



## Our Vision

Be the most respected and innovative Biobased lubricant company, which contributes to society and the environment through our high-quality products & services.



## Iowa Law Provides Incentive for Soy-based Metalworking Fluids



Left Picture, From Left to Right: Lowell Norland, Consultant; Penny Hauser, Administrative Assistant; John Jensen, Retired State Senator; Mike Jensen, Product Manager; Dr. Kasturi Lal, Director of Technology; Shashi Lal, Consultant; Shereena Honary, Assistant; Governor Tom Vilsack; Dr. Lou Honary, President and CEO; Ron Kearse, Sales Representative; Gary Bolhuis, Sales Representative; Gene Tripp, Sales Manager

Right Picture, From Left to Right: William Serbousek, Facility Manager, PMX Industries, Inc., Cedar Rapids; John Roth, Supervisor, PMX Industries, Inc., Cedar Rapids; Governor Tom Vilsack; Dr. Lou Honary, President and CEO

A bill that gives a \$2 per gallon income tax credit to companies that convert their metalworking shops to use soybean oil-based lubricants instead of conventional fluids has been signed into law by Gov. Tom Vilsack. "Soy-based lubricants are a wonderful example of university research being used to create economic opportunities throughout Iowa," Vilsack said in a news release issued by the University of Northern Iowa. "We must continue to encourage this kind of innovation as we strive to transform our economy and capitalize on our strengths." He signed the bill into law on Monday, June 6, 2005.

Companies in the United States use about 80 million gallons of metalworking fluids

each year, according to UNI's Ag-Based Industrial Lubricants Research Program, which developed the soy-based industrial lubricants and greases over more than 14 years of research. That research was sponsored by the Iowa Department of Economic Development, the U.S. Department of Agriculture, and the Iowa Soybean Promotion Board, the university said.

"The bill puts the products into a wider market," said Lou Honary, President and CEO of Environmental Lubricants Manufacturing, Inc., a manufacturer of soy-based lubricants located in Plainfield. "These products can compete on their own merit not only because they are better lubricants for machining, but

also because they are safer for workers and for the environment." But the initial cost involved in converting an operation represents an investment due to the cleaning and disposal expenses associated with changing out petroleum products."

John Roth, mechanical maintenance supervisor for PMX Industries, Inc., of Cedar Rapids, said his company currently is using soy-based metalworking fluids developed at UNI. "We continue to use soy-based coolants for cost savings and have found it to be a much cleaner product," he said.

Source: Waterloo-Cedar Falls Courier, June 7 2005 Issue

## Special Interest Activities

- Environmental Chamber
- Success story of Biobased Metal working Fluids at Hornady
- Product Value Analysis

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## New Environmental Chamber to Improve Product Development

ELM has experienced numerous successes in creating soy oil-based products that perform at subzero temperatures. Examples of such successful products include snow grade hydraulic oil used in snow trucks in Iowa and the arctic blend rail curve lubricant intended for northern climates. While Iowa winters provide a natural test environment for ELM researchers, a new environmental chamber installed at ELM will allow year-round performance testing of various lubricants at subzero temperatures.

Research has shown that when vegetable-based lubricants having the same pour points as petroleum lubricants are exposed to cold temperature for extended periods, they behave differently than petroleum products (Pour point of a liquid is the temperature below which it stops flowing). Since pour point is not a very dependable parameter to ascertain low temperature properties of vegetable oil-based lubricants, long-term low temperature studies are required to make sure that

products will perform satisfactorily in cold climates.

ELM employs several laboratory and bench test methods to ensure consistent product performance at sub-zero temperatures, but the environmental chamber allows the testing of full-size actual equipment operating around the clock at sub-zero temperatures. As a result, the environmental chamber increases the speed of developmental activities and facilitates continuous product improvement.

## ELM's Soy-based Metalworking Fluids a Success at Hornady Manufacturing Co.

**Hornady Manufacturing Co., the largest independent bullet maker in the U.S., replaces conventional petroleum-based quench oil with ELM's soy-based product, resulting in higher quality products with a smoother finish and improved plant safety.**

Hornady Manufacturing Co, the largest independent bullet maker in the United States, was recently featured in *Lubes 'n' Greases* (May 2005, Vol.11 Issue 5) for its work with the University of Northern Iowa's Ag-Based Industrial Lubricants Research Program (UNI-ABIL) and ELM for replacing conventional petroleum-based quench oil with ELM's soy-based product. Hornady follows a strict recycling policy to protect the environment from harmful vapors and chemicals. In the past, Hornady was using petroleum quench oil in the bullet forming process to protect the forming dies from sticking to the lead. The petroleum quench oil was causing problems at the point of adding scrap back to the molten lead. In Hornady's process, petroleum oil would collect on top and often flash, causing fires. Production Supervisor Mike Timmerman

says they "tried different ductwork, installed a baffle system, changed to a larger fan motor and even installed a \$15,000 cyclone." The use of conventional petroleum oil also resulted in bullets having to go through abrasive washing and subsequent polishing cycles to remove all traces of oil. These problems were creating safety issues at the plant and costing thousands of dollars in cleaning and related costs. The solution turned out to be soybean-based quench oil.

The company participated in ABIL's testing of soy-based metalworking fluids (manufactured by ELM) and has reaped numerous benefits. The soy-based oil does not burn or smoke as much, improving safety in the plant. Additionally, the new oil is much easier to clean from the bullets, using a less abrasive treatment, thus resulting

in higher quality bullets with a smoother finish. When asked for his opinion of the soybean quench oil, Timmerman said, "It is environmentally friendly; it works as well as the petroleum-based oil, it is 10 times easier to clean off, it allows for less tumbling and washing and it generates less waste...Using this product, the finish is better than it ever was...the customers are happy...they have noticed the difference."

