Pipeline Emergency Preparedness & Training: Electronic Reference Resources for Response to a Hazardous Materials Incident

In today's world, we are all becoming more dependent on electronic tools such as cell phones to perform our work. As a society we have become reliant on these critical communications devices to sustain our daily lives. If you don't believe it, try to go without it for a week and you will realize how it enhances our ability to do our jobs. The worlds of emergency response, communications and information management have been dramatically enhanced through these advances in technology. One of the areas where this is most evident is in response to hazardous materials incidents.

When local emergency responders are faced with identification of hazardous material, determining its characteristics, evaluating risks, and determining an incident action plan for handling it, comprehensive, timely, and accurate information is critical. One of the most prolific resources used for handling the initial phase of a hazardous material incident is the venerable U.S. Department of Transportation (DOT) Emergency Response Guidebook, often referred to as “the ERG”. This manual is published by the DOT on a four year cycle and is distributed free of charge through state emergency management agencies to first responders.

The ERG is now available in an electronic format as a .PDF file for use on laptops in the field, as well as a Windows Mobile format for smart phones. One significant advantage of electronic versions of the ERG is that both versions are searchable, which decreases the material research time in comparison with a hard copy version. Training resources for orienting personnel on the use of the ERG, including a video module are made available by the U.S. Department of Transportation. To access information concerning the ERG go to: http://www.phmsa.dot.gov/hazmat/library/erg.

Another hazardous materials response resource provided free of charge is the Wireless Information System for Emergency Responders, otherwise known as WISER. The WISER database contains detailed information regarding 440 hazardous substances developed by the National Library of Medicine. While designed to work as a stand-alone system or connected to the internet, a significant benefit of the tool is that in addition to the version for desktop or laptop computers, several mobile variants exist. This includes versions for Windows Mobile, Blackberry, Palm OS, and WISER.

Pipeline Emergency Response Tactics: Initial Response and Arrival – Conducting Effective Scene Size-Up

Conducting a thorough scene size-up is a critical first step in responding to any crisis event. This is especially true when responding to a pipeline emergency. Whether you are a first responder with the fire service, law enforcement, emergency medical service, emergency management, or a pipeline operations employee, ensuring scene safety is of the utmost importance for all responders. In far too many cases, we succumb to that urge when we arrive at the scene of an emergency to jump right in and begin taking action. We respond, we take action, that’s what we do!

However, regardless of the severity or complexity of the emergency, it is extremely important to take those few extra seconds, remove our figurative blinders, and survey the scene. This is when you assess the hazards and determine what is truly occurring. We all know the consequences of...
for iPhone. The WISER system allows responders to select one of three roles that they
will be performing at the scene of an incident and provides the appropriate information
tailored to the first responder, hazmat specialist, or EMS specialist. Additionally, WISER
provides radiological and biological support as well. For more information or to access

One additional resource available to local emergency responders is the National Pipeline
Mapping System. This on-line resource, provided by the Pipeline and Hazardous
Materials Safety Administration, provides responders with information concerning the
location of natural gas and liquids products pipelines in their area. The general public
may access the database to determine the name of pipeline operators with systems in
their area, but for security purposes access to mapping data requires registration on the
part of state and local officials. Information regarding the National Pipeline Mapping
System can be found at: [http://www.npms.phmsa.dot.gov/default.htm](http://www.npms.phmsa.dot.gov/default.htm)

**Overview of Pipeline Systems: Gas Compressor Stations**

Compressor stations are situated along natural gas transmission pipelines to enhance
pressures for effective flow and delivery to downstream customers. Similar to water
relay between pieces of fire apparatus, compressors (pumps) increase the pressure
along the pipeline (supply hose) to ensure proper pressure at the delivery point. Just
like modern fire apparatus, compressor stations are highly sophisticated and reliable.

The compressors at such facilities are usually powered by natural gas fired reciprocating
or turbine engines. In some cases large electric motors are used to power compressors
up to 12,500 horsepower. These facilities are typically operated on a remote basis by
Gas Control personnel who monitor and operate the pipeline system from technologically
advanced control centers using a variety of communications methods including landline,
cell phone and satellite systems. Gas Control personnel have the ability to start,
monitor and shut down compressors using Supervisory Control and Data Acquisition or
“SCADA” computer systems.

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Components of a typical compressor station include:

**Engine and Compressor Units** – Compressor stations may have multiple paired engines and compressor sets that can be individually operated based on the pressure and flow requirements at any given time on the pipeline system.

