Module 66101-14 describes the functions, purposes, and components of pipelines, the products that are transported, and the ways in which they move through the pipeline.

**Objectives**

**Learning Objective 1**
- Explain the basic functions and purposes of pipelines.
  a. Explain the origination of pipeline products.
  b. Explain the transport of pipeline products.
  c. Explain types of pipeline facilities and their purposes.
  d. Identify maps and drawings used to depict pipeline systems.

**Learning Objective 2**
- Identify the characteristics and hazards of common pipeline products.
  a. Identify the characteristics and hazards of natural hydrocarbons.
  b. Identify the characteristics and hazards of refined products.
  c. Identify the characteristics and hazards of special products.
  d. Describe protective safety measures taken to prevent harm to people, property, and the environment.

**Learning Objective 3**
- Explain how products move through a pipeline (hydraulics and pneumatics).
  a. Explain the principles of fluids and system hydraulics as they relate to pipelines.
  b. Explain the principles of gases and system pneumatics as they relate to pipelines.

**Learning Objective 4**
- Explain the basic functions and purposes of pipeline equipment and electrical power systems.
  a. Explain the basic functions and purpose of pumps and motors.
  b. Explain the basic functions and purpose of compressors.
  c. Explain the basic functions and purpose of valves, actuators/operators, and traps.
  d. Explain the basic functions and purpose of tanks.
  e. Explain the basic functions and purpose of pressure vessels.
  f. Explain the basic functions and purpose of pipe and fittings.
  g. Explain the basic functions and purpose of manifolds.
  h. Explain the basic functions and purpose of measuring/sampling equipment.
  i. Explain the basic functions and purpose of electrical power systems.

**Learning Objective 5**
- Summarize the basic operations and maintenance procedures for pipelines.
  a. Summarize the regulations for pipeline operations.
  b. Describe pipeline monitoring and maintenance procedures.
  c. Summarize methods for corrosion control.
  d. Explain the basic documentation required of pipeline operators.

**Learning Objective 6**
- Identify career opportunities in the pipeline industry.
  a. Identify career opportunities in the technical disciplines.
  b. Identify career opportunities in the professional disciplines.

**Performance Tasks**
There are no Performance Tasks for the module.
Teaching Time: 10 hours
(Four 2.5-hour classroom sessions)
Session time may be adjusted to accommodate your class size, schedule, and teaching style.

Before You Begin
As you prepare for each session, allow sufficient time to review the course objectives, content, visual aids (including the PowerPoint® presentation), and these lesson plans, and to gather the required equipment and materials. Consider time required for demonstrations, laboratories, field trips, and testing.

Using your access code, download the Module Examinations from www.nccerirc.com. The passing score for submission into NCCER’s Registry is 70 percent or above for the Module Examination.

Safety Considerations
Safety is paramount in the pipeline industry and safe habits and practices must be emphasized whenever possible. There are no safety considerations in this module.

Classroom Equipment and Materials
- Whiteboard/chalkboard
- Markers/chalk
- Pencils and paper
- Pipeline Maintenance PowerPoint® Presentation Slides
- Computer
- Copies of the Module Examination
- Vendor-supplied videos/DVDs relating to the pipeline industry (optional)
- TV/DVD player

Equipment and Materials for Laboratories
- Blank copies of several types of reports
- Code of Federal Regulations 49, Parts 192 and 195
- Example of a piping and instrumentation diagram (P&ID)
- Example of an alignment sheet/strip map
- Examples of maps and drawings commonly used to communicate information about pipeline equipment, flow, and processes
- Examples of various fittings used in pipeline systems
- Map created using GPS
- Photographs of a manifold or actual manifold
- Photographs of compressor cut-aways or actual compressor cut-aways
- Photographs of meter cut-aways or actual meter cut-aways
- Photographs of valve actuators/operators
- Photographs of valve cut-aways or actual valve cut-aways
- Photographs of well-drilling and -capping equipment
- Sample copies of material safety data sheets/safety data sheets (MSDSs/SDSs)
- Sample layout of a pipeline system
- Samples of the following types of documentation: accident/incident reports, operation logs, work orders, event logs, personnel qualifications, and inspection and repair reports
- Samples pieces of pipeline used for gathering lines, distribution lines, and main lines
- Scraper pig
- Set of blueprints for a pipeline project
Additional Resources and References
This module presents thorough resources for task training. The following resource material is suggested for further study:

American National Standard Institute (ANSI), 1899 L Street, NW, 11th Floor, Washington, DC 20036. www.ansi.org
American Petroleum Institute (API), 1220 L Street, NW, Washington, DC 20005. www.api.org
American Society for Mechanical Engineers (ASME), Two Park Avenue, New York, NY 10016-5990. www.asme.org
Association of Oil Pipe Lines (AOPL), 1808 Eye Street, NW, Suite 300, Washington, DC 20006. www.aopl.org
International Society of Automation (ISA), 67 TW Alexander Drive, Research Triangle Park, NC 27709. www.isa.org
National Association of Corrosion Engineers (NACE), 1440 South Creek Drive, Houston, TX 77084. www.nace.org
National Electrical Code®, www.nfpa.org
Occupational Safety and Health Administration (OSHA), 200 Constitution Avenue, NW, Washington, DC 20210. www.osha.gov
US Energy Information Administration, 100 Independence Avenue, SW, Washington DC 20585. www.eia.gov

There are a number of online resources available for trainees who would like more information on the pipeline industry. A search for additional information may be assigned as homework to interested trainees.

Instructors should view any videos that may be identified in the lesson plan before using them to ensure their suitability. The videos can provide teachable moments in both proper and improper work processes and behaviors. Be prepared to stop the videos at appropriate times to point out and discuss both proper and improper conduct and techniques.

Instructors are encouraged to locate additional audiovisual aids available on the Internet, make personal videos, and take photos related to the subject matter and add them to the PowerPoint® presentations throughout the program.
The lesson plan for this module is divided into four 2.5-hour sessions. Each session includes 10 minutes for administrative tasks and one 10-minute break.

###Session One
Session One introduces the functions, purposes, and products or pipelines.
1. Show Session One PowerPoint® presentation slides.
2. Discuss the functions and purposes of pipelines.
3. Describe products that are conveyed through pipelines.

###Session Two
Session Two introduces pipeline hydraulics, pneumatics, and equipment.
1. Show Session Two PowerPoint® presentation slides.
2. Discuss how products move through a pipeline.
3. Identify and describe pipeline equipment and electrical power systems.

###Session Three
Session Three introduces pipeline operations, maintenance, and careers.
1. Show Session Three PowerPoint® presentation slides.
2. Discuss operations and maintenance procedures for pipelines.
3. List and describe career opportunities in the pipeline industry.

###Session Four
Session Four is a review and testing session. Have trainees complete the module Review Questions and Trade Terms Quiz. (Alternatively, these may be assigned as homework at the end of Session Three.) Answer any questions that trainees may have.
1. Have trainees complete the Module Examination.
2. Record the testing results on Training Report Form 200, and submit the report to your Training Program Sponsor.
### Materials Checklist for Module 66101-14, Introduction to the Pipeline Industry

<table>
<thead>
<tr>
<th>Equipment and Materials</th>
<th>Equipment and Materials</th>
<th>Equipment and Materials</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Personal protective equipment:</strong></td>
<td>Blank copies of several types of reports</td>
<td>Photographs of valve actuators/operators</td>
</tr>
<tr>
<td>None</td>
<td><em>Code of Federal Regulations</em> 49, Parts 192 and 195</td>
<td>Photographs of valve cut-aways or actual valve cut-aways</td>
</tr>
<tr>
<td>Whiteboard/chalkboard</td>
<td>Example of a piping and instrumentation diagram (P&amp;ID)</td>
<td>Photographs of well-drilling and -capping equipment</td>
</tr>
<tr>
<td>Markers/chalk</td>
<td>Example of an alignment sheet/strip map</td>
<td>Sample copies of material safety data sheets/safety data sheets (MSDSs/SDSs)</td>
</tr>
<tr>
<td>Pencils and paper</td>
<td>Examples of maps and drawings commonly used to communicate information about pipeline equipment, flow, and processes</td>
<td>Samples of the following types of documentation: accident/incident reports, operation logs, work orders, event logs, personnel qualifications, and inspection and repair reports</td>
</tr>
<tr>
<td><strong>Pipeline Maintenance PowerPoint® Presentation Slides</strong></td>
<td>Examples of various fittings used in pipeline systems</td>
<td>Sample layout of a pipeline system</td>
</tr>
<tr>
<td>Computer</td>
<td>Map created using GPS</td>
<td>Samples pieces of pipeline used for gathering lines, distribution lines, and main lines</td>
</tr>
<tr>
<td>Copies of the Module Examination</td>
<td>Photographs of a manifold or actual manifold</td>
<td>Photographs of meter cut-aways or actual meter cut-aways.</td>
</tr>
<tr>
<td>Vendor-supplied videos/DVDs relating to the pipeline industry (optional)</td>
<td>Photographs of compressor cut-aways or actual compressor cut-aways</td>
<td>Set of blueprints for a pipeline project</td>
</tr>
<tr>
<td>TV/DVD player</td>
<td>Scraper pig</td>
<td></td>
</tr>
</tbody>
</table>

To the extent possible, provide a selection of the equipment listed for each session; alternatively, photos may be used to teach equipment identification.
Module 71101-14 describes how field personnel recognize and properly react to abnormal operating conditions (AOCs) that may occur during pipeline operations. Trainees will learn about the federal regulations and agencies governing the operation of gas and liquid pipelines.

### Objectives

#### Learning Objective 1
- Explain how to recognize abnormal operating conditions for both gas and liquid pipelines.
  - a. Explain how to recognize abnormal pipeline facility conditions.
  - b. Explain how to recognize the activation of a safety device.
  - c. Explain how to recognize a communications failure and a control system failure.
  - d. Explain how to recognize power interruptions.
  - e. Explain how to recognize a fire, explosion, and natural disaster occurring with the pipeline.
  - f. Explain how to recognize the unexpected release of hazardous liquid or gas.
  - g. Explain how to recognize unexplained pressure/flow rate changes.

