

EMERGENCY GENERATORS SAFETY AND FUEL QUALITY



2018 National Tank Conference

September 12, 2018

John Bell

Missouri Department of Agriculture

Division of Weights, Measures & Consumer Protection

Agriculture.mo.gov



DIVISION OF WEIGHTS, MEASURES & CONSUMER PROTECTION

Programs

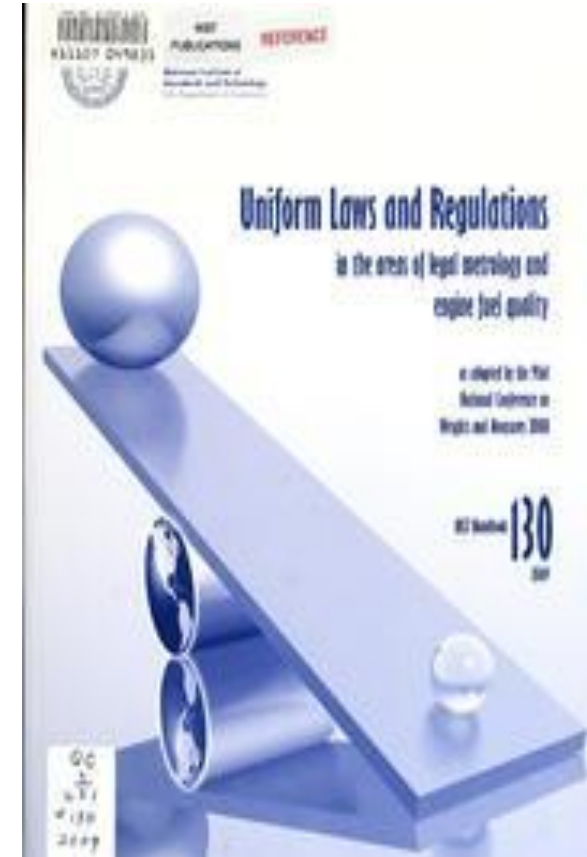
- **Scales**
 - Small to large scale inspectors
 - milk and egg licensing
- **Metrology**
 - Calibration of weights
 - Grain moisture meters
- **Fuel Quality**
 - Testing of all liquid fuels sold in Missouri
- **Petroleum/Propane/Anhydrous Ammonia**
 - Above ground storage tank and pump inspections
- **Land Survey**



FUEL QUALITY PROGRAM

KEVIN UPSCHULTE – PROGRAM MANAGER

- Approximately 35 years old
- Test a variety of fuel sold in Missouri (ASTM Specification)
 - **Gas** (D4814)
 - **Diesel (on and off road) and Fuel Oils** (D975 and D396)
 - **Biodiesel and Biodiesel(B6-B20) blends** (D6751 and D7467)
 - **Ethanol (Denatured, E85 & Mid level ethanol blends E20-E50)**
 - (D4806, D5798, and D7794)
 - **Race, Aviation Gas**(D910), **Jet Fuel**(D1655), **Kerosene**(D3699)
 - **6700** station(3700)samples/yr & **2000** terminal(24) samples/yr
 - **Turnaround time – typically 24-36 hours**
 - Also test lubricants (prepackaged and bulk)
 - **Motor Oil** (PCMO), **ATF**, and *most recently* **Tractor hydraulic fluids** (303)
 - **Antifreeze/Coolant**
 - Consumer complaints and Round Robins



Clean up the market place

used oil, mislabeled and short measure automotive products.



PETROLEUM / PROPANE / ANHYDROUS AMMONIA PROGRAM

JOHN ALBERT-PROGRAM MANAGER

Petroleum dispensers

inspected annually

Petroleum terminal meters and fuel delivery truck meters

Tested for accuracy

Premises where petroleum products are stored and/or sold

Inspected for safety.

Metered LPG delivery vehicles and dispensers

Checked for safety and accuracy.

Anhydrous Ammonia

Monitor storage and handling.

Safety Inspections and Device Accuracy at:

Aboveground storage tanks-Service stations-Refined fuels bulk storage plants-Marinas-Airports-Barge-Pipeline terminals-Other retail/wholesale locations and bulk delivery trucks



2017 HURRICANE SEASON HARVEY, IRMA, AND MARIA HOUSTON FLORIDA PUERTO RICO

- Major Issue
 - **Loss of power at Hospitals and Nursing homes**

Possible in Missouri?

