

Approved: 1-25-00  
Date

MINUTES OF THE SENATE COMMITTEE ON AGRICULTURE.

The meeting was called to order by Chairperson Steve Morris at 10:00 a.m. on January 20, 2000, in Room 423-S of the Capitol.

All members were present except:

Committee staff present:     Raney Gilliland, Legislative Research Department  
                                    Jill Wolters, Revisor of Statutes  
                                    Nancy Kippes, Committee Secretary

Conferees appearing before the committee:  
    Steve Howell, MARC-IV  
    Richard Nelson, PhD, Kansas State University

Others attending:     (See Attached)

Senator Huelskamp made a motion to approve the minutes of the January 20, 2000 meeting. Senator Umbarger seconded. The motion carried.

Steve Howell, MARC-IV Consultant, made a presentation on the potential of biodiesel in Kansas using beef tallow. Richard Nelson, PhD, Kansas State University, presented his role in the project.  
(Attachment 1)

The next meeting will be January 25, 2000.





*Biodiesel Update  
Kansas Senate Agricultural  
Committee*

*Steve Howell, MARC-IV  
Richard Nelson, Kansas State University  
January, 2000*



*Biodiesel Update--Objectives*

- ❖ Overview of Biodiesel
- ❖ Preliminary Findings from Biodiesel Feasibility Study
- ❖ Spark Interest

*Senate Agriculture  
1-20-00  
Attachment 1*

## *What is Biodiesel?*



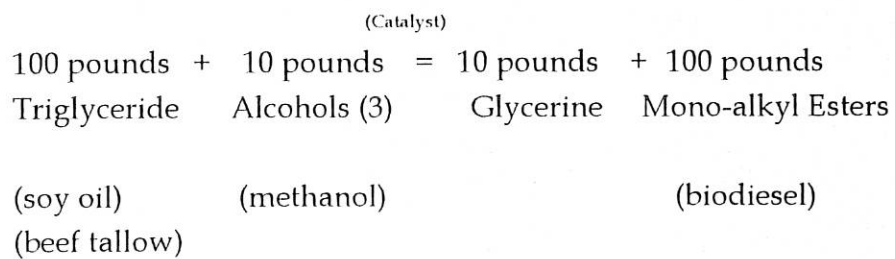
## *Written Definition*

- ❖ *biodiesel*, n. -- a fuel comprised of mono-alkyl esters of long chain fatty acids derived from vegetable oils or animal fats, designated B100.
- ❖ *biodiesel blend*, n. -- a blend of biodiesel fuel with petroleum-based diesel fuel designated BXX, where XX is the volume percent of biodiesel.

## So....What is Biodiesel?



## The Biodiesel Reaction



# Biodiesel Raw Materials

Oil or Fat

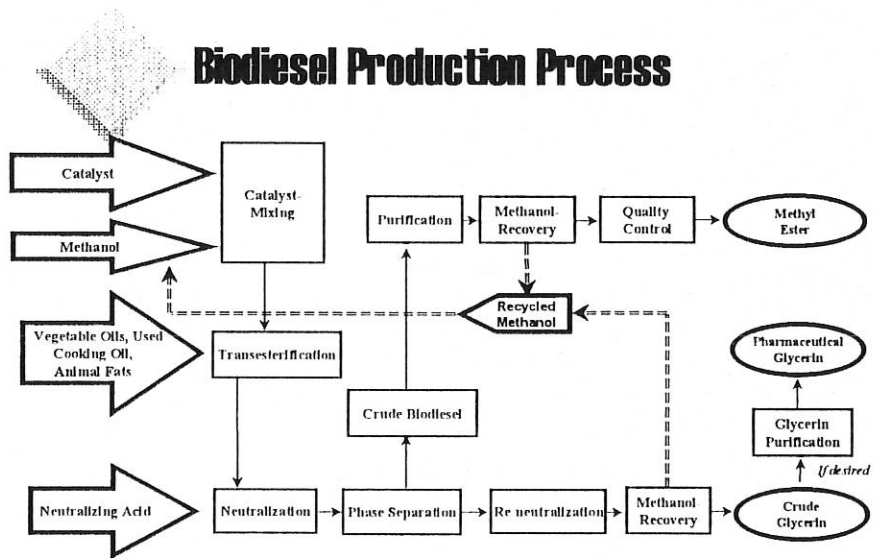
- Soybean
- Corn
- Canola
- Cottonseed
- Sunflower
- Beef tallow
- Pork lard
- Used cooking oils