#### Learning Objective 2
- Describe the proper reaction to abnormal operating conditions for both gas and liquid pipelines.
  - a. Describe the proper reaction to abnormal pipeline facility conditions.
  - b. Describe the proper reaction to the activation of a safety device.
  - c. Describe the proper reaction to a communications failure and a control system failure.
  - d. Describe the proper reaction to power interruptions.
  - e. Describe the proper reaction to a fire, explosion, and natural disaster occurring with the pipeline.
  - f. Describe the proper reaction to the unexpected release of hazardous liquid or gas.
  - g. Describe the proper reaction to unexplained pressure/flow rate changes.

### Performance Tasks
- This is a knowledge-based module; there are no performance tasks.

### Teaching Time: 5 hours
(Two 2.5-Hour Classroom Sessions)

Session time may be adjusted to accommodate your class size, schedule, and teaching style.

### Before You Begin
As you prepare for each session, allow sufficient time to review the course objectives, content, visual aids (including the PowerPoint® presentation), and these lesson plans, and to gather the required equipment and materials. Consider time required for demonstrations, laboratories, field trips, and testing.

Using your access code, download the Module Examinations from [www.nccerirc.com](http://www.nccerirc.com). The passing score for submission into NCCER’s Registry is 70 percent or above for the Module Examination.
Safety Considerations
This module does not include Performance Tasks, and as such, no PPE is required for completion of this module. However, trainees should consistently be reminded of all dangers presented by abnormal operating conditions in pipeline work. It should also be stressed that personnel safety is a priority.

Classroom Equipment and Materials
Whiteboard/chalkboard
Markers/chalk
Pencils and paper
PowerPoint® Presentation Slides
Computer
Copies of the Module Examination
Vendor-supplied videos/DVDs showing abnormal operating conditions (optional)
TV/DVD player

Additional Resources
This module presents thorough resources for task training. The following resource material is suggested for further study.

Code of Federal Regulations 49, Parts 192 and 195

There are a number of online resources available for trainees who would like more information on abnormal operating conditions. A search for additional information may be assigned as homework to interested trainees.
The lesson plan for this module is divided into two 2.5-hour sessions. Each session includes 10 minutes for administrative tasks and one 10-minute break.

**SESSION ONE**

Session One introduces ways personnel in the field recognize and properly react to various abnormal operating conditions (AOCs).

1. Show Session One PowerPoint® presentation slides.
2. Identify potential sources for AOCs.
3. Discuss the effects of pressure on flow rate.
4. Review the list of abnormal pipeline facility/system conditions that may require action.
5. List the general steps to follow when responding to an alarm.
6. Review proper reactions to abnormal operating conditions.

**SESSION TWO**

Session Two is a review and testing session. Have trainees complete the module Review Questions and Trade Terms Quiz. (Alternatively, these may be assigned as homework at the end of Session One.) Answer any questions that trainees may have.

1. Have trainees complete the Module Examination.
2. Record the testing results on Training Report Form 200, and submit the report to your Training Program Sponsor.
### Materials Checklist for Module 71101-14, Field Abnormal Operating Conditions

<table>
<thead>
<tr>
<th>Equipment and Materials</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Personal protective equipment:</strong></td>
</tr>
<tr>
<td>None</td>
</tr>
<tr>
<td>Copies of the Module Examination</td>
</tr>
<tr>
<td>PowerPoint® Presentation Slides</td>
</tr>
<tr>
<td>DVD player</td>
</tr>
<tr>
<td>Whiteboard/chalkboard</td>
</tr>
<tr>
<td>Markers/chalk</td>
</tr>
<tr>
<td>Pencils and paper</td>
</tr>
<tr>
<td>Computer</td>
</tr>
<tr>
<td>TV/DVD (optional)</td>
</tr>
</tbody>
</table>
Module 62103-14 describes the identification of and response to the release of product or crude.

**Objectives**

**Learning Objective 1**
- Describe release prevention activities.
  - a. Identify the main government agencies that regulate the release of hazardous materials.
  - b. Describe inspections and their role in release prevention.
  - c. Explain the importance of personnel being aware of surroundings and their role in release prevention.
  - d. Describe maintenance practices and their role in release prevention.

**Learning Objective 2**
- Explain release recognition activities.
  - a. Explain release recognition by control center personnel.
  - b. Explain reporting by aerial patrols, field personnel, and third parties.
  - c. Explain release recognition regarding soil contamination.

**Learning Objective 3**
- Describe release response activities.
  - a. Describe appropriate release response by control center personnel.
  - b. Describe appropriate release response by field personnel.
  - c. Describe isolation and containment activities.
  - d. Describe release recovery.
  - e. Describe waste handling.
  - f. Describe remediation.
  - g. Describe the Incident Command System (ICS).

**Performance Tasks**
There are no Performance Tasks for this module.

**Teaching Time: 5 hours**
(Two 2.5-hour classroom sessions)
Session time may be adjusted to accommodate your class size, schedule, and teaching style.

**Before You Begin**
As you prepare for each session, allow sufficient time to review the course objectives, content, visual aids (including the PowerPoint® presentation), and these lesson plans, and to gather the required equipment and materials. Consider time required for demonstrations, laboratories, field trips, and testing.

Using your access code, download the Module Examinations from www.nccerirc.com. The passing score for submission into NCCER’s Registry is 70 percent or above for the Module Examination.
**Safety Considerations**

Safety is paramount in the pipeline industry and safe habits and practices must be emphasized whenever possible. There are no safety considerations in this module.

---

**Classroom Equipment and Materials**

- Whiteboard/chalkboard
- Markers/chalk
- Pencils and paper
- *Pipeline Maintenance PowerPoint® Presentation Slides*
- Computer
- Copies of the Module Examination
- Vendor-supplied videos/DVDs showing release identification and response (optional)
- TV/DVD player

**Equipment and Materials for Laboratories**

- Photographs of different methods and materials used for isolation and containment
- Photographs of various recovery methods
- Photographs showing vegetation after releases have occurred
- Samples of a company’s environmental and release response procedures

---

**Additional Resources and References**

This module presents thorough resources for task training. The following resource material is suggested for further study:

- **American Petroleum Institute (API)**, 1220 L Street, NW, Washington, DC 20005. [www.api.org](http://www.api.org)
- **Environmental Protection Agency (EPA)**, 1200 Pennsylvania Avenue, NW, Washington, DC 20460. [www.epa.gov](http://www.epa.gov)
- **National Response Center (NRC) c/o United States Coast Guard (CG-5335 - Stop 7581)**, 2100 2nd Street, SW, Washington, DC 20593-0001. [www.nrc.uscg.mil](http://www.nrc.uscg.mil)
- **National Response Team**. [www.nrt.org](http://www.nrt.org)
- **Occupational Safety and Health Administration (OSHA)**, 200 Constitution Avenue, NW, Washington, DC 20210. [www.osha.gov](http://www.osha.gov)

There are a number of online resources available for trainees who would like more information on release identification and response. A search for additional information may be assigned as homework to interested trainees.

Instructors should view any videos that may be identified in the lesson plan before using them to ensure their suitability. The videos can provide teachable moments in both proper and improper work processes and behaviors. Be prepared to stop the videos at appropriate times to point out and discuss both proper and improper conduct and techniques.

Instructors are encouraged to locate additional audiovisual aids available on the Internet, make personal videos, and take photos related to the subject matter and add them to the PowerPoint® presentations throughout the program.
The lesson plan for this module is divided into two 2.5-hour sessions.
Each session includes 10 minutes for administrative tasks and one 10-minute break.

**SESSION ONE**

Session One introduces inspection, maintenance, and release prevention, identification, and response.

1. Show Session One PowerPoint® presentation slides.
2. Discuss release prevention activities.
3. Discuss inspection and maintenance activities.
4. Discuss release recognition activities.
5. Discuss release response activities.

**SESSION TWO**

Session Two is a review and testing session.

1. Have trainees complete the module Review Questions and Trade Terms Quiz. (Alternatively, these may be assigned as homework at the end of Session One.) Answer any questions that trainees may have.
2. Record the testing results on Training Report Form 200, and submit the report to your Training Program Sponsor.
### Materials Checklist for Module 62103-14, Release Identification and Response

<table>
<thead>
<tr>
<th>Equipment and Materials</th>
<th>Personal protective equipment:</th>
<th>Photographs of different methods and materials used for isolation and containment</th>
<th>Photographs showing vegetation after releases have occurred</th>
<th>Photographs showing various recovery methods</th>
<th>Samples of a company’s environmental and release response procedures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Whiteboard/chalkboard</td>
<td>None</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Markers/chalk</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pencils and paper</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Pipeline Maintenance PowerPoint® Presentation Slides</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Computer</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Copies of the Module Examination</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vendor-supplied videos/DVDs showing release identification and response (optional)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TV/DVD player</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

To the extent possible, provide a selection of the equipment listed for each session; alternatively, photos may be used to teach equipment identification.
Module 62104-13 describes use and care of the hand and power tools that are used in the pipeline industry. It also describes the use of welding equipment and the use of meters and testers, and it explains nondestructive testing and the uses of lifting equipment and heavy excavating equipment.

### Objectives

**Learning Objective 1**
- Use and maintain hand and power tools.
  a. Use and maintain hand tools.
  b. Use and maintain power tools.

**Learning Objective 2**
- Identify and explain the use of welding machines and related equipment.
  a. Identify and explain the use of welding machines.
  b. Identify and explain the use of beveling/cutting equipment.
  c. Identify and explain the use of line-up clamps.

**Learning Objective 3**
- Identify and explain the use of meters and testers.
  a. Identify and explain the use of atmospheric multigas monitors.
  b. Identify and explain the use of holiday detectors and jeeps.
  c. Identify and explain the use of line locators.

**Learning Objective 4**
- Explain the use of nondestructive examination methods and equipment.
  a. Explain the use of liquid-dye penetrant tests.
  b. Explain the use of magnetic-particle tests.
  c. Explain the use of ultrasonic tests.
  d. Explain the use of radiography.
  e. Identify and explain the use of visual and optical inspections.

