

NOCO ENERGY CORP.

NOCO Energy Corp.
700 Grand Island Boulevard
Tonawanda, NY 14150

Biodiesel & Ethanol Terminal Modifications-NOCO Energy Corp. July 10, 2007



Who is NOCO?

- Regional fuel supplier in Tonawanda, NY
- Own and operate 44 million gallon fuel terminal
- Receive product by ship, rail, pipeline or truck
- Store/Market:
 - #6 Fuel Oil
 - ULSD
 - Kerosene
 - Asphalt
 - Used Oil Fuel
 - # 2 Fuel Oil
 - Biodiesel
 - Gasoline

Biodiesel NYSERDA Project

- NOCO began exploring biodiesel in Spring of 2002.
- Partnered with NYSERDA on Biodiesel demonstration project
- Project ran from July 2002 through October 2004
- Objectives were:
 - Setup terminal infrastructure
 - Demonstrate winter operability

Biodiesel-Areas of Concern

- Areas of Concern:
 - Materials Compatibility
 - Special Handling
 - Quality Assurance

Materials Compatibility

- Solvency of Biodiesel
 - Tank/Equipment Cleanliness
- Ensure that all pumps and hoses are of a compatible material
 - Viton, Teflon – most common
 - Avoid Natural Rubber, Tygon, polypropylene
- Avoid Yellow Metals
 - Such as Copper, brass, bronze, tin, lead, and zinc
 - These materials react with Biodiesel over extended time periods

Special Handling

- Temperature Sensitive
 - Must be handled above cloud point (min 10 degrees F) of fuel for blending
- Limited Shelf Life
 - Generally accepted that B100 will degrade if stored beyond 6 months
- Water Sensitivity
 - Exposes fuel to possible microbial contamination
 - Corrosion of storage system

Quality Assurance

- Ensure receipt of on-spec product
 - B100 received with Supplier Certificate of Analysis
 - B100 meets specifications in ASTM D 6751
 - Purchase from BQ 9000 Producer
 - www.bq-9000.org
- Monitor product blends and specifications
 - Sampling-Railcars/Trucks/Tanks

NOCO Terminal Resources

- Receipt of product
 - Receive B100 by rail and truck
 - Ability to heat railcars
 - Unload railcars/trucks with a positive displacement pump
- Storage
 - 5-10,000 gallon horizontal tanks
 - Set up of 4 receiving and 1 (heated) marketing tank

NOCO Terminal Resources

- Loading Rack

- Dedicated loading arm for B100
- Outside piping was insulated and heat traced
- 2 separate racks-1 for diesel; 1 for biodiesel
- Load diesel portion first; splash blend with biodiesel portion
- Sample after loading to confirm complete blending

Filtering

- Filtered B100 product to 10 microns

NYSERDA Biodiesel Project

- Biodiesel B20 Fuel was supplied to:
 - NOCO's Fleet- over 40 tractors and tank wagon delivery trucks
 - Town of Tonawanda
 - 16 town school buses
 - 12 highway/sewer department vehicles
 - Local Municipal Bus Fleet
 - 35 public transit buses

Biodiesel NYSERDA Project

- Over the period of the project:
 - 490,000 gallons of B20 Biodiesel blend consumed
 - Over 3,000,000 miles driven

Future Terminal Changes

- Potential Terminal Modifications
 - Heat trace, insulate and additional piping for 500,000 gallon storage tank
 - In-line blending
 - Capable of blending 1 % and greater Biodiesel blends at loading rack
 - BQ-9000 Certification as a marketer

NYSERDA Ethanol Project

- Goals of proposed project:
 - Terminal modifications to receive Ethanol by truck or rail
 - Will have ability to store, blend and market Ethanol blends, including E-85
 - Modifications to two retail sites to store and supply E-85 to customers

Ethanol-Areas of Concern

- Areas of Concern:
 - Materials Compatibility
 - Special Handling
 - Quality Assurance

Materials Compatibility

- Solvency of Ethanol
 - May dissolve and loosen bottom sludge and also effect some types of coatings.
 - Suggest complete cleaning/rinsing of tank and piping
- Gaskets
 - Buna-N, neoprene seals, urethane rubber elastomers are not recommended for use with Ethanol
 - Teflon materials are recommended

Materials Compatibility

- Pump/piping Compatibility
 - Malleable Iron, brass, copper, are not recommended for use with ethanol
 - Aluminum is not suitable for continual contact applications
 - NOCO is using carbon steel for pump casings

Material Compatibility

- Tank Considerations

- There have been cases of Stress Corrosion Cracking (SCC) in welds in tanks, floating roofs and other components of equipment in Fuel Ethanol service
- Prevention-Coating system applied to inside of tank (minimum of all welded joints)
- More Information-API Recommended Practice 939-E – **“Guidelines for Identification, Repair, and Mitigation of Cracking of Steel Equipment in Fuel Ethanol Service”**

Material Compatibility

- Internal Floating Roof (IFR)
 - Generally aluminum IFR's are used for vertical tanks in gasoline service
 - Steel roofs must be welded on both sides, sealed w/coating-expensive
 - Possible to use Aluminum Roof for ethanol service-use knowing that it will have to be replaced when wearing damage occurs
 - No data on service life of an aluminum roof in Ethanol service
 - Reminder-Make sure that wiper seals on IFR are Ethanol compatible material

Special Handling

Water Control

- A dry tank and product are essential due to ethanol's affinity for water

When blending with gasoline:

- Excess water may cause ethanol to drop out of gasoline
- If any water present, it must be removed before adding ethanol blended gasoline
- The lower the product temperature, the lower the water tolerance

Special Handling

- Fire Fighting Measures
 - Terminal Foam Systems cannot use standard foam
 - Must use “alcohol type” foams (AFFF)
- Gasoline Additives
 - Gasoline/Ethanol blends (like other gasolines) are subject to EPA’s detergency requirements
 - Blends should provide same level of detergency performance comparable to other gasolines
 - Check with additive supplier on compatibility of additive with ethanol

Quality Assurance

- Specifications
 - Ethanol must meet specifications of ASTM D 4806-**Standard Specification for Denatured Fuel Ethanol for Blending with Gasoline**”
 - Includes specifications for Ethanol content, Acidity, pHe and water content
 - Blends must meet specifications of ASTM D 4814- **“Standard Specification for Automotive Spark Engine Fuel”**

Quality Assurance

Vapor Pressure

- Measure of the fuel's "front end" volatility
- Regulatory period of May 1 – September 15, the EPA's Phase II volatility restrictions apply (9.0 psi maximum in Western NY)
- Gasoline/Ethanol blends must meet a 9.0 psi Max.
- NOTE: A 10% ethanol blend will typically add 1.0 psi to the RVP.
- Roughly 30 % ethanol has a break even on the RVP

Water – problems previously discussed

NOCO Terminal Modifications

- Receiving

- Adding 60 foot long rail track pan (secondary containment)
 - Constructed of Ethanol compatible material
- Offloading pump
 - Compatible pump meeting specifications for ethanol service
 - Dedicated piping to storage tank

NOCO Terminal Modifications

- Storage

- Tank will be cleaned/inspected
- New floor being put in to tank with ethanol compatible coating
- New wiper seal installed on IFR

- Blending/Loading

- New meter/flow control for blending of ethanol
- Accuload system to enable inline blending from 1 – 99 % ethanol

NOCO Terminal Modifications

- Vapor Recovery Unit (VRU)
 - Ethanol is not compatible with liquid ring seal vacuum pumps
 - Purchased new vapor recovery unit that includes a dry vacuum pump that is compatible with ethanol usage

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