

Understanding MeOH

by Greg Dolan

In April, a welder working at a biodiesel plant in Alberta, Canada, touched off an explosion that ended his life and damaged the 5-million-gallon-per-year facility. The next month, a contractor welding at a 4-million-gallon-per-year biodiesel plant in Princess Anne, Maryland, also ignited an explosion that killed the worker.

While the investigations from both of these accidents are on-going, the most likely “fuel” for these explosions was methanol vapors. On a smaller scale, we have seen similar accidents involving “backyard biodiesel blenders,” including one fire that left a barn burned to the ground in Oregon.

For the Methanol Institute, the global trade association for the methanol industry, these incidents represent a serious product stewardship challenge. Accidents like these are very preventable, and had the welders understood the risks of working around methanol, they might still be alive.

First off, as we tell callers to our trade association looking to purchase methanol for biodiesel production, methanol is a flammable and hazardous chemical that should only be handled by trained professionals in an industrial setting. Having said that, we do have members that sell 55-gallon drums of methanol to individuals.

Many biodiesel plant operators and home blenders are unfamiliar with methanol, so our first task is to impart some basic facts about the physical properties of methanol, and how to properly store and handle this flammable and hazardous chemical.

As a liquid or vapor, methanol is both poisonous and highly flammable. Both of these risks can be managed to keep you safe. On the health side, there are four routes by which methanol can get into the body: skin contact; eye contact; breathing; and swallowing. Drinking as little as 50 mL of methanol – less than ¼ cup – can be fatal.

The key to personal protection is wearing the right clothes and equipment to prevent any exposure. This may include the use of fire retardant clothing, nitrile gloves, safety glasses with side shields or even full face shields, and rubber boots. In more extreme cases, such as responding to a methanol spill, the use of full chemical suits and self-contained breathing apparatus is recommended.

On the fire risk side, methanol in both its liquid form and as a vapor is flammable. You may have a storage tank that appears to be empty of liquid methanol, but may still contain methanol vapors that can easily ignite if an ignition source is present.

In January 2006 at a wastewater treat-



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ment plant in Daytona Beach, Florida using methanol for denitrification, it was methanol vapors coming from a corroded flame arrester on the top of a storage tank that first ignited. This led to a flash back that caused the tank to explode and become engulfed in flames, killing two workers that had been using an acetylene torch above the tank.

Methanol burns with a clear blue flame that may be difficult to see in bright sunlight, and the only indication of a methanol fire may be a shimmering “heat haze” or something nearby burning. By comparison, methanol is harder to ignite than gasoline, and burns with just one-eighth the heat.

Depending on the size of a methanol fire and its location, fire fighting equipment such as CO₂ extinguishers, dry chemical extinguishers, and alcohol resistant foam (type, AFFF(R)) can be used.

Water also can be used to put out metha-

nol fires, but you should contain any methanol/water mixtures for proper clean up.

The basics of fire prevention apply to methanol, with all three elements of the “fire triangle” required to be present to start a fire: fuel (methanol); ignition source; and oxygen. The aim is to break the fire triangle, and the best precaution is to eliminate any ignition sources near the methanol fuel.

Another way to prevent methanol fires is to remove oxygen from the equation, and this may involve more expensive solutions such as the use of nitrogen blanketing in larger storage tanks.

If you do decide to make your own biodiesel, first give a call to your local fire department and ask about fuel storage requirements. You may also want to have local fire officials visit your site during the design

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Firefighters train at a methanol handling site. Industrial producers and homebrewers alike have died in methanol accidents. *Facing page:* Protective clothing for handling methanol. (Photos courtesy Dolan)

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stage, and consider running a fire drill once you are up and running. Fire trucks don't always carry alcohol resistant foam, but if they know you are using methanol before you have to pull a fire alarm, they can come prepared.

In any emergency response situation, saving time can save lives and property.

Most "hot work" at a plant is carried out by maintenance and contract workers who – when it comes to methanol – don't know what they don't know. Procedures need to be put in place to ensure that any hot work is done by individuals who understand the risks of working around methanol and how to properly manage those risks.

Finally, if you want to use biodiesel fuel in your car or truck to promote alternative fuels and a cleaner environment, you may

want to first see if there is a biodiesel retailer in your area. A map of biodiesel pumps is available on the web site of the National Biodiesel Board at www.biodiesel.org. This might be a good first step, before you purchase a biodiesel "kit" on the internet and try to source virgin or recycled oil, methanol and lye, and figure out how to store it all safely in your garage.

Your family and neighbors also might appreciate it too.

Greg Dolan is Vice President of the Virginia-based Methanol Institute. For more information, visit them at www.methanol.org. The world's largest methanol producer and distributor, Methanex of Vancouver, Canada also has information and free videos available from its web site at www.methanex.com.

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