**Learning Objective 5**
- Identify and explain the use of lifting equipment.
  a. Identify and explain the use of hydraulic cranes.
  b. Identify and explain the use of pipeline side-boom tractors.
  c. Identify and explain the use of rigging equipment.

**Learning Objective 6**
- Identify and explain the use of excavation equipment.
  a. Identify and explain the use of trackhoes and backhoes.
  b. Identify and explain the use of bulldozers.
  c. Identify and explain the use of trenching equipment.

### Performance Tasks

**Performance Task 1** (Learning Objective 1)
- Demonstrate the use of a given hand tool according to standards given by the instructor.

**Performance Task 2** (Learning Objective 1)
- Demonstrate the use of a given power tool according to standards given by the instructor.

**Teaching Time:** 7.5 hours
(Three 2.5-hour sessions)
Session time may be adjusted to accommodate your class size, schedule, and teaching style.

**Prerequisites**
- Core Curriculum and Pipeline Maintenance Level One, Modules 66101-13, 66107-13, and 62103-13.
Before You Begin
As you prepare for each session, allow sufficient time to review the course objectives, content, visual aids (including the PowerPoint® presentation), and these lesson plans, and to gather the required equipment and materials. Consider time required for demonstrations, laboratories, field trips, and testing.

Using your access code, download the Module Examinations and Performance Profile Sheets from www.nccerirc.com. The passing score for submission into NCCER’s Registry is 70 percent or above for the Module Examination; performance testing is graded pass or fail.

Safety Considerations
This module requires that trainees demonstrate proper use of hand and power tools. Safety is paramount in the pipeline industry and safe habits and practices must be emphasized whenever possible. Performance Tasks must be completed under your supervision. Each trainee must use required PPE and follow safe tool practices and procedures.

Classroom Equipment and Materials
Whiteboard/chalkboard
Markers/chalk
Pencils and paper
Pipeline Maintenance Level One PowerPoint® Presentation Slides
LCD projector and screen
Computer
Copies of the Module Examination and Performance Profile Sheets
Vendor-supplied videos/DVDs showing tools used in the pipeline industry (optional)
TV/DVD player

Equipment and Materials for Laboratories and Performance Testing
Personal protective equipment (PPE):
   - Eye protection
   - Foot protection
   - Hand protection
   - Hearing protection
Air bag
Air compressors
Air movers
Assorted lengths of pipe of different thicknesses
Atmospheric multigas monitors
Bolt-thru ratchets
Bonding clamps
Borescope
Circular saw
Copy of OSHA 29 CFR 1926.301
Dewatering pump
Examples of damaged tools
Fiberscope
Flange alignment pins
Flange spreaders
Grinders
Hammer wrenches
Holiday detectors

Hydrant wrenches
Jeeps
Line locators
Line-traveling pipe preparation machines
Line-up clamps
Liquid-dye penetrant test kit
Lowering-in belts
Magnetic-particle test equipment
Photographs of backhoes and trackhoes
Photographs of boom trucks
Photographs of bulldozers
Photographs of pipeline skids
Photographs of rough-terrain cranes
Photographs of trenching equipment
Pipe-handling calipers
Pit gauges
Probe rod
Roller or wheel cradles
T-handle torque wrench
Ultrasonic test equipment
Valve wrench

Additional Resources and References
This module presents thorough resources for task training. The following resource material is suggested for further study:

Occupational Safety and Health Administration (OSHA), 200 Constitution Avenue, NW, Washington, DC 20210. www.osha.gov


There are a number of online resources available for trainees who would like more information on tools used in the pipeline industry. A search for additional information may be assigned as homework to interested trainees.
The lesson plan for this module is divided into three 2.5-hour sessions. Each session includes 10 minutes for administrative tasks and one 10-minute break.

**SESSION ONE**

Session One introduces hand and power tools, including welding equipment.

Show Session One PowerPoint® presentation slides.

Discuss hand and power tool safety, and emphasize the importance of working safely on a job site.

Identify, describe, and demonstrate the safe use of hand tools.

Identify, describe, and demonstrate the safe use of power tools.

Identify and describe the safe use of welding equipment.

**SESSION TWO**

Session Two introduces monitoring, lifting, and excavation equipment and nondestructive testing equipment.

Show Session Two PowerPoint® presentation slides.

Identify, describe, and demonstrate the safe use of monitoring equipment.

Identify, describe, and demonstrate the safe use of nondestructive testing equipment.

Identify, describe, and demonstrate the safe use of lifting equipment.

Identify and describe the safe use of excavation equipment.

**SESSION THREE**

Session Three is a review and testing session. Have trainees complete the module Review Questions and Trade Terms Quiz. (Alternatively, these may be assigned as homework at the end of Session Two.) Answer any questions that trainees may have.

Have trainees complete the Module Examination. Any outstanding performance testing must be completed during this session.

Record the testing results on Training Report Form 200, and submit the report to your Training Program Sponsor.
### Materials Checklist for Module 62104-13, Tools of the Trade

<table>
<thead>
<tr>
<th>Equipment and Materials</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Personal protective equipment:</strong></td>
<td></td>
</tr>
<tr>
<td>Air bag</td>
<td>Line locators</td>
</tr>
<tr>
<td>Eye protection</td>
<td>Air compressors</td>
</tr>
<tr>
<td>Foot protection</td>
<td>Air movers</td>
</tr>
<tr>
<td>Hand protection</td>
<td>Assorted lengths of pipe of different thicknesses</td>
</tr>
<tr>
<td>Hearing protection</td>
<td>Atmospheric multigas monitors</td>
</tr>
<tr>
<td>Whiteboard/chalkboard</td>
<td>Bolt-thru ratchets</td>
</tr>
<tr>
<td>Markers/chalk</td>
<td>Bonding clamps</td>
</tr>
<tr>
<td>Pencils and paper</td>
<td>Borescope</td>
</tr>
<tr>
<td><strong>Pipeline Maintenance Level One PowerPoint® Presentation Slides</strong></td>
<td></td>
</tr>
<tr>
<td>Circular saw</td>
<td>Photographs of bulldozers</td>
</tr>
<tr>
<td><strong>LCD projector and screen</strong></td>
<td>Copy of OSHA 29 CFR 1926.301</td>
</tr>
<tr>
<td><strong>Computer</strong></td>
<td>Dewatering pump</td>
</tr>
<tr>
<td><strong>Copies of the Module Examination</strong></td>
<td>Examples of damaged tools</td>
</tr>
<tr>
<td><strong>Vendor-supplied videos/DVDs showing release identification and response (optional)</strong></td>
<td>Fiberscope</td>
</tr>
<tr>
<td><strong>TV/DVD player</strong></td>
<td>Flange alignment pins</td>
</tr>
<tr>
<td></td>
<td>Flange spreaders</td>
</tr>
<tr>
<td></td>
<td>Grinders</td>
</tr>
<tr>
<td></td>
<td>Hammer wrenches</td>
</tr>
<tr>
<td></td>
<td>Holiday detectors</td>
</tr>
<tr>
<td></td>
<td>Hydrant wrenches</td>
</tr>
<tr>
<td></td>
<td>Jeeps</td>
</tr>
</tbody>
</table>

To the extent possible, and as required for performance testing, provide a selection of the tools listed for each session; alternatively, photos may be used to teach tool identification.
Module 62105-14 describes the different types of documents required in the pipeline industry.

### Objectives

**Learning Objective 1**
- Identify and describe pipeline facility documents.
  a. Identify and describe facility-related maps.
  b. Identify and describe facility diagrams and drawings.

**Learning Objective 2**
- Identify and describe common pipeline operations documents.
  a. Identify and describe inspection-based documents.
  b. Identify and describe construction and maintenance documents.
  c. Identify and describe safety-related documents.

### Performance Tasks

There are no Performance Tasks for the module.

### Teaching Time: 5 hours

(Two 2.5-hour classroom sessions)

Session time may be adjusted to accommodate your class size, schedule, and teaching style.

### Before You Begin

As you prepare for each session, allow sufficient time to review the course objectives, content, visual aids (including the PowerPoint® presentation), and these lesson plans, and to gather the required equipment and materials. Consider time required for demonstrations, laboratories, field trips, and testing.

Using your access code, download the Module Examinations from [www.nccerirc.com](http://www.nccerirc.com). The passing score for submission into NCCER’s Registry is 70 percent or above for the Module Examination.
# Safety Considerations

Safety is paramount in the pipeline industry and safe habits and practices must be emphasized whenever possible. There are no safety considerations in this module.

## Classroom Equipment and Materials
- Whiteboard/chalkboard
- Markers/chalk
- Pencils and paper
- Pipeline Maintenance PowerPoint® Presentation Slides
- Computer
- Copies of the Module Examination
- Vendor-supplied videos/DVDs showing pipeline documents *(optional)*
- TV/DVD player

## Equipment and Materials for Laboratories
- Copies of the following documents:
  - Alignment sheets/strip maps
  - Blank accident reports
  - Exposed-pipe reports
  - Follow-up reports
  - Isometric piping drawings
  - Pipe repair/replacement reports
  - Piping and instrumentation diagrams (P&IDs)
- Profile maps
- Right-of-way reports
- Safety-related condition reports
- Tank inspection reports
- Topographical maps
- Valve inspection reports
- Work orders

## Additional Resources and References

This module presents thorough resources for task training. The following resource material is suggested for further study:


There are a number of online resources available for trainees who would like more information on pipeline documents. A search for additional information may be assigned as homework to interested trainees.

Instructors should view any videos that may be identified in the lesson plan before using them to ensure their suitability. The videos can provide teachable moments in both proper and improper work processes and behaviors. Be prepared to stop the videos at appropriate times to point out and discuss both proper and improper conduct and techniques.

Instructors are encouraged to locate additional audiovisual aids available on the Internet, make personal videos, and take photos related to the subject matter and add them to the PowerPoint® presentations throughout the program.
The lesson plan for this module is divided into two 2.5-hour sessions. Each session includes 10 minutes for administrative tasks and one 10-minute break.

**Session One**

Session One introduces pipeline documentation.

1. Show Session One PowerPoint® presentation slides.
2. Identify and describe pipeline facility documents.
3. Identify and describe common pipeline operations documents.

