

U.S. EPA

Biofuel Manufacturing: Wastewater Permitting Considerations

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Forces influencing the Biofuel Industry

- Desire for energy independence
 - Environmental benefits
 - Reduction of air pollution, in particular CO₂ and motor vehicle emissions
 - Federal and State policies and regulations:
 - i.e. MTBE ban in California, New York, and other states
 - Renewable fuels standards (20 in 10)
 - Federal and State tax incentives:
 - \$.50 to up \$1.0 per gallon tax credit for biofuel blenders
 - \$0.10 per gallon of biofuel for producers
 - 30% credit for the cost installing clean-fuel refueling equipment
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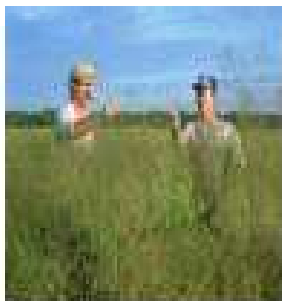
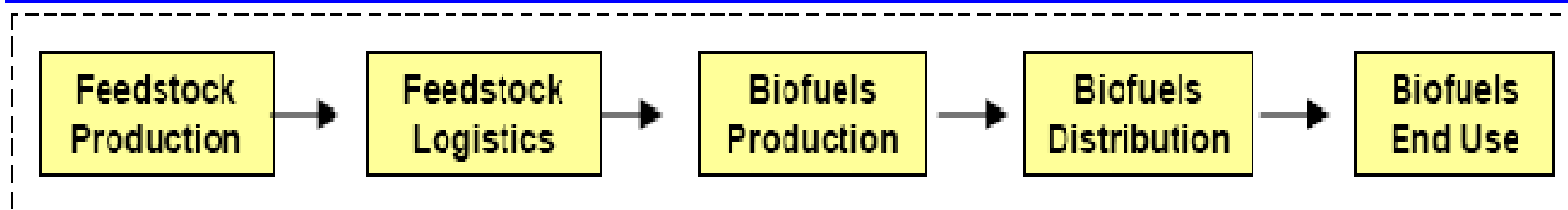


The Role of Water in the Biofuel Industry

- **Water Quantity:** Water is needed for growing and processing biomass to biofuels.
 - i.e. the industrial corn-ethanol process alone uses from 3.5 to 6 gallons of water for every gallon of ethanol
 - **Water Quality:** concerns are starting to emerge both in terms of:
 - Impacts from increase agricultural activities, i.e. higher rate of fertilizer applications, sedimentation, etc.
 - management of industrial wastewater, i.e. for every gallon of ethanol that is produced about 12 gallons of sewage like effluent is co-produced
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The Biofuel Supply Chain



**Non-point
source:
Agriculture**

Point sources: Industrial wastewater

**I will
focus
on this**



Industrial Wastewater from Biofuels

- **Wastewater effluents** characteristics, treatment, and practices vary with the size, type, and location of the manufacturing processes and unit operations.
 - **Wastewater disposal practices:** include direct (to water of the United States); indirect discharges to POTWs, septic tanks or CWT; and land application.
 - **Concerns** have been raised on biofuel plants meeting sewage pollution limits:
 - conventional pollutants in particular, BOD, TSS, oil and grease
 - Small towns capacity to treat high concentrations of conventional pollutants.
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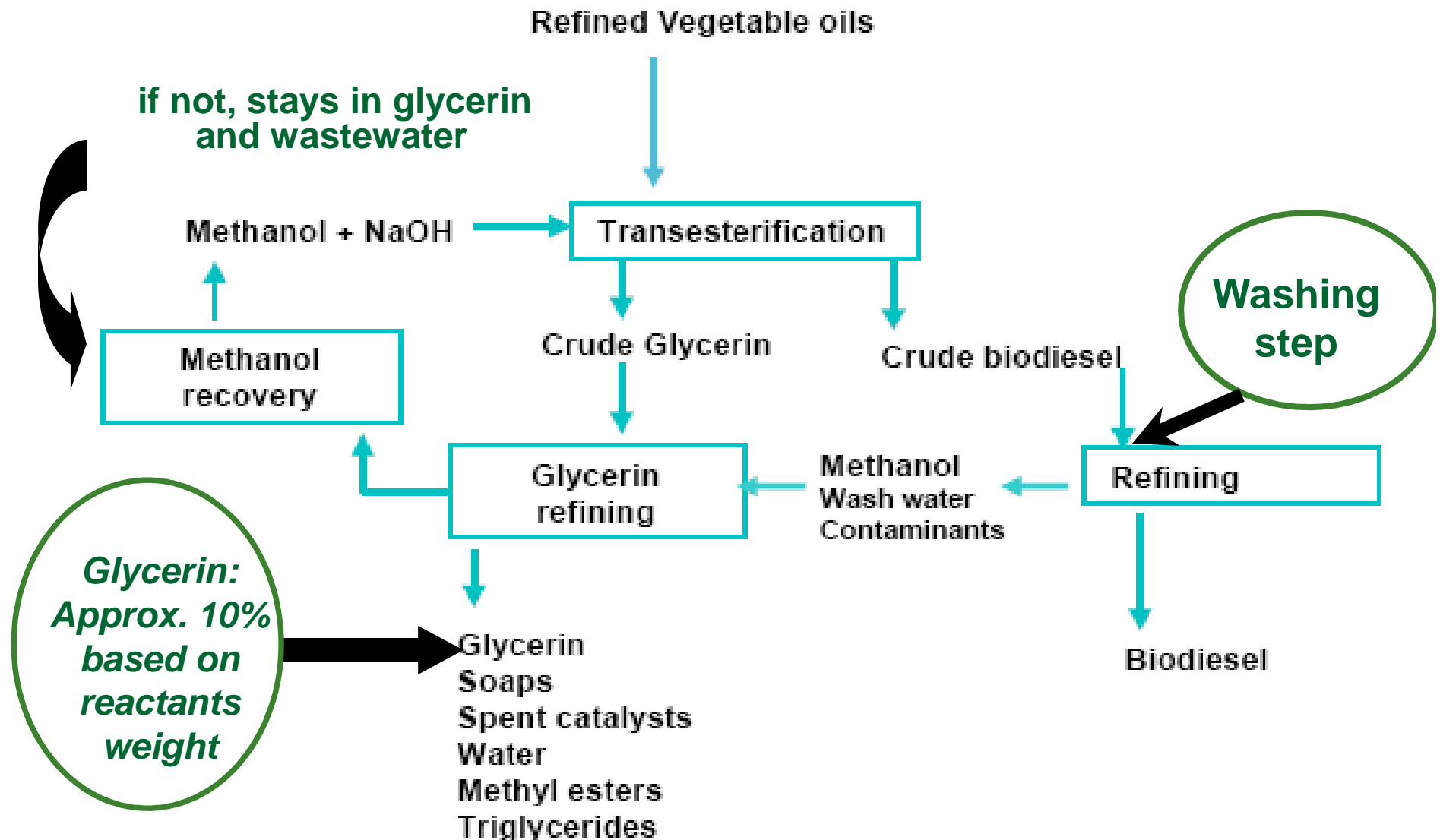
Regulation of the Biofuel Sector