**Mainline and Station Yard Piping** – Natural gas is transported into and out of the compressor station through mainline and station yard piping. Due to the fact that natural gas is heated during the compression process, coolers may be used in the station yard if needed, to reduce the temperature of the gas before it is returned to the mainline pipeline for transportation.

**Separators** – Large filters are installed in the facility on the suction side of the compressors to remove any impurities that may be in the gas stream from the initial production process.

**Lubrication Oil Systems** – Lubrication systems provide storage and transportation of oil used to lubricate and cool the moving parts of the engines and compressors.

**Safety Systems** – All compressor stations are equipped with safety systems and devices. One of the most common devices found at a compressor station is the Emergency Shutdown System or ESD. When initiated, this system stops engines and vents natural gas from the station piping. This safety system can be triggered by operating personnel, or electronic detection systems designed to detect fire or the presence of product in the atmosphere.

Compressor stations are maintained by highly trained technicians and maintenance personnel who are assigned to the facilities. These employees provide on-going maintenance of the engines, compressors, and subsystems in the station. In addition, they implement a comprehensive testing and inspection program to ensure the safety systems are functioning properly.

In the unlikely event that an emergency occurs at a compressor station, and you are notified to respond, inherent safety systems will usually eliminate the risk of any natural gas fed fires. From a tactical perspective, first responders should ensure that the company operating the compressor station has been notified, should promptly work to protect exposures, and should coordinate with pipeline company personnel concerning additional response actions. Signs located at facility gates will have twenty-four hour contact information for the pipeline operator.

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Keeping Pipelines Safe/Practices & Protocols: Cathodic Protection

Any metal object left to its own accord will seek to become the basic substance iron oxide, or commonly known as rust. That can be a real problem, especially for metals used in critical modes of transportation such as bridges or even pipelines. Preventing pipelines from corrosion typically referred to as cathodic protection, is a major focus of the energy industry.

So how is pipeline corrosion prevented? First, pipelines are covered with a variety of coatings used to protect the bare steel and to insulate it. This article will elaborate more on this later. Next, there are two basic types of cathodic protection- sacrificial anodes and impressed current.

In the case of sacrificial anodes, metal devices having more negative potential than the steel needing protection are wired to the pipeline in what is referred to as a “ground bed” and are “sacrificed” or allowed to corrode thus protecting the steel pipeline. Sacrificial anodes are made of a variety of materials including zinc, magnesium, and aluminum. The sacrificial anode type of cathodic protection is typically used on comparatively small applications such as short sections of buried pipe.

For larger applications like long distance transmission pipelines, an impressed current cathodic protection system is employed. In this type of system, DC current is supplied through a rectifier which converts AC power to DC output, and is then applied to the pipeline with a minimum of .850 millivolts. This impressed current travels down the pipeline and is supplemented by rectifiers installed at strategic locations along the right-of-way.
Best Practices from Emergency Response Peers

“I attend local pipeline safety meetings and encourage local law enforcement and VFD leaders to attend. I also inform the community when local pipeline companies are performing work or test on their lines, when they inform me.”

Emergency Management, Cherokee County, TX

“We attend local training provided by Kinder Morgan. Some of our municipal EOC training is based on pipeline emergencies.”

City of Greeley, Colorado

“We attend pipeline training meetings. We do drills. We talk about the different products the lines in our response area.”

Willow City VF&R Willow City, Texas

“We discuss pipeline incidents in our LEPC meetings and play videos of incidents when they are available.”

Local Emergency Planning Committee, Atoka, Oklahoma

“We contacted the responsible parties involved with our local pipeline and have direct phone numbers to the safety line rider and local manager in case of emergency. We have committed with them to be their local eyes and ears for the portion of the local pipeline in our immediate response area. They provided us with useful information on safety precautions and situations to look out for. We also purchased the Pipeline Emergencies book and DVD which we have shown to our CERT volunteers at our monthly meetings and will pass on to other CERT teams in our local area.”

Somerset-Washoe Sheriff CERT Reno, Nevada

Since the pipeline is coated with a dielectric material the current stays where it is intended and protects the steel.

Pipeline operators regularly inspect test points along the pipeline to ensure that the cathodic protection is working appropriately. Additionally, whenever a pipeline is exposed during construction or maintenance activities, the coating is meticulously inspected and repaired if needed. During new pipeline construction, the entire line is inspected with monitoring devices to ensure the integrity of the coating as the pipeline is being installed in the ground.

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