**Session Two**

Session Two is a review and testing session. Have trainees complete the module Review Questions and Trade Terms Quiz. (Alternatively, these may be assigned as homework at the end of Session One.) Answer any questions that trainees may have.

1. Have trainees complete the Module Examination.
2. Record the testing results on Training Report Form 200, and submit the report to your Training Program Sponsor.
## Materials Checklist for Module 62105-14, Introduction to Pipeline Documents

<table>
<thead>
<tr>
<th>Equipment and Materials</th>
<th>Equipment and Materials</th>
<th>Equipment and Materials</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Personal protective equipment:</strong></td>
<td>Copies of the following documents:</td>
<td>Profile maps</td>
</tr>
<tr>
<td>None</td>
<td>Profile maps</td>
<td>Profile maps</td>
</tr>
<tr>
<td></td>
<td>Alignment sheets/strip maps</td>
<td>Right-of-way reports</td>
</tr>
<tr>
<td>Whiteboard/chalkboard</td>
<td>Blank accident reports</td>
<td>Safety-related condition reports</td>
</tr>
<tr>
<td>Markers/chalk</td>
<td>Exposed-pipe reports</td>
<td>Tank inspection reports</td>
</tr>
<tr>
<td>Pencils and paper</td>
<td>Follow-up reports</td>
<td>Topographical maps</td>
</tr>
<tr>
<td><em>Pipeline Maintenance PowerPoint® Presentation Slides</em></td>
<td>Isometric piping drawings</td>
<td>Valve inspection reports</td>
</tr>
<tr>
<td>Computer</td>
<td>Pipe repair/replacement reports</td>
<td>Work orders</td>
</tr>
<tr>
<td>Copies of the Module Examination</td>
<td>Piping and instrumentation diagrams (P&amp;IDs)</td>
<td></td>
</tr>
<tr>
<td>Vendor-supplied videos/DVDs showing release identification and response (optional)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

TV/DVD player

To the extent possible, provide a selection of the equipment listed for each session; alternatively, photos may be used to teach equipment identification.
Module 62106-14 describes the notification process used to prevent pipeline damage, the methods for locating pipelines, and the process for marking pipelines.

### Objectives

**Learning Objective 1**
- Describe the purpose and procedures for the One-Call system.
  - a. Describe the appropriate operator response to standard notifications.
  - b. Describe the appropriate operator response to emergency notifications.

**Learning Objective 2**
- Explain line-locating methods and equipment.
  - a. Explain the use of alignment sheets, maps, and drawings to locate pipelines.
  - b. Explain the use of the Global Positioning System (GPS) to locate pipelines.
  - c. Explain mechanical line-locating equipment.
  - d. Explain electronic line-locating equipment.

**Learning Objective 3**
- Explain the process for marking pipelines.
  - a. Explain the purpose and procedures for temporary markers.
  - b. Explain the purpose and procedures for permanent markers.
  - c. Explain how to install line markers.
  - d. Explain how to inspect and maintain markers.

### Performance Tasks

**Performance Task 1** (Learning Objective 2)
- Locate or simulate locating a line per company procedure and/or using Performance Verification 14.1 and 17.1 as a guide.

**Performance Task 2** (Learning Objective 3)
- Install or simulate installing a line marker per company procedure and/or using Performance Verification 14.2 and 17.2 as a guide.

**Performance Task 3** (Learning Objective 3)
- Inspect and maintain a line marker per company procedure and/or using Performance Verification 14.3 and 17.3 as a guide.

**Performance Task 4** (Learning Objective 3)
- Inspect and maintain an aerial line marker per company procedure and/or using Performance Verification 14.4 as a guide.

### Teaching Time: 15 hours
(Six 2.5-hour classroom sessions)
Session time may be adjusted to accommodate your class size, schedule, and teaching style.

### Before You Begin
As you prepare for each session, allow sufficient time to review the course objectives, content, visual aids (including the PowerPoint presentation), and these lesson plans, and to gather the required equipment and materials. Consider time required for demonstrations, laboratories, field trips, and testing.

Using your access code, download the Module Examinations and Performance Profile Sheets from www.nccerirc.com. The passing score for submission into NCCER’s Registry is 70 percent or above for the Module Examination; performance testing is graded pass or fail.
Safety Considerations
This module requires that trainees install, inspect, and maintain line markers. Safety is paramount in the pipeline industry and safe habits and practices must be emphasized whenever possible. Performance Tasks must be completed under your supervision. Each trainee must use required PPE and follow safe tool practices and procedures.

Classroom Equipment and Materials
- Whiteboard/chalkboard
- Markers/chalk
- Pencils and paper
- Pipeline Maintenance PowerPoint® Presentation Slides
- Computer
- Copies of the Module Examination and Performance Profile Sheets
- Vendor-supplied videos/DVDs showing line locating and marking (optional)
- TV/DVD player

Equipment and Materials for Laboratories and Performance Testing
- Personal protective equipment (PPE):
  - Eye protection
  - Work boots
  - Hearing protection
  - Hard hat
  - Alignment sheets/strip maps
  - Electromagnetic locators
  - Electronic pipe-locating equipment
  - Ground clamp and rod
  - Induction set
  - Permanent line markers
- Photographs of signs designating underground pipelines
- Photographs of temporary markers in place
- Probe rods
- Samples of One-Call tickets
- Shovels
- Signal clamps
- Temporary line markers
- Test leads
- Vacuum-powered tools

Additional Resources and References
This module presents thorough resources for task training. The following resource material is suggested for further study:


There are a number of online resources available for trainees who would like more information on pipeline locating and marking. A search for additional information may be assigned as homework to interested trainees.

Instructors should view any videos that may be identified in the lesson plan before using them to ensure their suitability. The videos can provide teachable moments in both proper and improper work processes and behaviors. Be prepared to stop the videos at appropriate times to point out and discuss both proper and improper conduct and techniques.

Instructors are encouraged to locate additional audiovisual aids available on the Internet, make personal videos, and take photos related to the subject matter and add them to the PowerPoint® presentations throughout the program.
Session Outline for 62106-14

LINE LOCATING AND MARKING (CTs 14 and 17)

The lesson plan for this module is divided into six 2.5-hour sessions. Each session includes 10 minutes for administrative tasks and one 10-minute break.

SESSION ONE

Session One introduces the One-Call system and line locating.

1. Show Session One PowerPoint® presentation slides.
2. Discuss the use of the One-Call system and One-Call tickets.
3. Discuss the use of alignment sheets/strip maps to locate pipelines. Provide alignment sheets/strip maps to the trainees and ensure that trainees are proficient in reading them.
4. Discuss how pipeline or cable depth is determined.

SESSION TWO

Session Two introduces GPS and mechanical pipe-locating methods.

1. Show Session Two PowerPoint® presentation slides.
2. Discuss the use of GPS to create maps.
3. Discuss and demonstrate the use of probe rods. Have trainees demonstrate the proper use of probe rods.
4. Discuss and demonstrate the use of hand digging and pot-holing to locate pipelines and cables. Have trainees demonstrate the proper use of hand digging and pot-holing.
5. Discuss and demonstrate the use of vacuum-powered tools. Have trainees demonstrate the proper use of vacuum-powered tools.
6. Discuss the use of a backhoe to expose underground pipe and cables.

SESSION THREE

Session Three introduces electronic pipe-locating equipment.

1. Show Session Three PowerPoint® presentation slides.
2. Discuss and demonstrate the use of electronic pipe-locating equipment. Have trainees demonstrate the safe use of electronic pipe-locating equipment.
3. Discuss and demonstrate the use of an electromagnetic locator. Have trainees demonstrate the safe use of an electromagnetic locator.

SESSION FOUR

Session Four introduces signal strength and effectiveness, as well as other pipe-locating methods.

1. Show Session Four PowerPoint® presentation slides.
2. Discuss signal effectiveness and factors that affect it.
3. Discuss and demonstrate the use of signal clamps. Have trainees demonstrate the safe use of signal clamps.
4. Discuss and demonstrate the use of the direct-connection method. Have trainees demonstrate the safe use of the direct-connection method.
5. Discuss and demonstrate other methods of locating pipes and cables.
**Session Outline for 62106-14**

**LINE LOCATING AND MARKING (CTs 14 and 17)**

---

**Session Five**

Session Five introduces marking pipelines.

1. Show Session Five PowerPoint® presentation slides.
2. Discuss the color codes used for marking pipelines.
3. Discuss and demonstrate the proper procedure for installing temporary line markers. Have trainees demonstrate the proper procedure for installing temporary line markers.
4. Discuss and demonstrate the proper procedure for installing permanent line markers. Have trainees demonstrate the proper procedure for installing permanent line markers.
5. Discuss and demonstrate the proper procedure for inspecting and maintaining line markers. Have trainees demonstrate the proper procedure for inspecting and maintaining line markers.

---

**Session Six**

Session Six is a review and testing session.

1. Have trainees complete the module Review Questions and Trade Terms Quiz. (Alternatively, these may be assigned as homework at the end of Session Five.) Answer any questions that trainees may have.
2. Record the testing results on Training Report Form 200, and submit the report to your Training Program Sponsor.
## Materials Checklist for Module 62106-14, Line Locating and Marking (CTs 14 and 17)

<table>
<thead>
<tr>
<th>Equipment and Materials</th>
<th>Equipment and Materials</th>
<th>Equipment and Materials</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Personal protective equipment:</strong></td>
<td>Alignment sheets/strip maps</td>
<td>Probe rods</td>
</tr>
<tr>
<td>Eye protection</td>
<td>Electromagnetic locators</td>
<td>Samples of One-Call tickets</td>
</tr>
<tr>
<td>Work boots</td>
<td>Electronic pipe-locating equipment</td>
<td>Shovels</td>
</tr>
<tr>
<td>Hearing protection</td>
<td>Ground clamp and rod</td>
<td>Signal clamps</td>
</tr>
<tr>
<td>Hard hat</td>
<td>Induction set</td>
<td>Temporary line markers</td>
</tr>
<tr>
<td>Whiteboard/chalkboard</td>
<td>Permanent line markers</td>
<td>Test leads</td>
</tr>
<tr>
<td>Markers/chalk</td>
<td>Photographs of signs designating underground pipelines</td>
<td>Vacuum-powered tools</td>
</tr>
<tr>
<td>Pencils and paper</td>
<td>Photographs of temporary markers in place</td>
<td></td>
</tr>
<tr>
<td><strong>Pipeline Maintenance</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>PowerPoint® Presentation</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Slides</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Computer</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Copies of the Module Examination</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vendor-supplied videos/DVDs showing release identification and response (optional)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TV/DVD player</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

To the extent possible, provide a selection of the equipment listed for each session; alternatively, photos may be used to teach equipment identification.
Module 62109-14 describes the process of inspecting a right-of-way by aerial, vehicle, and foot patrols. It covers what constitutes a reportable observation as well as proper reporting procedures.