Tornado, Lightning, Flood, Fire and Earthquake

John Albert contacted **Missouri Hospital Association**

Suggested inspection of Hospitals, Nursing homes and similar facilities
(members and non-members)

- Generator tank(s) and system
- Sample Fuel
 - Ensure systems would operate during emergencies.

**Not concerned with natural gas or not located in MO*

GENERATOR TANK ISSUES

Issue

Solution

Vent pipes should terminate vertically	Prevent any liquid from entering vent pipe, no horizontal sections. Liquid may block vent.
No emergency vent	Prevent overfilling or fire. Releases pressure so tank won't rupture. At 2.5psi opens/relieves pressure
No vent pipe found	Allow air in during use to prevent implosion (ruin and replace tank) and vapor out when filling
Paint exposed piping	Reduce corrosion
Paint corrosion on AST	Touch up to save money in long run. Wire brush and paint=tank lasts longer. Don't wait until entire tank needs painting.
Install overfill alarm	Driver may assume you know the ullage and may overfill. Only allow 90% of tank capacity
Replace fill cap with threaded cap	Overfill alarm may require all tank openings may need to be air tight (not just a flip cap).

Issue

Solution

Remote emergency stop buttons are recommended on all generators	Shut off if there is a problem
Emergency shutoff switches should be moved away from generator housing	Allows a safe distance if there is an issue with the generator
Posted fire extinguishers for all Baldor and CAT generators	To extinguish flames
Remove wooden pallet under AST	No combustible material around tanks including weeds, wood, rags etc..
Remove all PVC	All lines must be compatible with product. PVC can build up static electricity and same with vent pipe.
Tank needs containment	Concrete, steel, earth. Earth containment may require an engineer to sign off on. Concrete must be poured solid, not blocks

Issues not reported but addressed

Crash Protection

**Protection against vehicles with steel pipe
or concrete post**

Label Tanks

Properly Identify product inside

Salt (winter)

**Leads to corrosion of fill basin and
possibility of water contamination in UST**

GENERATOR FUEL QUALITY

Diesel – Typically off road diesel

Tests to Determine Acceptability of Fuel

- Cloud point – Temp the formation of wax(paraffin) crystals occur
 - Avoid clogging filters, pumps, injectors, or fuel lines
 - Issue at MODOT b/c of high biodiesel content in winter
- Flashpoint (*is it contaminated*) and Distillation (*how much contamination*)
 - Determine if fuel is contaminated with gasoline (or flammable substance)
 - December-February Flashpoint min 100°F (Mar-Nov min 125°F)
- Sulfur
 - Government regs require the removal of high levels of sulfur to reduce air pollution
 - Reduced lubricity
 - Reduce/Eliminate the ability to kill microbes that feed on fuel
- Water
 - It shall be a violation for water to exceed one inch (1")-2 **CSR 90-30.040**
 - Diesel, Gasoline w/o ethanol, and Kerosene
 - Allows for the possible growth of Bacteria/Fungus in bottom of the tank
 - Leads to deterioration of tank and leakage.



Fuel (Food)

Water (microbial habitat)

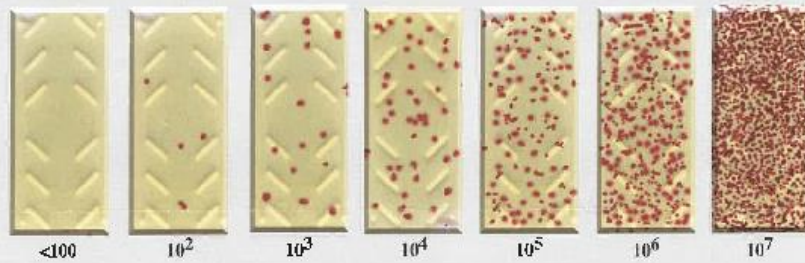
Microbial Waste (various acidic molecules)