Hornady Manufacturing Co. is very pleased with the switch to soy-based metalworking fluids. As the research and development in this field continues and new biobased lubricants and metal working fluids are developed, ELM plans to remain the leader in offering environmentally friendly and superior performing vegetable oil based products.



## Value Analysis of SoyEasy UNI-Cut™ (A Biobased Metalworking Fluid)

ELM's SoyEasy UNI-Cut™ is a universal cutting oil, way lube, and hydraulic fluid formulated using high oleic soybean oil and specialized additives. It surpasses lubricity and performance of conventional petroleum, synthetic and semi-synthetic metalworking fluids. Its applications include general purpose cutting and grinding, milling, tapping, reaming, gear cutting, broaching, gun drilling, screw machining, and sharpening high-speed steel and carbide cutting tools. Some of the benefits of using SoyEasy UNI-Cut™ include improved surface finishes,

higher feed rates and productivity, reduced chip welding, cooler operating temperature, little or no smoke, less mist generation, reduced tool and wheel pressures, and is safer for all metals. Its high flash point provides additional advantage in comparison to petroleum cutting oils. All of ELM customers who are currently using SoyEasy UNI-Cut™ like it better than the petroleum cutting oils they have used over the years. The versatile use of this product in three different applications (cutting oil, way lube and hydraulic fluid) also reduces product complexity.

Some of the properties of SoyEasy UNI-Cut™ are:

Viscosity @40°C	50 cSt
Total Sulfur	0%
Total Chlorine	0%
Flash Point	260°C/500°F
4-Ball Weld	250 kg
4-Ball Wear	0.41 mm
Biodegradability	92%
Aquatic Toxicity	None

As exemplified below many of ELM customers have realized significant savings by switching to SoyEasy UNI-Cut™.

Company Name		Dirona Gear	Material Type		Steel
Equipment Type		Gleason	Tool Application		Gear tooth cutter
		CURRENT	PROPOSED	VARIANCE	% VARIANCE
<b>CUTTING OIL</b>					
A	Cost per liter	\$1.50	\$2.65	\$1.15	76.7
B	Consumption per year	8,280	8,280	-	0%
C	Cost per year [AxB]	\$12,420	\$21,942	-\$9,522	-76.7
D	# of parts produced per year	60,000	60,000	-	0%
E	Cost per part [C+D]	\$0.21	\$0.37	\$0.16	76.7
<b>MACHINE</b>					
F	Cost per hour	\$80.00	\$80.00	-	0%
G	Machining Cycle Time	10.50	8.41	2.09	19.9%
H	Cost per part [(FxG)+60]	\$14.00	\$11.21	2.79	19.9%
I	Cost per year [HxD]	\$840,000	\$672,800	167,200	19.9%
<b>TOOLS</b>					
J	Tools Cost	1,052.42	1,052.42	-	0%
K	Number of edges/resharps	45	45	-	0%
L	Resharp Cost	\$160	\$160	-	0%
M	Numer of parts per edge/resharp	77	90	13.00	17%
N	Time for tool change (min)	3	3	-	0%
O	Cost of tool charge per part [(FxN/60/M)]	0.05	0.04	0.01	20.0%
P	Cost of tool change per year (OxD)	3,117	2,667	450	14.4%
Q	Cost per part [(J+(LxK))+(MxK)]	2.38	2.04	0.34	14.3%
R	Cost per part per year [QxD]	142,436	122,258	20178	14.2%
<b>TOTAL COST</b>					
S	Per part [E+H+O+Q]	16.64	13.74	2.90	17.4%
T	Per annual production [SxD]	998,436	824,635	173,801	17.4%
<b>TOTAL SAVINGS</b>			<b>\$173,801</b>		

### Useful Links

[www.biobased.oce.usda.gov](http://www.biobased.oce.usda.gov) - This website provides information on the preferred procurement program for Biobased products.

[www.soyatech.com](http://www.soyatech.com) - Soyatech, Inc. is a publishing, market research and consulting firm that specializes in bringing valuable information to the food, feed, soybean and oil seed industries.

[www.biomassnews.org/](http://www.biomassnews.org/) - This website provides information about renewable energy resources and promotes biomass as energy fuel.

This is an environmentally friendly customer bulletin, printed with soybased ink.

## Letter to the Editor

### Q. What is the difference between *biobased* and *biodegradable*?

There has been considerable confusion between the terms *biodegradable* and *biobased*. A product can be biodegradable, but that does not necessarily mean that it is also biobased. To address this discrepancy the U.S. Department of Agriculture (USDA) created a new term that focused on the origin of the raw material rather than the finished product and coined the term "biobased." Initially it was intended to refer to products comprising a minimum content of 51% bio-materials (renewable) such as plants and vegetables, like soybeans). But now the USDA

identifies biobased products at varying percentages of minimum bio-content in order to provide a market entry advantage to products in early developmental stages. Biodegradable lubricants can be made from synthetic materials that are not biobased, but biobased lubricants cannot be made from biodegradable materials that are not biobased.

USDA testing of biobased materials calls for carbon analysis (per ASTM test methods) capable of determining the percentage of "new" carbon, as found in plants and vegetables, as compared to

fossilized carbon as found in petroleum products. Having been involved in the development and promotion of biobased and biodegradable lubricants, ELM has given special emphasis to biodegradability. The lubricants and greases developed and commercialized at ELM mostly range in biobased content from 50-99% biobased materials. To ensure these products meet both ASTM performance standards and OECD standards of biodegradability, toxicity and biodegradability testing has remained an integral part of the formulation and development process.

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