Objectives

Learning Objective 1
- Describe surface right-of-way inspection.
  a. Describe the regulatory requirements for surface right-of-way inspections.
  b. Explain how to locate the pipeline.
  c. Describe aerial-patrol purpose and performance.
  d. Describe vehicle/foot-patrol purpose and performance.

Learning Objective 2
- Identify the reportable observations for surface right-of-way inspections.
  a. Identify emergency situations.
  b. Identify environmental changes.
  c. Identify pipeline damage or exposure.
  d. Identify missing or damaged signs/markers.
  e. Identify encroachment/nearby activities.
  f. Identify vandalism.
  g. Identify other unsafe conditions.

Learning Objective 3
- Explain the procedures for performing post-blasting leak surveillance.
  a. Explain the procedures for performing a leak survey.
  b. Explain the procedures for monitoring for pressure loss.

Learning Objective 4
- Explain the reporting procedures for surface right-of-way inspections.
  a. Explain written inspection reports.
  b. Explain emergency and verbal inspection reports.
  c. Explain ROW investigation reports.

Performance Tasks

Performance Task 1 (Learning Objective 2)
- Inspect surface conditions of the right-of-way per company procedure and/or using Performance Verification 15.1 as a guide.

Performance Task 2 (Learning Objective 4)
- Complete documentation and report forms for a right-of-way inspection per company procedure and/or using Performance Verification 15.2 as a guide.

Teaching Time: 7.5 hours
(Three 2.5-hour classroom sessions)
Session time may be adjusted to accommodate your class size, schedule, and teaching style.

Before You Begin
As you prepare for each session, allow sufficient time to review the course objectives, content, visual aids (including the PowerPoint® presentation), and these lesson plans, and to gather the required equipment and materials. Consider time required for demonstrations, laboratories, field trips, and testing.

Using your access code, download the Module Examinations and Performance Profile Sheets from www.nccerirc.com. The passing score for submission into NCCER’s Registry is 70 percent or above for the Module Examination; performance testing is graded pass or fail.
**Safety Considerations**

This module requires that trainees inspect surface conditions of a pipeline right-of-way. Safety is paramount in the pipeline industry and safe habits and practices must be emphasized whenever possible. Performance Tasks must be completed under your supervision. Each trainee must use required PPE and follow safe tool practices and procedures.

---

**Classroom Equipment and Materials**

- Whiteboard/chalkboard
- Markers/chalk
- Pencils and paper
- *Pipeline Maintenance* PowerPoint® Presentation Slides
- Computer
- Copies of the Module Examination and Performance Profile Sheets
- Vendor-supplied videos/DVDs showing surface right-of-way inspections (optional)
- TV/DVD player
- Notebooks

**Equipment and Materials for Laboratories and Performance Testing**

- Personal protective equipment (PPE):
  - Hard hat
  - Safety vest
- Examples of alignment sheets
- Photographs of reportable pipeline conditions
- Blank ROW inspection forms

---

**Additional Resources and References**

This module presents thorough resources for task training. The following resource material is suggested for further study:


There are a number of online resources available for trainees who would like more information on surface right-of-way inspections. A search for additional information may be assigned as homework to interested trainees.

Instructors should view any videos that may be identified in the lesson plan before using them to ensure their suitability. The videos can provide teachable moments in both proper and improper work processes and behaviors. Be prepared to stop the videos at appropriate times to point out and discuss both proper and improper conduct and techniques.

Instructors are encouraged to locate additional audiovisual aids available on the Internet, make personal videos, and take photos related to the subject matter and add them to the PowerPoint® presentations throughout the program.
The lesson plan for this module is divided into three 2.5-hour sessions.
Each session includes 10 minutes for administrative tasks and one 10-minute break.

**Session One**

Session One introduces surface right-of-way inspections and reportable observations.

1. Session One PowerPoint® presentation slides.
2. Discuss the differing regulations for liquid and gas pipelines.
3. Discuss the use of alignment sheets/strip maps to locate pipelines. Provide alignment sheets/strip maps to the trainees for review.
4. Discuss the various methods of inspecting pipelines—by foot patrol, by vehicle, and by aerial patrol.
5. Examine reportable observations, including emergency situations, environmental changes, pipeline damage or exposure, missing or damaged signs and markers, and encroachment activities.

**Session Two**

Session Two introduces the procedures for performing leak surveys and the required reporting for surface right-of-way inspections.

1. Show Session Two PowerPoint® presentation slides.
2. Discuss the steps involved in performing a leak survey and in monitoring pressure loss on the pipeline.
3. Discuss the reporting process for required reports, including written inspection reports, emergency and verbal inspection reports, and ROW investigation reports.

**Session Three**

Session Three is a review and testing session. Have trainees complete the module Review Questions and Trade Terms Quiz. (Alternatively, these may be assigned as homework at the end of Session Two.) Answer any questions that trainees may have.

1. Have trainees complete the Module Examination. Any outstanding performance testing must be completed during this session.
2. Record the testing results on Training Report Form 200, and submit the report to your Training Program Sponsor.
### Equipment and Materials

<table>
<thead>
<tr>
<th>Equipment and Materials</th>
<th>Examples of alignment sheets</th>
<th>Blank ROW inspection forms</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Personal protective equipment:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hard hat</td>
<td>Photographs of reportable</td>
<td></td>
</tr>
<tr>
<td>Safety vest</td>
<td>pipeline conditions</td>
<td></td>
</tr>
<tr>
<td>Whiteboard/chalkboard</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Markers/chalk</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pencils and paper</td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Pipeline Maintenance</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>PowerPoint® Presentation</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Slides</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Computer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Copies of the Module Examination</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vendor-supplied videos/DVDs showing release</td>
<td></td>
<td></td>
</tr>
<tr>
<td>identification and response (optional)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TV/DVD player</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Notebooks</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

To the extent possible, provide a selection of the equipment listed for each session; alternatively, photos may be used to teach equipment identification.
Module 62203-14 describes the procedures for performing four different types of mainline valve inspections: a walk-around inspection, an external integrity inspection, a valve function test, and a valve leak test. The text describes the specific abnormal operating conditions (AOCs) that may occur during each type of inspection and the proper reaction for each.

**Objectives**

**Learning Objective 1**
- Explain how to perform a mainline valve inspection.
  a. Explain the purpose and procedures for a routine walk-around inspection.
  b. Explain the purpose and procedures for an external integrity inspection.
  c. Explain the purpose and procedures for a valve function test.
  d. Explain the purpose and procedures for a valve leak test.

**Learning Objective 2**
- Describe abnormal operating conditions (AOCs) that may be encountered during valve inspections and the proper reactions for each.
  a. Describe the proper reactions for AOCs that may be encountered during a routine walk-around inspection and routine external integrity test.
  b. Describe the proper reactions for AOCs that may be encountered during a routine valve function and valve leak test.

**Performance Tasks**

**Performance Task 1 (Learning Objective 1)**
- Perform a routine walk-around valve inspection per company procedure.

**Performance Task 2 (Learning Objective 1)**
- Perform an external integrity inspection on a valve per company procedure.

**Performance Task 3 (Learning Objective 1)**
- Perform or simulate performing a function test on a valve per company procedure.

**Performance Task 4 (Learning Objective 1)**
- Perform or simulate performing a leak test on a valve per company procedure.

**Teaching Time: 7.5 hours**
(Three 2.5-hour Classroom sessions)
Session time may be adjusted to accommodate your class size, schedule, and teaching style.

**Before You Begin**

As you prepare for each session, allow sufficient time to review the course objectives, content, visual aids (including the PowerPoint® presentation), and these lesson plans, and to gather the required equipment and materials. Consider time required for demonstrations, laboratories, field trips, and testing.

To obtain access to all the Pipeline Maintenance Instructor Resources including exams, performance profile sheets, and PowerPoint® presentations from www.nccerinc.com, contact your Pearson sales representative for an Access Code Card. The passing score for submission into NCCER’s Registry is 70 percent or above for the Module Examination; performance testing is graded pass or fail.
Safety Considerations
This module requires that trainees perform inspections of mainline valves. Safety is paramount in the pipeline industry and safe habits and practices must be emphasized whenever possible. Performance Tasks must be completed under your supervision. Each trainee must use required PPE and follow safe tool practices and procedures.

Classroom Equipment and Materials
- Whiteboard/chalkboard
- Markers/chalk
- Pencils and paper
- Pipeline Maintenance PowerPoint® Presentation Slides
- Computer
- Copies of the Module Examination and Performance Profile Sheets
- Vendor-supplied videos/DVDs showing the inspection of mainline valves (optional)
- TV/DVD player

Equipment and Materials for Laboratories and Performance Testing
- Appropriate PPE:
  - Fire retardant clothing
  - Hard hat
  - Hearing protection
  - Safety glasses
  - Safety shoes
- Example of a pipeline valve

Additional Resources and References
This module presents thorough resources for task training. The following resource material is suggested for further study:

- American National Standards Institute Code B31.5 and API 6d. [www.ansi.org](http://www.ansi.org)

There are a number of online resources available for trainees who would like more information on the inspection of mainline valves. A search for additional information may be assigned as homework to interested trainees.
The lesson plan for this module is divided into three 2.5-hour sessions. Each session includes 10 minutes for administrative tasks and one 10-minute break.

**SESSIONS ONE AND TWO**

Sessions One and Two introduce the different types of inspections of mainline valves, how to perform the inspections, and the proper responses to AOCs that might be encountered during these inspections.

