 6cst, 33.3% Group III 8cst)-VGO
VGO	(US Gulf Coast Low Sulfur Vacuum Gas Oil)

Statements made and information that are not historical facts are "forward looking statements" within the meaning of the U.S. Private Securities Litigation Reform Act of 1995. Forward-looking statements are inherently uncertain and necessarily involve risks that may affect the business prospects and performance of HFC, and actual results may differ materially from estimates. Such risks and uncertainties include but are not limited to actual 1Q15 crude charge differing from the Company's expectations, the demand for and supply of crude oil and refined products and the spread between market prices for refined products and market prices for crude oil. Additional information on risks and uncertainties that could affect the business prospects and performance of HFC is provided in the

Definitions

Viscosity: measure of a fluid's resistance to flow. It is ordinarily expressed in terms of the time required for a standard quantity of the fluid at a certain temperature to flow through a standard orifice. The higher the value, the more viscous the fluid. Since viscosity varies inversely with temperature, its value is meaningless unless accompanied by the temperature at which it is determined.

Centistokes (cSt) : a unit of kinematic viscosity, one hundredth of a stokes. In practice, measurements are usually stated in centistokes, not stokes.

SN (Solvent Neutral) : SN is used to describe the viscosity levels in Group I Base Oils.

Hydrocracking: the elimination of aromatics and impurities by chemically reacting the feed stock with hydrogen in the presence of a catalyst at high temperature (400°C and high pressure (3000 psig). This process removes the polar compounds, converts the aromatic hydrocarbons to saturated cyclic hydrocarbons, and breaks up heavy molecules into lighter saturated hydrocarbons.

Saturates: saturated molecules contain a higher percentage of carbon-hydrogen bonds, which is beneficial in lubricating fluids because those bonds remain stable longer, resulting in a more durable lubricant. The higher number of saturates, the higher molecular bond strength of the oil and therefore, the better the resistance to breakdown or loss of viscosity.

Aromatics: aromatics are considered unsaturated compounds (impurities) because the viscosity of aromatics respond relatively poorly to changes in temperature and can shorten the useful life of a base oil. Aromatics are removed from base oil during the hydrotreating process.

Polar Compounds: impurities in a base oil that are eliminated in the hydrocracking and hydrotreating process.

Oxidation: a form of chemical deterioration when oxygen is combined with a lubricant. Oxidation will lead to an increase in the oil's viscosity and deposits of varnish and sludge. The rate of oxidation is dependent upon on the quality of base oil used and is accelerated by high temperatures, water, acids and catalysts such as copper.

ISO Accredited Lab: meets the strict standards (quality, safety, performance etc.) as set forth by the International Organization for Standardization.

Process Oil: process oils are used as a raw material component in a large variety of finished products in the chemical and manufacturing industry.

Hydrotreating Unit (HTU): processes vacuum gas oil (VGO) streams that have been fractionated from crude oil but not hydrotreated. The HTU eliminates aromatics and polar compounds by reacting the feedstock with hydrogen in the presence of a catalyst at high temperatures and pressures. The HTU produces exceptionally high quality basestocks including Group II base oils and pharmaceutical grade white oils.

Catalytic Dewaxing Unit (CDW): a high-pressure hydrogen and catalyst system that isomerizes feedstock into high quality basestock with excellent low temperature properties. This CDW produces exceptionally high quality Group II/II+/III/III+ basestock and technical grade white mineral oils.

Isomerization: process employs a specialized catalyst to selectively rearrange the atoms in wax molecules (n-paraffin mixture) to yield base oils with higher VIs and improved yields, compared to previous conventional dewaxing techniques. The process is capable of producing 130 VI base fluids.

Bright Stock: base oil at the upper end of the specifications for Group I base oils (85-89% saturates).

Methyl Ethyl Ketone (MEK): a solvent dewaxing process that separates the wax portion of the feedstock from the oil portion. This process produces waxes and base oils.

Lube Extraction Unit (LEU): solvent extracting process that prepares the feedstock for the MEK unit by removing low V.I. material; producing a higher V.I. MEK feed.

Paraffins: a waxy solid substance containing a mixture of saturated hydrocarbons that is obtained from the vacuum distillation process.

Vacuum Distillation: process of further refining heavy hydrocarbons into LVGO and HVGO. The distillation column is placed under a vacuum, which reduces that boiling point low enough so that lighter products can vaporize without cracking, or degrading, the oil.

Thermal Stability: measure of a base oil's resistance to heat. Higher thermal stability leads to reduced deposits and cleaner equipment internals.

Synthetic Lubricants : lubricants manufactured by a process, where a chemical conversion or transformation of one complex mixture of molecules into another complex mixture takes place.



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