

# Readily Biodegradable Solutions Meet Environmental, Performance Challenges for Dredging Operators

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# RSC Overview



*Radiator Specialty Company*

- Diversified, family-owned private enterprise
- Deeply experienced formulator, manufacturer and distributor of cleaners, lubricants and functional fluids
- Family of trusted brands



*A separate, connected platform*

- Full array of innovative lubricating and cleaning products & services that delivers superior performance and systems savings without sacrificing environmental safety
- Leverages the strength and reach of RSC, investing in emerging and advanced technology and creating new-to-the-world solutions

*Partners and Investments*



**Terresolve Technologies**

- Founded in 1996
- Acquired in 2012
- Leader in biodegradable, high-performance industrial lubricants



**Gemtek Products**

- Exclusive technology license
- Proprietary biobased surfactant blends and solvents



**Sorbent Green**

- Exclusive distribution rights
- High performance and safe absorbent technology



# Introduction to RSC Bio Solutions

## Key Markets Served



Offshore Oil & Gas



Transportation



Construction



Utility Fleets



Wind Power



Waste



Turf

Applications which demand high levels of performance and benefit from risk reduction RSC BIO Solutions offer.



# Dredging Industry Challenges

- **Unauthorized Fluid Discharges**
  - Leaks far outpace catastrophic events
  - Have to be reported, cleaned up
  - Difficult to prevent
- **Consequences of Spills**
  - Lost productivity
  - Costly fines, remediation
  - Damage to environment
  - Negative public relations



2013 VGP changes are designed to address this issue.





# U.S. EPA

## Vessel General Permit 2013

### Applicable to:

- All commercial vessels > 79 ft
  - New builds: at time of construction
  - Existing assets: at next dry dock
- Recommended, not yet mandated, for vessels < 79 ft
- Operating within three nautical miles of
  - U.S. Coastline
  - Great Lakes
  - Inland Waterways





# U.S. EPA

## Vessel General Permit 2013

### Requires all vessels to use:

- Environmentally acceptable lubricants (EALs) in all oil-to-sea interfaces unless technically infeasible
- Cleaners and detergents for deck washdowns are required to be phosphate free (permit p. 112) and non toxic
- VGP maintains regulations on “sheen” originating from EPA Oil Pollution Act (OPA 90 – 1990)





# U.S. EPA

## Vessel General Permit 2013

### Oil to Sea interfaces include:

- Oil-lubricated stern tubes
- On-deck, underwater or submerged machinery
  - hydraulic cutters
  - cranes
  - thruster bearings
  - wire ropes
  - CPP propellers
  - Z drives
  - dump barges
  - excavators