1. Show Sessions One and Two PowerPoint® presentation slides.
2. Explain the purposes and outcomes of routine walk-around inspections, external integrity inspections, valve function tests, and valve leak tests.
3. Demonstrate how to complete a routine walk-around inspection, an external integrity inspection, a valve function test, and a valve leak test.
4. Discuss the proper reactions and responses to common AOCs that may be encountered during mainline valve inspections.
5. Trainees practice and/or complete the tasks associated with Performance Tasks 1 through 4 in a series of hands-on sessions.

**SESSION THREE**

Session Three is a review and testing session. Have trainees complete the module Review Questions and Trade Terms Quiz. (Alternatively, these may be assigned as homework at the end of Session Two.) Answer any questions that trainees may have.

1. Have trainees complete the Module Examination. Any outstanding performance testing must be completed during this session.
2. Record the testing results on the Registration of Training Modules Form, and submit the report to your Training Program Sponsor.
### Equipment and Materials

<table>
<thead>
<tr>
<th>Personal protective equipment:</th>
<th>Example of a pipeline valve</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fire retardant clothing</td>
<td></td>
</tr>
<tr>
<td>Hard hat</td>
<td></td>
</tr>
<tr>
<td>Hearing protection</td>
<td></td>
</tr>
<tr>
<td>Safety glasses</td>
<td></td>
</tr>
<tr>
<td>Safety shoes</td>
<td></td>
</tr>
<tr>
<td>Whiteboard/chalkboard</td>
<td></td>
</tr>
<tr>
<td>Markers/chalk</td>
<td></td>
</tr>
<tr>
<td>Pencils and paper</td>
<td></td>
</tr>
<tr>
<td><em>Pipeline Maintenance</em></td>
<td></td>
</tr>
<tr>
<td><em>PowerPoint® Presentation</em></td>
<td></td>
</tr>
<tr>
<td><em>Slides</em></td>
<td></td>
</tr>
<tr>
<td>TV/DVD player</td>
<td></td>
</tr>
<tr>
<td>Computer</td>
<td></td>
</tr>
<tr>
<td>Copies of the Module</td>
<td></td>
</tr>
<tr>
<td>Examination and Performance</td>
<td></td>
</tr>
<tr>
<td>Task sheets</td>
<td></td>
</tr>
<tr>
<td>Vendor-supplied videos/DVDs</td>
<td></td>
</tr>
<tr>
<td>showing the inspection of</td>
<td></td>
</tr>
<tr>
<td>mainline valves (<em>optional</em>)</td>
<td></td>
</tr>
</tbody>
</table>

To the extent possible, and as required for performance testing, provide a selection of the tools listed for each session; alternatively, photos may be used to teach tool identification.
Module 62209-14 describes security inspections, visual facility inspections, and building inspections. While inspection procedures for each company may vary, the purpose of all inspections is to ensure the safety of the entire pipeline facility.

<table>
<thead>
<tr>
<th>Objectives</th>
<th>Performance Tasks</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Learning Objective 1</strong></td>
<td><strong>Performance Task 1 (Learning Objective 2)</strong></td>
</tr>
<tr>
<td>• Describe how to conduct an inspection of facility security.</td>
<td>• Complete an inspection of a facility building in accordance with your company’s procedures.</td>
</tr>
<tr>
<td>a. Identify types of security measures.</td>
<td></td>
</tr>
<tr>
<td>b. Explain how to perform a security inspection.</td>
<td></td>
</tr>
<tr>
<td><strong>Learning Objective 2</strong></td>
<td></td>
</tr>
<tr>
<td>• Explain how to conduct a routine visual facility inspection.</td>
<td></td>
</tr>
<tr>
<td>a. Explain safety procedures to follow during an inspection.</td>
<td></td>
</tr>
<tr>
<td>b. Explain how to visually inspect the outside of facilities.</td>
<td></td>
</tr>
<tr>
<td>c. Explain how to visually inspect mechanical equipment and components inside a facility.</td>
<td></td>
</tr>
</tbody>
</table>

**Teaching Time: 2.5 hours**
(One 2.5-hour Classroom session)
Session time may be adjusted to accommodate your class size, schedule, and teaching style.

**Before You Begin**
As you prepare for each session, allow sufficient time to review the course objectives, content, visual aids (including the PowerPoint® presentation), and these lesson plans, and to gather the required equipment and materials. Consider time required for demonstrations, laboratories, field trips, and testing.

To obtain access to all the Pipeline Maintenance Instructor Resources including exams, performance profile sheets, and PowerPoint® presentations from www.nccerirc.com, contact your Pearson sales representative for an Access Code Card. The passing score for submission into NCCER’s Registry is 70 percent or above for the Module Examination; performance testing is graded pass or fail.
Safety Considerations
This module requires that trainees inspect a facility building. Safety is paramount in the pipeline industry and safe habits and practices must be emphasized whenever possible. Performance Tasks must be completed under your supervision. Each trainee must use required PPE and follow safe tool practices and procedures.

Classroom Equipment and Materials
- Whiteboard/chalkboard
- Markers/chalk
- Pencils and paper
- Pipeline Maintenance PowerPoint® Presentation Slides
- Computer
- Copies of the Module Examination and Performance Profile Sheets
- Vendor-supplied videos/DVDs showing proper procedures for security and facility inspections *(optional)*
- TV/DVD player

Equipment and Materials for Laboratories and Performance Testing
- Appropriate PPE:
  - Fire retardant clothing
  - Hard hat
  - Hearing protection
  - Safety glasses
  - Safety shoes

Additional Resources and References
This module presents thorough resources for task training. The following resource material is suggested for further study:

- Transportation Security Administration (TSA) Pipeline Security Guidelines, [www.tsa.gov](http://www.tsa.gov)

There are a number of online resources available for trainees who would like more information on security and facility inspections. A search for additional information may be assigned as homework to interested trainees.
The lesson plan for this module is one 2.5-hour session. The session includes 10 minutes for administrative tasks and one 10-minute break.

**SESSION ONE**

Session One introduces security and visual facility inspections, and what conditions should be observed during these inspections.

1. Show Session One PowerPoint® presentation slides.
2. Discuss security measures employed by pipeline operators.
3. Walk trainees through the steps involved in completing a security inspection.
4. Review the conditions to look for when doing outside and inside visual inspections of pipeline facilities.
5. Have trainees practice and/or complete the tasks associated with Performance Task 1 in a hands-on session.

Session One is also a review and testing session. Have trainees complete the module Review Questions and Trade Terms Quiz. Answer any questions that trainees may have.

1. Have trainees complete the Module Examination. Any outstanding performance testing must be completed during this session.
2. Record the testing results on the Registration of Training Modules Form, and submit the report to your Training Program Sponsor.
<table>
<thead>
<tr>
<th>Personal protective equipment:</th>
<th>Equipment and Materials</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fire retardant clothing</td>
<td></td>
</tr>
<tr>
<td>Hard hat</td>
<td></td>
</tr>
<tr>
<td>Hearing protection</td>
<td></td>
</tr>
<tr>
<td>Safety glasses</td>
<td></td>
</tr>
<tr>
<td>Safety shoes</td>
<td></td>
</tr>
</tbody>
</table>

| Whiteboard/chalkboard                                          |                         |
| Markers/chalk                                                  |                         |
| Pencils and paper                                               |                         |
| *Pipeline Maintenance PowerPoint* Presentation Slides          |                         |
| TV/DVD player                                                  |                         |
| Computer                                                       |                         |
| Copies of the Module Examination and Performance Profile Sheets |                         |
| Vendor-supplied videos/DVDs showing proper procedures for     |                         |
| security and facility inspections (optional)                   |                         |

To the extent possible, and as required for performance testing, provide a selection of the tools listed for each session; alternatively, photos may be used to teach tool identification.
Module 62202-14 describes the frequency and purpose of breakout tank inspections as well as reporting procedures. The text provides a step-by-step procedure for inspecting breakout tanks, including what conditions and elements to look for and report on.

### Objectives

**Learning Objective 1**
- Explain the inspection of breakout tanks.
  - a. Explain the conditions that are examined during a tank inspection.
  - b. Explain the procedures for the monthly or annual inspection of tanks.

### Performance Tasks

**Performance Task 1 (Learning Objective 1)**
- Perform a monthly inspection of a breakout tank per company procedure.

### Teaching Time: 7.5 hours

(Three 2.5-hour Classroom sessions)

Session time may be adjusted to accommodate your class size, schedule, and teaching style.

### Before You Begin

As you prepare for each session, allow sufficient time to review the course objectives, content, visual aids (including the PowerPoint® presentation), and these lesson plans, and to gather the required equipment and materials. Consider time required for demonstrations, laboratories, field trips, and testing.

To obtain access to all the Pipeline Maintenance Instructor Resources including exams, performance profile sheets, and PowerPoint® presentations from [www.nccerirc.com](http://www.nccerirc.com), contact your Pearson sales representative for an Access Code Card. The passing score for submission into NCCER’s Registry is 70 percent or above for the Module Examination; performance testing is graded pass or fail.
**Safety Considerations**
This module requires that trainees perform an inspection of a breakout tank. Safety is paramount in the pipeline industry and safe habits and practices must be emphasized whenever possible. Performance Tasks must be completed under your supervision. Each trainee must use required PPE and follow safe tool practices and procedures.

---

**Classroom Equipment and Materials**
- Whiteboard/chalkboard
- Markers/chalk
- Pencils and paper
- *Pipeline Maintenance* PowerPoint® Presentation Slides
- Computer
- Copies of the Module Examination and Performance Profile Sheets
- Vendor-supplied videos/DVDs showing breakout tank inspections *(optional)*
- TV/DVD player

---

**Equipment and Materials for Laboratories and Performance Testing**
- Appropriate PPE:
  - Hard hat
  - Reflective safety vest
- Copies of a generic or company-specific tank inspection report form
- Copies of API standard 653
- Copies of PHMSA Breakout Tank Inspection Form (Form 10)
- Handouts of the tank inspection procedure outlined in the Trainee Guide
- PHMSA requirements for monthly inspections
- Photographs of conditions found during routine tank inspections
- Tape

---

**Additional Resources and References**
This module presents thorough resources for task training. The following resource material is suggested for further study:

- American Petroleum Institute (API), 1220 L Street, NW, Washington, DC 20005. [www.api.org](http://www.api.org)

There are a number of online resources available for trainees who would like more information on breakout tank inspections. A search for additional information may be assigned as homework to interested trainees.
The lesson plan for this module is divided into three 2.5-hour sessions. Each session includes 10 minutes for administrative tasks and one 10-minute break.