Alcohol

- Methanol
- Ethanol

Catalyst

- Sodium hydroxide
- Potassium hydroxide



## *Biodiesel--Physical Properties*

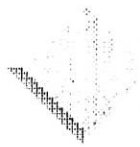
- ❖ No Sulfur
  - ❖ No Aromatics
  - ❖ High Cetane (over 50)
  - ❖ High Lubricity (over 6000 g)
  - ❖ Biodegradable
  - ❖ Non-Toxic
- ❖ All Proven Through Scientific Study



## *How can Biodiesel be used?*

- ❖ As a pure fuel
- ❖ As a blending stock with petrodiesel (B20)
- ❖ In low levels with petrodiesel (1 to 5%)

ANYWHERE #1 or #2 diesel is used



## *Consumer Readiness*

- ❖ Compliments new diesel technologies--  
petroleum's preferred partner
  
- ❖ Existing distribution system can be used  
(pipes, tanks, fueling stations)
  
- ❖ Existing engines/vehicles can be used



## *Biodiesel Technical Attributes*

- ❖ Biodiesel Emissions
  - Reduces Particulates
  - Reduces Carbon Monoxide
  - Reduces Unburned Hydrocarbons
  - Nitrogen Oxides Unchanged or Up Slightly:
    - ◆ Optimized Engine Can Reduce NOx



## *Health Effects*

- ❖ The cancer causing potential of diesel exhaust largely a function of:
  - Amount, size, and composition particulates
  - Mutagenicity of exhaust gases
- ❖ High exhaust mutagenicity can cause:
  - shortened life, still births
  - birth defects, cancer
  - asthma and respiratory problems
    - ◆ Especially in infants or the elderly

## *Biodiesel and Health Effects*

- ❖ Reduces Particulate Emissions
- ❖ Reduces targeted compounds thought to cause cancer: PAH, nPAH
- ❖ Significantly Reduces the Mutagenicity of Exhaust
  - In both the gaseous and particulate phases
- ❖ Biodiesel Can Play an Important Role in Reducing Cancer and Birth Defects

## *Global Warming*



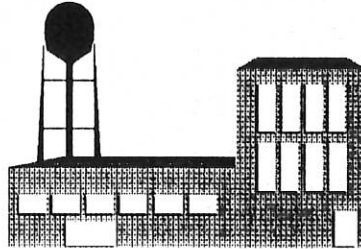
- ❖ Focus: Reduce CO<sub>2</sub>
- ❖ How?
- ❖ Reducing Fossil Fuels: Gasoline, Diesel, Natural Gas, Coal, etc.
- ❖ Higher Efficiency Engine Platforms
- ❖ Increased CAFE

## *Biodiesel and Global Warming*

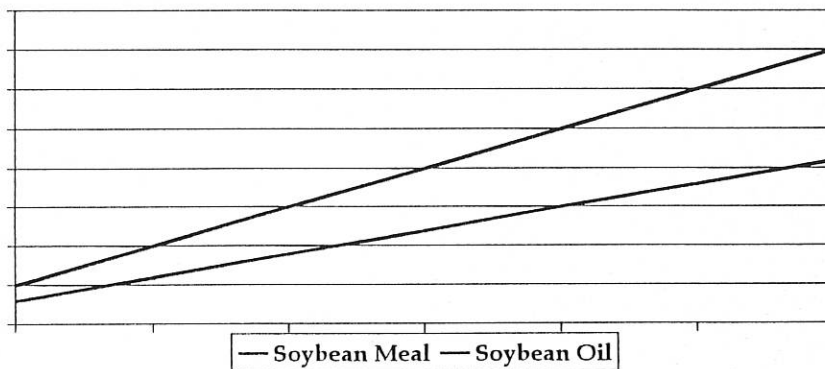
- ❖ Closed Carbon Cycle: CO<sub>2</sub> Used to Grow Feedstock is Put Back Into Air
  - ◆ 80% Life Cycle Decrease In CO<sub>2</sub>
- ❖ Energy Balance 3.24 to 1
- ❖ Compression Ignition Platform 30% to 40% More Efficient Than Spark Ignition