**Any component with potential to leak lubricants is included.**

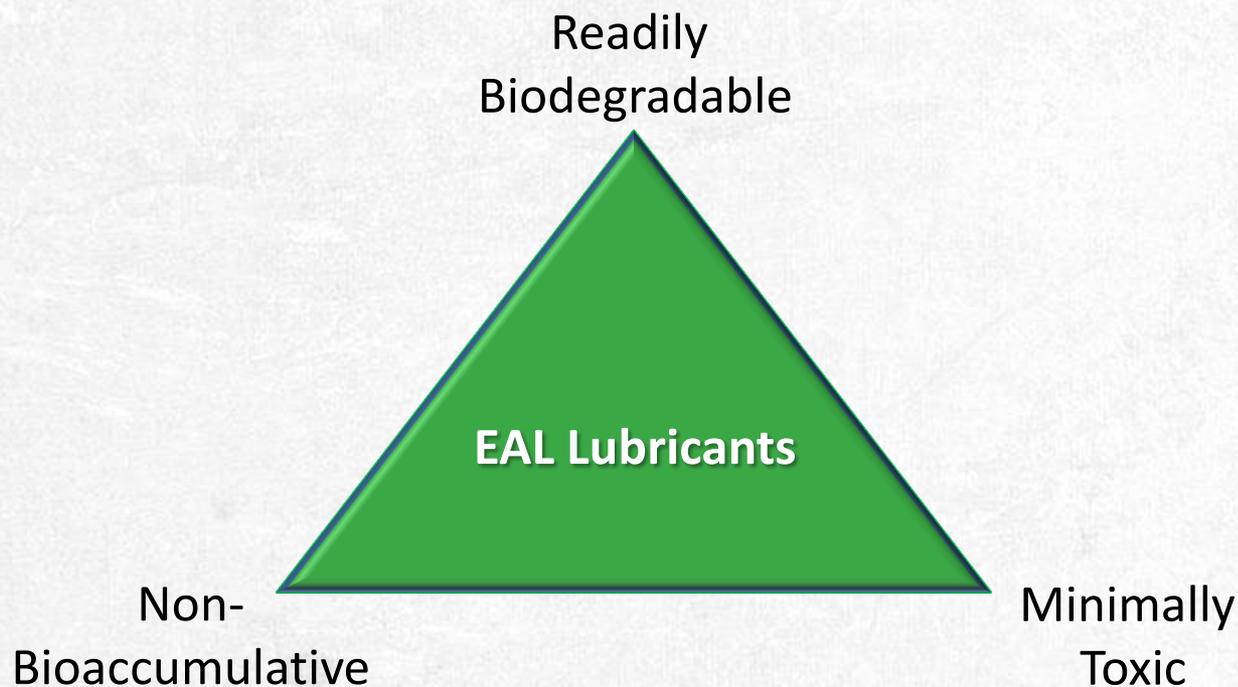




# US EPA

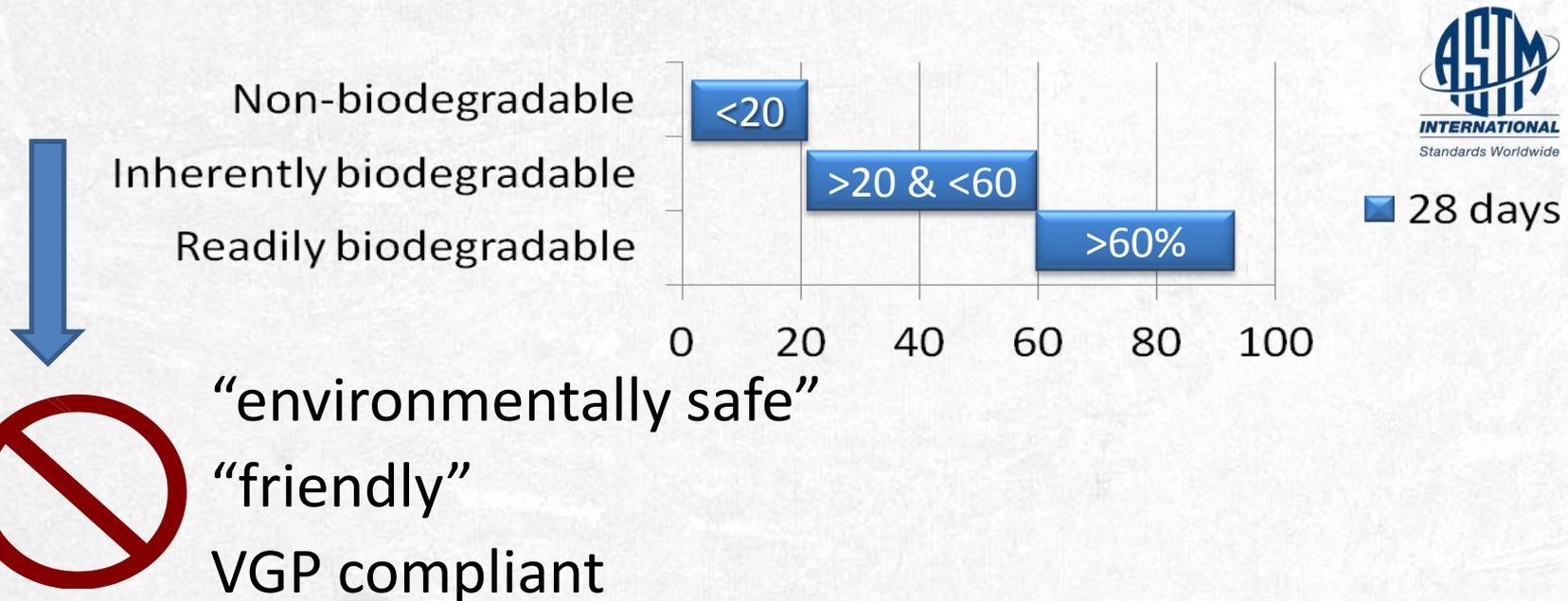
## Vessel General Permit 2013

### How does the EPA define EALs?



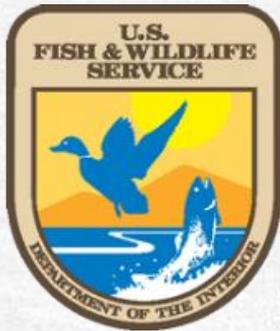
# Biodegradation: Commonly Misused Term

- **Not all solutions are the same**
  - Biodegradation according to ASTM definition