Ongoing Activities at EPA:

- Review of existing Effluent Guidelines and Standards (ELGs) to assess applicability to biodiesel sector
 - Characterize existing biodiesel/ethanol operations: waste streams, wastewater characterization, wastewater management options
 - Develop Technical Guidelines
 - Contemplate addressing need for ELGs for Biodiesel/Ethanol in the 2008 Effluent Guidelines Plan:
<http://www.epa.gov/waterscience/guide/304m/index.html>
 - Collaboration with EPA regions
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Flow Diagram: Biodiesel production





Biodiesel Site Visits: Preliminary General Observations

■ **Processing:**

- Facilities overwhelmingly use the water-based washing process for making biodiesel (11 out of 15)
- Most operate in batch vs. continuous processes (14)

■ **Feedstock:**

- Most use exclusively soybean oil as feedstock
- Only 2 facilities pre-treat feedstock all the time

■ **Water Usage**

- All facilities use city water
 - Most facilities used about 1 gal of water per gallon of biodiesel produced (exception waterless facilities)
 - 1/3 of the facilities report treating water prior to use
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Biodiesel: Management of Waste Streams: Preliminary Observations

■ **Wastewater Discharges Permits:**

- *Storm water:* 1/3 have NPDES, 2 have pre-treatment permit
- *Processed water:* 1 NPDES, 8 pre-treatment permits, 1 off-site disposal, 1 hauls to CWT, 1 land application and remaining 3 waterless operations
- About ½ perform some wastewater treatment prior to discharge

■ **Glycerin:**

- 3 facilities report using it as energy source in their furnace
- 6 facilities sell it "as is". i.e. for use as animal feed supplement
- 1 facility sends it to landfill

■ **Methanol:**

- About ½ facilities recycle and reuse methanol in their process
 - 1 facility indicate that no-excess methanol is used
 - 1 facility is considering updating to recycle methanol
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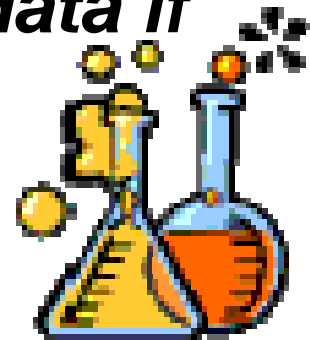


Biodiesel: Wastewater Characteristics

Characteristics of raw process wastewater from limited data:

- ① BOD: 4,500 - 37,000 mg/l
- ① TSS: 156- 2130 mg/l
- ① Oil and Grease: from 152 up to 1090 mg/L Total* (HEM)

we are interested in obtaining more data if available!





How to Permit Biodiesel Indirect Discharges:

- Initial concepts for setting wastewater limits:
 - Apply general pretreatment standards, including a prohibition on discharges causing “pass through” or “interference”
 - Apply local limits.
 - **Other Issues to consider:**
 - Spill Protection
 - Chemical and wastewater compatibility, flammability, etc.
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Next Steps

- **Characterization of Biofuel Sector:**
 - Continue with site visits to biodiesel facilities (Regions 5&7)
 - Initiate site visits to ethanol facilities
- **Perform analysis** of collected information on wastewater effluent
- **Develop technical guidance** for permit writers and for POTWs
 - BMPs
 - Establishing Local Limits

Need more effluent data to determine the levels of pollutants that are produced from this industry!!!



Questions

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