## *Economic Development--Biodiesel*

- ❖ Creates Manufacturing Jobs
- ❖ Reduces Energy Imports
- ❖ Improves Balance of Trade
- ❖ Creates Expanded Markets for Agriculture



## *Soybean Market Dynamics*



## *Issues Facing Tallow*

- ❖ Human Preference for Mono-unsaturated Fats and Oils
- ❖ BSE Issues are Impacting Foreign Markets for Tallow
- ❖ Recent European Concerns Regarding Contaminated (PCB) Feeding Fats, Combined With GMO Issues, Reducing Use of Feeding Markets in Europe.

## *Biodiesel and EPACT*

- ❖ EPACT--Energy Policy Act of 1992
  - Federal, State, and Utility Fleets
  - Must Purchase Alternative Fueled Vehicles
- ❖ ECRA: Energy Conservation Reauthorization Act of 1998
  - 450 gallons of biodiesel in existing diesel vehicles equals one new AFV purchase credit
  - Congressional Budget Office
    - ◆ Savings of \$10MM

# Biodiesel--1999

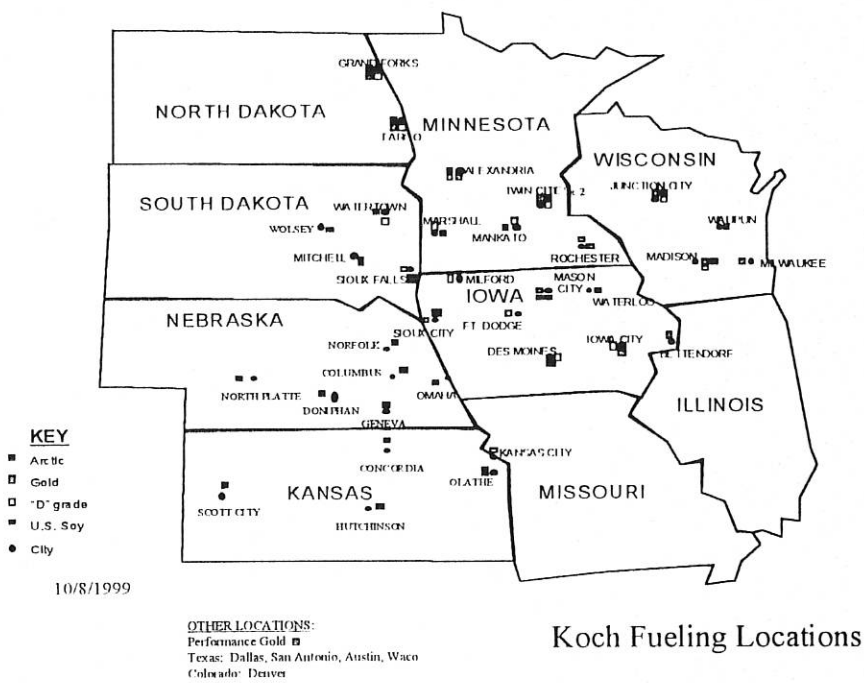
## ❖ Premium Biodiesel Additive

### ❖ Koch Petroleum

- US Soy Field and US Soy Field 50 Diesel
- 18 terminals in 5 states
- Enhanced lubricity
- Evaluating offering B20 at terminals

### ❖ Country Energy

- Soy Master
- 5 terminals in 5 states



## President Signs Executive Order

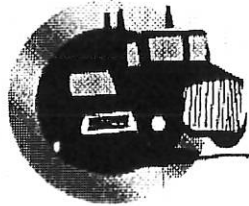
- ❖ Executive Order 13134, 8-12-99
- ❖ Triple the Use of Bioenergy and Bio-based products by 2010
- ❖ USDA Secretary Dan Glickman Announced USDA's Biodiesel Use



