

***New US EPA Regulations:
Environmentally Acceptable Lubricants
Vessel General Permit - VGP
Small Vessel General Permit – sVGP***

Presented by:



Scott Southworth

Southeast Territory

American Chemical Technologies, Inc.

2013 VGP Released Last Week...Now What?

Very Important Change In Verbage

- 2008 VGP's required **Environmentally *Friendly* Lubricants**
- 2013 VGP has changed from EFL to EAL – Environmentally Acceptable Lubricants

US EPA – White Paper

- EPA contracted an independent lab to conduct a battery of tests with the purpose of drafting a White Paper
- The purpose of this document was to describe the range of environmentally preferable lubricants that may be used as a best management practice (BMP) by operators of vessels covered under the Vessel General Permit for Discharges Incidental to the Normal Operation of Vessels (VGP / sVGP)
- The document defines what they are calling “Environmentally Acceptable Lubricants” – EAL’s
 - Differentiating them from “Environmentally Friendly Lubricants”
 - White Oils now fit into the EFL category

US EPA - “Environmentally Acceptable Lubricants”

Goal: Provide Reduced Environmental Impact Compared to Conventional Lubricants – 3 Categories

- Superior Biodegradation
 - Process of chemical breakdown of oil caused by organisms or their enzymes into carbon dioxide and water
- Reduced (Aquatic) Toxicity
 - Concentration in ppm or milligrams per liter that kills a given % of the species being tested
- Bioaccumulation
 - The build-up of chemicals within the tissues of an organism over time.

US EPA – White Paper – Test Protocol

- “Readily” Biodegradable
 - “> 60 % biodegraded on OECD 301 A-F”
- “Low (Aquatic) Toxicity”
 - OECD 201 – 212
 - Food chain - Algae / Daphnia / Fish
- “Non-Bioaccumulative”
 - OECD 107 & 117
 - Partition Coefficients of $\text{Log } K_{ow} < 3.0$

White Paper - Conclusions

- Because the majority of a lubricant is composed of the base oil, (3) types that are biodegradable were identified as EAL's:
 - Vegetable Oil
 - Synthetic Ester
 - Polyalkylene Glycol

Vegetable Oil

PRO's

- Least Costly EAL
- Renewable Content
- Compatible with Petroleum base oils
- Good Lubricity
- Non-bioaccumulative
- High Flash Point
 - Some are FM Approved

CON's

- Poor Performance at both low and high Temperature
- Hydrolytically Unstable
 - Reacts with water
 - Produces Acid as byproduct
- Unsaturated molecule
 - Reacts with catalysts to form sludge/varnish as decomposition products
- Poor Oxidation Stability
- Sheen

- Short Life Cycle
 - 12-18 months

Synthetic Ester

PRO's

- High Viscosity Index
- Long Life Cycle
- Good Oxidation Stability
- Good Lubricity
- Compatible with Petroleum base oil
- Non-bioaccumulative

CON's

- Highest Price EAL
- Hydrolytically Unstable
 - Reacts with Water
- Paint Compatibility
- Seal Compatibility
- Sheen

Polyalkylene Glycol - PAG

PRO's

- Best High/Low Temperature Properties
- Inert to Water
 - Limits - 1.5% salt 2.5% fresh
- Good Lubricity
- Chemically incapable of producing varnish
- Non-Sheening
 - Heavier than water
 - Water Soluble
- Non-bioaccumulative
- Factory Mutual Approved

CON's

- Paint Compatibility
- Seal Compatibility
- 3-4 times price of conventional petroleum oil

VGP – Language Pertaining to EAL's

- VGP - Vessels 80' and longer
 - 2.2.9 Controllable Pitch Propeller and Thruster Hydraulic Fluid and Other Oil-to-Sea Interfaces Including Lubrication Discharges from Paddle Wheel Propulsion, Stern Tubes, Thruster Bearings, Stabilizers, Rudder Bearings, Azimuth Thrusters, Propulsion Pod Lubrication, and Wire Rope and Mechanical Equipment Subject to Immersion
 - Page 43

sVGP – Language Pertaining to EAL's

- Vessels 79' and shorter
 - **2.3 ENGINE AND OIL CONTROL**
 - (h) Unless technically infeasible, you must use environmentally acceptable lubricants (as defined in Part 6 of this permit) in all machinery and equipment, including but not limited to stern tubes, wires, and two-stroke engines, where discharges of oil to surrounding waters are likely to occur.
- Page 4

Time Frames – VGP/sVGP

- “All Vessels constructed on or after December 19, 2013 must use an environmentally acceptable lubricant in all oil-to-sea interfaces”.
- “For all vessels built before December 19, 2013, unless technically infeasible, owner/operators must use an EAL in all oil-to sea interfaces”.
 - Technically Infeasible
 - Equipment must be “retrofitted” to accept EAL
 - If EAL significantly degrades performance
 - If deemed Technically Infeasible, owner/operator must document why they cannot use EAL, and must note the use of a non-EAL in the vessel’s Annual Report.
 - “Lastly, any discharge of oil, including oily materials, from any of these oil-to-sea interfaces may not result in a discharge that may be harmful as defined by 40 CFR Part 110 or result in the production of a visible sheen”.
 - Proposed 2013 VGP Fact Sheet, Page 136
 - Note: Dispersants, detergents, emulsifiers, chemicals or other substances that remove the appearance of a visible sheen may not be added to the bilge.
 - sVGP – Section 2.3 ENGINE OIL CONTROL, (j)



THANK YOU