**SESSION ONE**

Session One introduces breakout tanks, conditions to look for during an inspection, and the reporting process.

1. Show Session One PowerPoint® presentation slides.
2. Explain the operation of a breakout tank and why routine inspections are important.
3. Review common conditions to look for during a tank inspection.
4. Discuss the reporting process using a generic or company-specific inspection form and the PHMSA Breakout Tank Inspection Form (Form 10).

**SESSION TWO**

Session Two introduces a step-by-step procedure for inspecting breakout tanks.

1. Show Session Two PowerPoint® presentation slides.
2. Walk trainees through the steps involved in performing an inspection of a breakout tank.
3. Trainees practice and/or complete the tasks associated with Performance Task 1 in a hands-on session.

**SESSION THREE**

Session Three is a review and testing session. Have trainees complete the module Review Questions and Trade Terms Quiz. (Alternatively, these may be assigned as homework at the end of Session Two.) Answer any questions that trainees may have.

1. Have trainees complete the Module Examination. Any outstanding performance testing must be completed during this session.
2. Record the testing results on the Registration of Training Modules Form, and submit the report to your Training Program Sponsor.
<table>
<thead>
<tr>
<th>Equipment and Materials</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Personal protective equipment:</strong></td>
<td></td>
</tr>
<tr>
<td>Copies of a generic or company-specific tank</td>
<td>Handouts of the tank inspection procedure outlined in the Trainee Guide</td>
</tr>
<tr>
<td>inspection report form</td>
<td></td>
</tr>
<tr>
<td>Handouts of the tank inspection procedure</td>
<td></td>
</tr>
<tr>
<td>outlined in the Trainee Guide</td>
<td></td>
</tr>
<tr>
<td>Hard hat</td>
<td>Copies of PHMSA Breakout Tank Inspection Form (Form 10)</td>
</tr>
<tr>
<td>PHMSA requirements for monthly inspections</td>
<td></td>
</tr>
<tr>
<td>Reflective safety vest</td>
<td>Copies of API standard 653</td>
</tr>
<tr>
<td>Tape</td>
<td></td>
</tr>
<tr>
<td>Whiteboard/chalkboard</td>
<td>Photographs of conditions found during routine tank inspections</td>
</tr>
<tr>
<td>Markers/chalk</td>
<td></td>
</tr>
<tr>
<td>Pencils and paper</td>
<td></td>
</tr>
<tr>
<td>Pipeline Maintenance</td>
<td></td>
</tr>
<tr>
<td>PowerPoint® Presentation</td>
<td></td>
</tr>
<tr>
<td>Slides</td>
<td></td>
</tr>
<tr>
<td>TV/DVD player</td>
<td></td>
</tr>
<tr>
<td>Computer</td>
<td></td>
</tr>
<tr>
<td>Copies of the Module Examination and Performance</td>
<td></td>
</tr>
<tr>
<td>Profile Sheets</td>
<td></td>
</tr>
<tr>
<td>Vendor-supplied videos/ DVDs showing breakout</td>
<td></td>
</tr>
<tr>
<td>tank inspections (optional)</td>
<td></td>
</tr>
</tbody>
</table>

To the extent possible, and as required for performance testing, provide a selection of the tools listed for each session; alternatively, photos may be used to teach tool identification.
Module 62206-14 introduces leakage surveys performed on gas pipelines. It describes procedures for conducting a vegetation survey, and explains how to use combustible and flame ionization gas detectors to pinpoint leaks along the pipeline route.

**Objective**

**Learning Objective 1**
- Describe the purpose and procedures for conducting a leakage survey on gas pipelines.
  a. Explain the procedures for conducting a vegetation survey.
  b. Explain the procedures for surveying with a combustible gas detector.
  c. Explain the procedures for surveying with a flame ionization gas detector.

**Performance Task**

**Performance Task 1 (Learning Objective 1)**
- Conduct or simulate conducting a leakage survey on a gas pipeline per company procedure.

**Teaching Time: 5 hours**

(Two 2.5-hour Classroom sessions)

Session time may be adjusted to accommodate your class size, schedule, and teaching style.

**Before You Begin**

As you prepare for each session, allow sufficient time to review the course objectives, content, visual aids (including the PowerPoint® presentation), and these lesson plans, and to gather the required equipment and materials. Consider time required for demonstrations, laboratories, field trips, and testing.

To obtain access to all the Pipeline Maintenance Instructor Resources including exams, performance profile sheets, and PowerPoint® presentations from www.nccerirc.com, contact your Pearson sales representative for an Access Code Card. The passing score for submission into NCCER's Registry is 70 percent or above for the Module Examination; performance testing is graded pass or fail.
**Safety Considerations**

This module requires that trainees survey a pipeline for leaks. Safety is paramount in the pipeline industry and safe habits and practices must be emphasized whenever possible. Performance Tasks must be completed under your supervision. Each trainee must use required PPE and follow safe tool practices and procedures.

---

### Classroom Equipment and Materials

- Whiteboard/chalkboard
- Markers/chalk
- Pencils and paper
- *Pipeline Maintenance* PowerPoint® Presentation Slides
- Computer
- Copies of the Module Examination and Performance Profile Sheets
- Vendor-supplied videos/DVDs showing leak survey techniques *(optional)*
- TV/DVD player

### Equipment and Materials for Laboratories and Performance Testing

- Appropriate PPE:
  - Hard hat
  - Reflective safety vest
  - Combustible gas detector and manufacturer’s instructions
  - Pens and notebooks
- Electronic pipe locator
- Flame ionization gas detector and manufacturer’s instructions
- Google Maps satellite maps of different class locations

---

### Additional Resources and References

This module presents thorough resources for task training. The following resource material is suggested for further study:


There are a number of online resources available for trainees who would like more information on leak survey techniques. A search for additional information may be assigned as homework to interested trainees.
The lesson plan for this module is divided into two 2.5-hour sessions. Each session includes 10 minutes for administrative tasks and one 10-minute break.

**Session One**

Session One explains how to conduct leakage surveys on gas pipelines. It describes procedures for vegetation surveys and surveys using combustible gas detectors and flame ionization gas detectors.

1. Show Session One PowerPoint® presentation slides.
2. Discuss the factors affecting how often a gas pipeline must be surveyed for leaks.
3. Walk trainees through the steps involved in completing a vegetation survey.
4. Demonstrate the processes for using a combustible gas detector and a flame ionization gas detector.
5. Have trainees practice and/or complete the tasks associated with Performance Task 1 in a hands-on session.

**Session Two**

Session Two is a review and testing session. Have trainees complete the module Review Questions and Trade Terms Quiz. (Alternatively, these may be assigned as homework at the end of Session One.) Answer any questions that trainees may have.

1. Have trainees complete the Module Examination. Any outstanding performance testing must be completed during this session.
2. Record the testing results on the Registration of Training Modules Form, and submit the report to your Training Program Sponsor.
## Materials Checklist for Module 62206-14, Pipeline Maintenance OQ CT 52.1, 52.2, 52.3, Leakage Survey

<table>
<thead>
<tr>
<th>Equipment and Materials</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Personal protective equipment:</strong></td>
</tr>
<tr>
<td>Combustible gas detector and manufacturer’s instructions</td>
</tr>
<tr>
<td>Hard hat</td>
</tr>
<tr>
<td>Electronic pipe locator</td>
</tr>
<tr>
<td>Reflective safety vest</td>
</tr>
<tr>
<td>Flame ionization gas detector and manufacturer’s instructions</td>
</tr>
<tr>
<td>Whiteboard/chalkboard</td>
</tr>
<tr>
<td>Google Maps satellite maps of different class locations</td>
</tr>
<tr>
<td>Markers/chalk</td>
</tr>
<tr>
<td>Pens and notebooks</td>
</tr>
<tr>
<td>Pencils and paper</td>
</tr>
<tr>
<td>Pipeline Maintenance PowerPoint® Presentation Slides</td>
</tr>
<tr>
<td>TV/DVD player</td>
</tr>
<tr>
<td>Computer</td>
</tr>
<tr>
<td>Copies of the Module Examination and Performance Profile Sheets</td>
</tr>
<tr>
<td>Vendor-supplied videos/DVDs showing leakage survey techniques (optional)</td>
</tr>
</tbody>
</table>

To the extent possible, and as required for performance testing, provide a selection of the tools listed for each session; alternatively, photos may be used to teach tool identification.
Module 62210-14 describes the materials used in threaded piping systems. It explains how to determine pipe lengths between threaded pipe fittings, prepare the pipe and fittings for fit-up, and assemble the piping system.

**Objectives**

**Learning Objective 1**

- Describe the materials used in threaded pipe systems.
  a. Describe the types of pipe used in threaded pipe systems.
  b. Explain the sizing of pipe used in threaded pipe systems.
  c. Identify schedules and wall thicknesses of pipe used in threaded pipe systems.
  d. Explain pipe threads used in threaded pipe systems.

**Learning Objective 2**

- Identify and explain the purpose of pipe fittings.
  a. Identify and explain the purpose of elbows, offsets, and return bends.
  b. Identify and explain the purpose of branch connections.
  c. Identify and explain the purpose of caps and plugs.
  d. Identify and explain the purpose of line connections.
  e. Identify and explain the purpose of nipples.
  f. Identify and explain the purpose of flanges.

**Learning Objective 3**

- Explain how to determine pipe lengths between fittings.
  a. Explain how to use the center-to-center method to determine pipe lengths between fittings.
  b. Explain how to use the center-to-face method to determine pipe lengths between fittings.
  c. Explain how to use the face-to-face method to determine pipe lengths between fittings.
  d. Explain how to calculate offsets.