# Aquatic Toxicity

- U.S. Fish and Wildlife Classification
  - Used to categorize by Exposure, Lethal Limits 50 values



Toxicity Classifications	
Relative Toxicity	Aquatic EL50 or LL50 (mg/L)
Super Toxic	< 0.01
Extremely Toxic	0.01 - 0.1
Highly Toxic	0.1 - 1.0
Moderately Toxic	1.0 - 10
Slightly Toxic	10 - 100
Practically Non-Toxic	100 - 1000
Relatively Harmless	> 1000

***EnviroLogic Products are classified as Relatively Harmless.***



# Viability Alternatives Can Reduce Cost

## Environmentally acceptable lubricants (EALs)

### – Don't

- Eliminate the spill occurrence
- Eliminate the need to report
- Eliminate the need to clean up

### – Do

- Perform equal to or better than petroleum based lubricants
- Mitigate the discharge's impact
  - Environmental
  - Regulatory

**Improved Productivity = Improved Profitability**



# Four Misperceptions about EALs

- “All EALs are the same”
- “HEPR type fluids are not biodegradable”
- “All EALs are technically infeasible”
- “EALs are not compatible with seals and other lubricants”



# Truth: There Are Four Classifications of EALs Recognized By VGP and ISO

## ISO 6743/4

- Hydraulic Environmental Triglycerides (HETG)
- Hydraulic Environmental Polyalkylene Glycols (HEPG)
- Hydraulic Environmental Synthetic Esters (HEES)
- Hydraulic Environmental PAO (polyalphaolefins) and related products (HEPR)

Particular application factors affect EAL selection.



# Conventional Vegetable Fluids (HETG)

- Good Frictional Characteristics and Viscosity Index
  - Shorter oil life expectancy than time between dry docks
- Oxidative Stability
  - Under high temperature application more susceptible to oxidation
- Hydrolytic Stability
  - More prone to hydrolysis in the presence of water (typically > 1%)
- Care must be taken



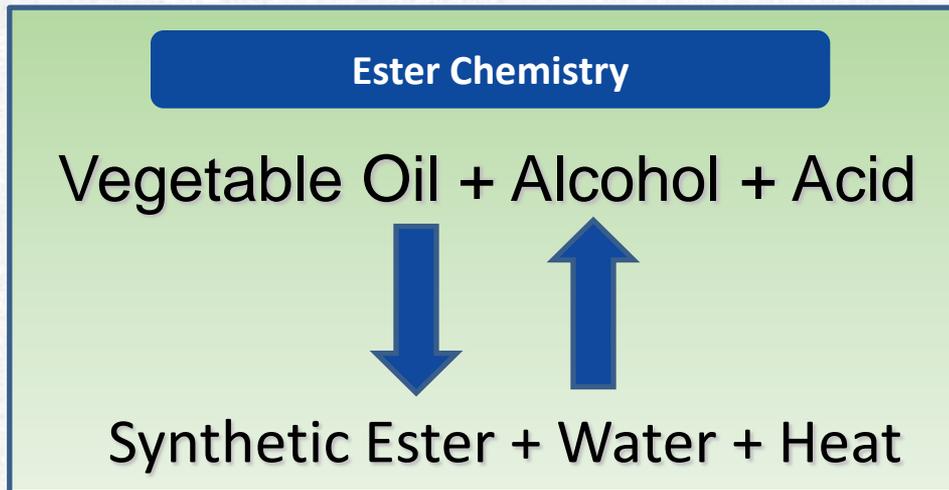
# Polyalkylene Glycol Synthetic (HEPG or PAG)

- Fire Resistant
- Not Compatible with Conventional Seals or Filters
- Not Compatible with Petroleum, Vegetable, Ester-based Oils
- Absorbs Water (creates rust and acid)



# Synthetic Esters (HEES)

- Hydrolytic Unstable
  - “unzips” with water
  - forms acid
- Seal Deterioration



# Bio-polyolefin Synthetic (HEPR)

- Durable
- Low Cost/Long Fluid Life
- Separates From Water
- Good Seal Compatibility
- Broad Temperature Range

Many EnviroLogic EAL offerings are HEPR type.



# Conclusions

- Many factors to consider when deciding to convert to readily biodegradable lubricants
- A readily biodegradable lubricant may be more expensive initially, but could save money in the long term
- Readily biodegradable lubricants have been proven in the field with performance equivalent to petroleum based fluids



# Questions?

## Thank You!

For more information, please contact  
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