Static Electricity Mitigation

SCOPE AND PURPOSE

This procedure describes the precautions to be taken to reduce the potential for static electric discharge from polyethylene and metallic pipe where a hazardous atmosphere could exist. It must be noted that we can never completely eliminate static electricity, but we can effectively control it.

RESPONSIBILITY

The Construction, Underground Maintenance, Measurement or Service Department Supervisor or other designee, is responsible to ensure that an approved method will be used to reduce static electricity and is performed as described in this procedure.

PERSONNEL SAFETY

- Suitable personal protective equipment (PPE) shall be used by personnel as needed.
- Personnel shall ensure that safety conditions exist.
- Potential static electricity sources should be eliminated.
- A fire extinguisher must be present at the site placed at a suitable location.

EQUIPMENT AND MATERIALS

Bonding and grounding tool and equipment.
Aerosol static suppressor
Strap and ground rod
CGI

GENERAL

- Static shall be controlled when working on a gas line with live gas.
- Wear Personal Protective Equipment (PPE) as needed.
- Static electricity is electricity at rest, or simply not moving. Static is worse when humidity is low, like in the winter.
- Static electricity is produced inside the pipe and on the outside of the pipe by gas flowing through the pipe and handling, loading, unloading, stringing, fusing/welding, squeezing off and installing pipe. Dirty gas produces more static electricity.
- Plastic pipe is an insulator and does not allow static electricity to flow to the ground except at the area where the plastic pipe is in direct contact with the ground.
- If a conductive path is provided for the static electricity to flow to or from the pipe, the resulting static discharge or spark may cause a pin hole in plastic pipe or the ignition of a gaseous atmosphere.
- When natural gas mixes with air (4-15% by volume), the resulting mixture can be ignited easily by a static discharge. Static discharge is sometimes cited as the possible cause of fires or explosions.
- A static spark from your finger can ignite natural gas and many other gases.
- Body static voltages can vary from 0 to 35000 volts or more.
- A static spark of 3000 volts can have a temperature of approximately 1200 F. Natural gas ignites at approximately 1163 F.
- It is not uncommon to build up 8,000 – 10,000 volts sliding on the seat while exiting a car or truck.

- Unloading the plastic pipe generates 9,000 volts.
- Fusing the pipe can generate as much as 24,000 volts.

INSTRUCTIONS

Indoor Odor

- Walking across a carpeted floor may produce enough static electricity to ignite a gaseous atmosphere
- Synthetic clothing such as heavy winter jackets, can produce static electricity.
- Most materials will produce static electricity and it is very difficult to prevent. You must be aware of this easily produced ignition source.
- Before entering a structure, touch the ground or wall to discharge any static electricity built up in your body.

Steel Pipe with Gas

- **Those working with steel pipe must have bonding and grounding tools and equipment.**
- Static electricity is controlled best by using bonding wires for steel.
- In the excavations where steel pipe will be cut, when the pipe is separated the electrical potential will balance itself and if that potential is strong enough, a spark will be produced.
- Before cutting the pipe, the pipe must be bonded across the area to be cut. This provides an electrical flow path for any static electricity that has accumulated.
- The pipe must then be grounded.
- The proper bonding wires should be a number 8 stranded wire or larger. The welding leads and two c-clamps are effective and easy to install. The bonding wires should be long enough to prevent any tripping, falling or accidental disconnection.
- When dealing with a broken steel line, the area of the steel to be handled and about a foot beyond on each side must be sprayed with aerosol static suppressor, covering all sides of the pipe.
- The pipe should then be grounded if possible.

Insulators

- Static electricity is controlled best by using bonding wires for steel.
- DO NOT place any metallic object, like a pipe wrench, across the insulator ends. If an insulator is to be worked on, judgement will determine if bonding wires are to be used.
- Insulators are used to separate two different underground piping systems and may cause an arc if disturbed.

Plastic Pipe with Gas

- Plastic pipe is an insulator and does not allow static electricity to flow to the ground except at the area that is shorted to ground. Anywhere you touch the pipe could cause a static spark if you are in contact with the ground.
- Static electricity is controlled best on plastic pipe by using aerosol static suppressor.
- Spray the pipe within the area that it will be handled and about a foot beyond on each side with aerosol static suppressor, from approximately 6 inches away, covering all sides of the

pipe. If the area is blue from the spray, then there is no static. Static spray must be reapplied if water or alcohol gets on the pipe or if the spray is scraped off.

- If plastic pipe is removed from service, spray inside the cut ends as soon as practical with static suppression spray. The area of the pipe being cut may be sprayed while being cut to reduce the chance of a static spark.

Plastic Pipe Leak Repair

- When confronted with a gas leak from damaged plastic pipe and it is necessary to squeeze off the pipe, all efforts should be made to conduct squeezing operations in separate bell holes.
- Squeezing off the pipe should be performed far enough away to prevent a gaseous atmosphere ignition.
- Squeezing pipe increases the velocity and turbulences of blowing gas, therefore increasing the static electricity discharge potential.
- Aerosol static suppressor must be used as listed previously no matter where the line is squeezed off.
- If spraying in the area of the break, begin spraying approximately 12 inches away and move closer as you spray. Also spray as close to the blowing end as possible.
- If the gas is off spray the broke ends outside and inside before handling.

Purging

- Do not purge or vent gas using plastic pipe as the discharge point. A **grounded** steel discharge point smaller than the line being purged must be used. The discharge point must be above head high unless you are doing a slow controlled purge through a regulator orifice.

Tapping

- Before making a hot tap, after the tap is fused or welded to the pipe, spray inside the tap through the tap outlet.
- Follow normal procedures for cleaning and fusing when fusing to the tap outlet after using static suppression spray.

Tool Grounding

- Tools must be grounded if they have or are supposed to have a grounding attachment.
- Drive a ground rod into the ground, then clip the wire from the tool to the rod before using the tool. Any rod that is not chrome covered will work best.
- Tools may be sprayed with aerosol static suppressor
- Fusion heater plates and facing units are not explosion proof. Heater plates are to be disconnected from the generator at the fusion temperature, then they may be used in a gaseous atmosphere.

Static suppression spray should not be used if it is more than 2 years old.
The identification code is YYDDD-NN.

- YY= Last 2 digits of the year manufactured.
- DDD= Number of the day of the year it was manufactured.
- NN= Temperature formula: -05 for regular temp (32F) and -40 for low temp (- 20F)
- Code 12032-40 = made on the 32nd day of 2012 (Feb 1, 2012) and is low temp formula.

RELATED PROCEDURES

CONST003 - Isolating, Abandoning & Deactivating Pipeline Facilities
CONST004 - Purging with Gas, Air, or Inert Gas
EMER003 - Blowing Gas Investigation