SNV CHECK[®] BF

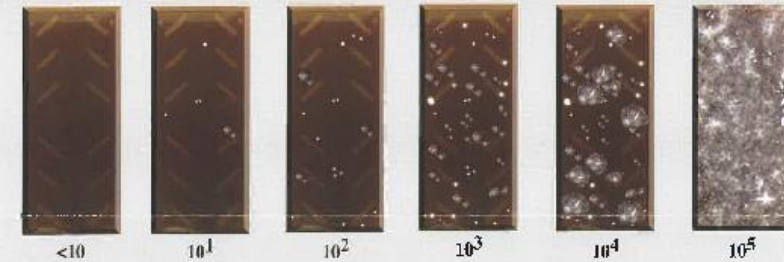
DIRECTIONS FOR USE

1. Unscrew the cap and remove the paddle from the vial. Be careful not to touch either of the paddle's surfaces.
2. Immerse the paddle into the sample for 2-3 seconds so that both surfaces are covered with the liquid.
3. Allow the excess fluid to drain from the paddle by touching the tip to an absorbent piece of paper (such as a paper towel).
4. Screw cap back and incubate in an upright position between 25 and 30°C for 24-36 hours. At that time, bacterial side can be read. Fungal growth, if heavy, can also be read at 36 hours. For sparse fungal growth, up to 5 days of incubation may be required.
5. Compare the growth on the paddle to the conversion chart below for a quantitative interpretation of the results.

Bacteria cfu / ml



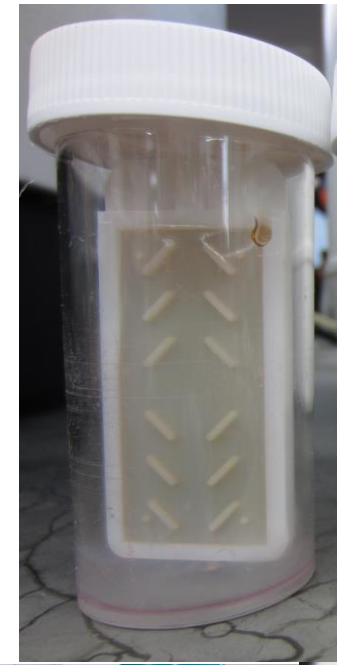
Fungi (yeast & mold) cfu / ml



cfu/ml – colony forming units per milliliter



1950 Tobolsk Court ■ Warren, MI 48091-1351 U.S.A.
 Phone: 586.755.8970 ■ Toll Free: 800.253.6800 ■ Fax: 586.755.8978
www.biosan.com



06/25/2018 00:37

CORRECTIVE MEASURES FOR WATER IN FUELS

- Identify the source of water and fix it
- Removal of water/sediment
- Clean/shock tank
- Purge dispensers (**Not Back Into Tank**)
- Install new and appropriate size filter

WE KNOW

Fuel Quality Laboratory diesel tank failed after only 25 years

- Cost to replace ~\$100,000.00 (*dual compartment, 1000 gal ea.*)
- Inconvenience
 - Over a year of preparation
- Possibility of environmental contamination
- Prevention
 - Maintenance, monitoring, and separate contaminated samples
 - Test our fuel annually

WHAT HAVE WE LEARNED

2018 - 120 samples from 53 Health Care Facilities

- 18 Samples Failed (15% Samples failed)
 - 1-Water in tank
 - 8-Water only
 - 3-Water and sediment
 - 3-Sediment only
 - 2-Appearance
 - 4-Biological growth
 - *Some samples failed on multiple items*
- 13 Facilities with fuel quality issues (24.5% Facilities failed)
 - No NOV's (Notice of Violation) issued – Not regulated by the state

Stress the importance of monitoring generator/tank safety and fuel quality

BE PREPARED

- Proper Delivery of product
- Periodically check tanks for water and/or sediment
 - Use water finding paste (not always detected with electronic monitoring)
 - 30 micron or smaller pore sized filters
- Periodic testing of generator system
 - Monthly or annual start and run to ensure system functions properly
 - Maintenance check list
- Repair
 - Unsafe piping or wiring
 - Malfunctioning/deteriorating parts
- Fuel turnover: USE OR REPLACE
 - Too many variables to determine shelf life of fuel
- Test the fuel
 - Best place to sample - Tank Bottom
 - Benefit will outweigh the cost





IN CONCLUSION

- Continue to test samples
- Educate and assist facilities and communities with tank/fuel issues
- Possibly extend testing to other organizations DOC, SEMA, ...

TANK YOU

Contact us

Ron Hayes-Division Director

John Albert

Petroleum/Propane/
Anhydrous Ammonia Program

Kevin Upschulte & John Bell

Fuel Quality Program

573-751-4211

Agriculture.mo.gov