Photos Courtesy of the American Soybean Association

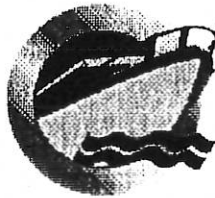


## Biodiesel Fuel Markets



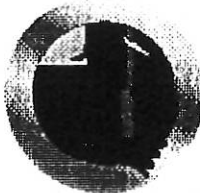
### EPACT REGULATED FLEETS

- Federal
- State
- Utilities



### MARINE

- Recreational
- Tour Boats
- Environmentally Sensitive Areas



### PREMIUM DIESEL

- Lubricity Enhancement
- Carrier Oil for Multifunctional Chemistries

## *Biodiesel's Future*

### ❖ Low Cost Compliance Option at B20 or Lower Blends:

- Energy Policy
- Clean Air/Health Effects
- Global Warming--CO<sub>2</sub> Reduction
- Economic Development

## *Biodiesel's Future*

### ❖ Blending Component For Petrodiesel:

- Lubricity
- Farm/Rural Use
- Sulfur/Aromatic Reduction
- Incremental Cetane Improvement
- Emissions Benefits

## *Biodiesel Feasibility--Liberal, KS*

### ❖ Objectives:

- Determine the economic viability of producing biodiesel near Liberal, KS
- Technology, size, operating questions
- Assess biodiesel demand near Liberal
- Summary of economic impacts to the region and to the state
- Use the study to provide information to private investors, others for consideration

## *US Energy Consumption and Imports*

- ❖ Since 1990, US energy consumption has increased by 14% (28% in the last 25 years) and is forecast to increase another 22% by 2020
- ❖ Net petroleum imports are projected to increase to 65% of total energy consumption within 20 years while at the same time domestic crude production is expected to continue to decline
- ❖ Transportation sector accounts for about 70% of US petroleum use



## *US and Kansas Diesel Fuel Consumption*

- ❖ Over the last 9 years diesel fuel use in the US has increased nearly 50% and is forecast to increase another 30% by 2020
- ❖ Kansas' annual consumption is nearly 375 million gallons
- ❖ Average percent increase in diesel fuel consumption in the 5 closest states was nearly 25% in the last three years

## *US and Kansas Cattle Slaughter*

- ❖ Kansas is the #1 cattle slaughtering state accounting for over 1/5 of the total slaughter in the US
- ❖ Slaughter concentrated at 5 facilities in Southwest Kansas and 1 in Emporia
- ❖ Nearly 1.2 billion pounds of edible and inedible tallow generated annually at these 6 facilities

## *Kansas Biodiesel Feedstocks*

- ❖ Primary feedstocks for biodiesel production in Kansas:
  - soybean
  - sunflower
  - animal fats and waste greases
  
- ❖ Potential Kansas biodiesel production:

<input type="checkbox"/> soybean	107 million gallons
<input type="checkbox"/> sunflower	5 million gallons
<input type="checkbox"/> animal fats	166 million gallons

## *Edible and Inedible Tallow*

- ❖ Tallow is defined as rendered animal fat derived from the slaughter of cattle
  
- ❖ Primarily two different grades of tallow, edible and inedible
  
- ❖ Edible tallow markets :
  - baking and frying fats
  
- ❖ Inedible tallow markets:
  - animal feed (primary)
  - lubricants and soaps (secondary)

## *Fat and Oil Price Trends*

- ❖ Kansas fat and oil prices generally follow national averages
- ❖ Animal fat prices typically less than vegetable oil prices
- ❖ Current pricing is low for most fats/oils

## *Biodiesel and Kansas*

- ❖ Biodiesel technology is available
  - Installed plant costs: \$3MM to \$15MM
- ❖ Beef tallow abundant in Kansas
  - As well as soybean oil
- ❖ Diesel demand is large
- ❖ Cold flow issues will affect tallow based biodiesel's ability to penetrate some markets

## *Biodiesel and Kansas*

- ❖ Determining potential demand over next several months
  - State regulations, incentives a big part
  
- ❖ Time appears right for biodiesel
  - EPACK ramping up
  - Low blend/premium biodiesel ramping up
  - Agriculture needs a boost

## *Kansas and Biodiesel*

### Key Challenges for Biodiesel

- ❖ Increasing Awareness of the Fuel
  
- ❖ Monetizing the Benefits of the Fuel