

# Mercer County Community College

## Division of Business and Technology

### UTI 109

#### Introduction to Gas Distribution

##### **COURSE DESCRIPTION:**

Provides The student with the fundamental knowledge and skill to achieve 16 basic operator qualifications necessary for gas utility construction and maintenance in accordance with D.O.T. Pipeline Operator Qualifications regulations.

##### **Text: References & Textbooks:**

Handouts Reference Guides  
Gas Standards Manual

Prerequisites: Introduction to the Energy Utility Industry UTI 101

Credits: 4                      Lecture Hours: 3                      Studio/Lab Hours 4

<p>Food and drink are strictly prohibited in classrooms as per health and safety laws. Students may not bring in chemicals or cleaning fluids without the appropriate MSD sheets.</p>
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Course Coordinator: Dominick DeFino

Revised: 10/23/02

**Course Objectives:**

- Identify Bloodborne Pathogens modes of transmitting, proper decontamination procedures for tools, personal protective equipment, label/color code/dispose of potentially infectious waste and procedures for notification and incident cleanup.
- Describe the safe operation of light duty vehicles or Utility Vehicles, including conduct all required safety inspections and operation according to the Gas Distribution Safety Standards and Procedures Manual.
- Identify select & describe the correct fire extinguisher and operating procedures to eliminate one of the three elements of a fire triangle - heat, oxygen and fuel for the four classes of fire - A, B, C and D, according to the equipment manufacturer's instructions.
- Identify & define the various type of safety tags used to indicated potential hazards, cautions, and defective equipment in accordance with the Safety Standards and Procedures Manual
- Demonstrate the ability to conduct a Tailboard Conference (Pre/Post Job Briefing) that assesses potential hazards, describes the job scope, assign duties, establishes expectations, review applicable safety rules & personal protective equipment and allows all team members to question potential safety issues.
- Identify requirement and procedure for setup and removal of traffic control zones necessary to warn and direct vehicle and pedestrian traffic around short duration work sites in compliance with D.O.T. Manual on Uniform Traffic Control Devices requirements.
- Identify and demonstrate the proper use of safety equipment including Foot protection, Head protection, Flame Retardant Coverall, Respiratory protection, Hand protection, Electric Contact protection and Hearing protection according to the Gas Distribution Safety Standards and Procedures Manual Section 2.1 and Section 9.
- Identify, describe and demonstrate the use of the following testing instruments; Combustible Gas Indicator, Spring Gauge, Manometer, Insulphone, Holiday Detector, GX-82, Dip Needle, Bottle Test, Pipe Locator, and Box Locator.
- Identify and describe how to properly use hand tools including screwdriver, hammer, pipe wrenches, chisel, file, hand shovel, pipe cutter, pipe reamer, stock & die, vise, ax, wood and hack saw, torque wrench, plastic cutters, chamfering tools and peelers for Electric Fuse according to manufacturers procedure.
- Identify and qualify on the installation of proper repair clamps, including full seal clamp, repair clamps for cast iron main, split-sleeve on a cast iron main, Bell Joints and procedure for plastic main repairs, according to the Gas Distribution Standards using manufacturer's procedures.
- Identify and describe pipefitting use including elbows, street elbows, nipples, coupling, union, cap, plug, in line tee and street tee according to the Gas Distribution Standards.

- Identify B.U.D. areas including the absence of overhead wires, observation of pad mount transformers, observation of electric manholes and conduit exiting ground and entering outside electric meters according to the Gas Safety Standards and Procedures Manual Section 2.1.
- Discuss proper joint trench installations including location of gas and other facilities along with depth of either main or service trenches according to the Gas Distribution Standards Section 4.7-5.
- Explain actions to be taken in the event of an electrical damage including trenching machine, personal protective equipment and tools according to the Gas Safety Standards and Procedures Manual Section 2.1.
- Discuss the four precautionary measures taken before entry into manhole, including training, work area protection, engine exhausts away from manholes and elimination of sources of ignition according to the Gas Safety Standards and Procedures Manual Section 2.6.
- Explain the basic safety rules for entering a manhole including test for combustible gas, no combustible gas on initial test, combustible gas on initial test and other alien gases according to the Gas Safety Standards and Procedures Manual Section 2.6
- Explain and qualify on the application of field coating to buried metallic pipe including primer and green line wrap and the use of a holiday detector according to the Gas Distribution Standards Section 2.2 and manufacturer's procedures.
- Explain and qualify on the proper procedures to thermo-weld a test lead to steel pipe, including preparation of pipe, preparation of lead, ignition of thermo-weld and cathodically protecting exposed metallic pipe according to the Gas Distribution Standards Section 2.
- Explain and demonstrate the proper procedures for draining static electricity on plastic pipe including a situation involving a gaseous atmosphere and nongaseous atmosphere, using a detergent solution and wet burlap according to the Gas Distribution Standards Section 7.19.
- Explain the proper material used in venting gas including the use of steel pipe, grounding of steel vent and procedures used in dismantling of steel vent on plastic pipe according to the Gas Distribution Standards Section 7.19.
- Identify and demonstrate for qualification the proper use of pneumatic tools including the Pavement Breaker, Tamper, Jack Hammer, Clay Spade, Scaler and personal protective equipment requirements, according to manufacturers recommendations & safety guidelines.
- Demonstrate qualifications for the proper procedures in handling live gas including a utilization pressure fitting, pressure fitting, and fusion equipment, according to the Standards & to equipment manufacturers recommendations.

- Demonstrate qualifications, both knowledge & skill, to properly construct a new gas service, including Electrofuse Sidewall Service Tee; fittings: servi-sert or posi-lock, insulated meter shut off, plug and mount sweep; conduct air test, tapping of service tee; clearing of service pipe from air to gas; installation of #12 locating wire and caution tape and proper mounting of gas meter according to the Gas Distribution Standards.
- Demonstrate qualifications of clearing a service or main from air to gas using a simulated mock-up according to the Gas Distribution Standards Section 4.9.
- Identify and demonstrate qualifications for proper installation of the compression Couplings: Bolted & Boltless Mechanical, according to the Gas Distribution Standards Section 4.3-2 and manufacturer's procedures.

**Evaluation Procedure:**

**Grading Criteria for Participants**

The participants will be individual evaluated on the course content utilizing the following criteria:

- Attendance - Mandatory
- Average of Quizzes = 30 % of Total Grade
- Final Examination = 70 % of Total Grade

**Course/Instructor Evaluation**

The course and instructor evaluation will consist of the following:

- End of Course Reaction Survey which will ask the participant opinion of the course based on within the objectives and outline
- Overall performance of as indicated by participants completion of quizzes, practical & laboratory exercises and final exam
- Instructor observations by PSE&G – Technical Training team to ensure consistence of instructional quality

**Course Content Outline - “Introduction to Gas Distribution ” UTI 109**

- |     |   |                                   |
|-----|---|-----------------------------------|
| I.  | Introduction & Orientation                              | <i>Lecture 100%</i>               |
|     | a. Course Objectives                                    |                                   |
|     | b. Schedule (Lecture/Discussion & Laboratory Exercises) |                                   |
|     | c. Evaluation System & Grading Criteria                 |                                   |
|     | d. Safety Characteristics                               |                                   |
|     | i. Bloodborne Pathogens                                 |                                   |
|     | ii. Vehicles  |                                   |
|     | iii. Fire Extinguishers                                 |                                   |
|     | iv. Tagging   |                                   |
|     | v. Tailboard Conference (Job Briefing)                  |                                   |
|     | vi.   |                                   |
| II. | Characteristics & Work Area Protection                  |                                   |
|     | a. Properties of Natural Gas                            | <i>Lecture 100%</i>               |
|     | b. Work Area Protection (MUTCD)                         | <i>Lecture 100%</i>               |
|     | c. Personal Protective Equipment                        | <i>Lecture 100%</i>               |
|     | d. Test Instruments                                     | <i>Lecture 75% - Hands-</i>       |
|     | on 25%  |                                   |
|     | e. Hand Tools   | <i>Lecture 100%</i>               |
|     | f. Repair Clamps  | <i>Lecture 75% - Hands-on 25%</i> |

- III. Piping & Corrosion
  - a. Basic Pipe Fitting *Lecture 100%*
  - b. Joint Trenching & Buried underground Distribution *Lecture 100%*
  - c. Manhole/Vault Safety Concerns *Lecture 100%*
  - d. Corrosion Control *Lecture 60% - Hands-on 40%*
  - e. Static Electricity on Plastic Pipe *Lecture 100%*
  - f. Pneumatic Tools *Lecture 90% - Hands-on 10%*
  
- IV. Handling Live Gas
  - a. Practices & Procedures *Lecture 10% - Hands-on 90%*
  - b. Joining Plastic Pipe *Lecture 10% - Hands-on 90%*
  
- V. Services
  - a. New Services *Hands-on 100%*
  - b. Replacement Services *Hands-on 100%*
  
- VI. Taping & Piping
  - a. Taping Machines *Lecture 10% - Hands-on 90%*
  - b. Purge Air/Gas *Lecture 75% - Hands-on 25%*
  - c. Compression Coupling *Lecture 50% - Hands-on 50%*
  - d. Abnormal Operating Conditions *Lecture 100%*
  
- VII. *DOT Operator Qualification* *Hands-on 100%*
  
- VIII. *DOT Operator Qualification* *Hands-on 100%*
  
- IX. Final Exam *Lecture*
  - a. Complete & Review Final Exam
  - b. Calculate Final Course Grades
  - c. Complete Course Evaluation