**Learning Objective 4**

- Explain the processes and tools used to thread and assemble threaded pipe.
  a. Explain how to cut and ream pipe.
  b. Explain how to thread pipe manually and by machine.
  c. Identify types of pipe joint compounds and explain how to use them.
  d. Explain how to fit screwed pipe and fittings.
  e. Explain how to install threaded valves.

**Performance Tasks**

**Performance Task 1 (Learning Objective 4)**

- Thread pipe, using manual threaders and/or a threading machine.

**Performance Task 2 (Learning Objective 4)**

- Apply pipe joint compound to the male threads of the pipe.

**Performance Task 3 (Learning Objective 4)**

- Make up the pipe and fittings.

**Teaching Time: 15 hours**

(Six 2.5-hour Classroom sessions)

Session time may be adjusted to accommodate your class size, schedule, and teaching style.

**Before You Begin**

As you prepare for each session, allow sufficient time to review the course objectives, content, visual aids (including the PowerPoint® presentation), and these lesson plans, and to gather the required equipment and materials. Consider time required for demonstrations, laboratories, field trips, and testing.

To obtain access to all the Pipeline Maintenance Instructor Resources including exams, performance profile sheets, and PowerPoint® presentations from www.nccerirc.com, contact your Pearson sales representative for an Access Code Card. The passing score for submission into NCCER’s Registry is 70 percent or above for the Module Examination; performance testing is graded pass or fail.
Safety Considerations
This module requires that trainees thread pipe and make up pipe and fittings. Safety is paramount in the pipeline industry and safe habits and practices must be emphasized whenever possible. Performance Tasks must be completed under your supervision. Each trainee must use required PPE and follow safe tool practices and procedures.

Classroom Equipment and Materials
Whiteboard/chalkboard
Markers/chalk
Pencils and paper
*Pipeline Maintenance* PowerPoint® Presentation Slides
Computer
Copies of the Module Examination and Performance Profile Sheets
Vendor-supplied videos/DVDs showing how to measure pipe length and thread and assemble a pipe system (optional)
TV/DVD player

Equipment and Materials for Laboratories and Performance Testing
Appropriate PPE:
  - Dust mask
  - Eye protection
  - Gloves
  - Hard hat
  - Calculators
  - Hearing protection
  - Non-skid safety shoes
  - Cutting fluid
  - Drawings for a pipeline assembly
  - Examples of NPT pipe
  - Examples of various branch connections
  - Examples of various caps and plugs
  - Examples of various elbows, offsets, and return bends
  - Examples of various flanges
  - Examples of various line connections
  - Examples of various nipples
  - Framing square
  - Makeup charts from various manufacturers
  - Manual pipe threader and threading dies
  - Manufacturers’ literature on powered pipe-threading machines
  - Pipe cutter
  - Pipe dope
  - Pipe reamer
  - Pipe stands
  - Pipe wrenches
  - Powered pipe-threading machine
  - PTFE tape
  - Rags
  - Safety Data Sheets for pipe joint compounds
  - Samples of threaded pipe and fittings
  - Small brush
  - Vise

Additional Resources and References
This module presents thorough resources for task training. The following resource material is suggested for further study:


There are a number of online resources available for trainees who would like more information on threaded pipe. A search for additional information may be assigned as homework to interested trainees.
The lesson plan for this module is divided into six 2.5-hour sessions. Each session includes 10 minutes for administrative tasks and one 10-minute break.

**Session One**

Session One introduces threaded pipe materials and fittings.

1. Show Session One PowerPoint® presentation slides.
2. Discuss the advantages and disadvantages of a threaded piping system.
3. Describe common types, sizes, and thicknesses of pipe and National Pipe Thread (NPT) standards.
4. Introduce elbows, offsets, and return bends; branch connections; caps and plugs; line connections; nipples; and flanges. Explain how these fittings are used in a piping system.

**Session Two**

Session Two introduces the process of calculating pipe lengths between fittings.

1. Show Session Two PowerPoint® presentation slides.
2. Explain the three methods used to determine pipe lengths—center-to-center, center-to-face, and face-to-face.

**Session Three**

Session Three introduces the process of calculating offsets.

1. Show Session Three PowerPoint® presentation slides.
2. Discuss how offsets are used in pipeline systems.
3. Explain how to find the travel in a 45-degree offset.
4. Explain how to find the travel or run when the set and elbow angle are known.
5. Explain how to calculate offsets using trigonometry and the concept of a right triangle.
6. Explain how to calculate the travel of a rolling offset.

**Session Four**

Session Four introduces procedures used to cut, thread, and ream pipe.

1. Show Session Four PowerPoint® presentation slides.
2. Discuss the procedure for fabricating a threaded pipe system.
3. Demonstrate how to cut and ream pipe.
4. Demonstrate how to properly thread pipe using a manual threader and a threading machine.
5. Have trainees practice and/or complete the tasks associated with Performance Tasks 1 and 2 in a series of hands-on sessions.
Session Outline for 62210-14

PIPELINE MAINTENANCE OQ CTTP, THREADED PIPE

**SESSION FIVE**

Session Five introduces pipe joint compounds, fitting screwed pipe, and threaded valves.

1. Show Session Five PowerPoint® presentation slides.
2. Discuss the purpose of pipe joint compound and explain how it is used.
3. Demonstrate how to properly apply PTFE tape and pipe dope to the male threads of a pipe.
4. Discuss the importance of the proper fitting of pipe and fittings. Describe the qualities of a strong, leakproof joint.
5. Demonstrate how to properly join a taper threaded pipe connection.
6. Review the special precautions to follow when installing valves with threaded ends.
7. Have trainees practice and/or complete the tasks associated with Performance Tasks 3 and 4 in a series of hands-on sessions.

**SESSION SIX**

Session Six is a review and testing session. Have trainees complete the module Review Questions and Trade Terms Quiz. (Alternatively, these may be assigned as homework at the end of Session Five.) Answer any questions that trainees may have.

1. Have trainees complete the Module Examination. Any outstanding performance testing must be completed during this session.
2. Record the testing results on the Registration of Training Modules Form, and submit the report to your Training Program Sponsor.
# Materials Checklist for Module 62210-14, Pipeline Maintenance OQ CT TP, Threaded Pipe

<table>
<thead>
<tr>
<th>Equipment and Materials</th>
<th>Equipment and Materials</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Personal protective equipment:</strong></td>
<td><strong>Drawings for a pipeline assembly</strong></td>
</tr>
<tr>
<td>Dust mask</td>
<td>Calculators</td>
</tr>
<tr>
<td>Eye protection</td>
<td>Examples of NPT pipe</td>
</tr>
<tr>
<td>Gloves</td>
<td>Examples of various nipples</td>
</tr>
<tr>
<td>Hard hat</td>
<td>Pipe cutter</td>
</tr>
<tr>
<td>Non-skid safety shoes</td>
<td>Pipe reamer</td>
</tr>
<tr>
<td>Hearing protection</td>
<td>Pipe wrenches</td>
</tr>
<tr>
<td>Whiteboard/chalkboard</td>
<td>Rags</td>
</tr>
<tr>
<td>Markers/chalk</td>
<td>Vise</td>
</tr>
<tr>
<td>Pencils and paper</td>
<td>Examples of various branch connections</td>
</tr>
<tr>
<td><strong>Pipeline Maintenance PowerPoint® Presentation Slides</strong></td>
<td>Examples of various line connections</td>
</tr>
<tr>
<td>TV/DVD player</td>
<td>Manual pipe threader and threading dies</td>
</tr>
<tr>
<td>Computer</td>
<td>Safety Data Sheets for pipe joint compounds</td>
</tr>
<tr>
<td>Copies of the Module Examination and Performance Profile Sheets</td>
<td></td>
</tr>
<tr>
<td>Vendor-supplied videos/DVDs showing how to measure pipe length and thread and assemble a pipe system (optional)</td>
<td></td>
</tr>
</tbody>
</table>

To the extent possible, and as required for performance testing, provide a selection of the tools listed for each session; alternatively, photos may be used to teach tool identification.
Module 62212-14 describes the equipment and methods used to locate and mark pipelines. It includes a discussion of the One-Call notification system. It also identifies soil types and sloping requirements for excavation, and describes how to prepare fill, place bedding, compact soil, and backfill a trench.

### Objectives

#### Learning Objective 1
- Describe the process for line locating and marking.
  - a. Describe the purpose and procedures for the One-Call system.
  - b. Explain line-locating methods and equipment.
  - c. Explain the process for marking pipelines.

#### Learning Objective 2
- Describe the excavation process.
  - a. Describe the sloping requirements for excavation work.
  - b. Explain the methods used to protect the pipeline during excavation.

#### Learning Objective 3
- Explain backfilling preparation techniques and the proper procedures for backfilling a trench.
  - a. Describe the procedures for preparing fill.
  - b. Describe the procedures for placing bedding.
  - c. Describe the procedures for compacting soil.
  - d. Explain the procedures for backfilling a trench.

### Performance Tasks

#### Performance Task 1 (Learning Objective 2)
- Explain excavating a trench for maintenance per company procedure.

#### Performance Task 2 (Learning Objective 3)
- Explain backfilling a trench following maintenance per company procedure.

### Teaching Time: 5 hours

(Two 2.5-hour Classroom sessions)

Session time may be adjusted to accommodate your class size, schedule, and teaching style.

### Before You Begin

As you prepare for each session, allow sufficient time to review the course objectives, content, visual aids (including the PowerPoint® presentation), and these lesson plans, and to gather the required equipment and materials. Consider time required for demonstrations, laboratories, field trips, and testing.

To obtain access to all the Pipeline Maintenance Instructor Resources including exams, performance profile sheets, and PowerPoint® presentations from [www.nccerirc.com](http://www.nccerirc.com), contact your Pearson sales representative for an Access Code Card. The passing score for submission into NCCER’s Registry is 70 percent or above for the Module Examination; performance testing is graded pass or fail.
Safety Considerations
This module requires that trainees explain how to backfill a trench following maintenance. Safety is paramount in the pipeline industry and safe habits and practices must be emphasized whenever possible.

Classroom Equipment and Materials
- Whiteboard/chalkboard
- Markers/chalk
- Pencils and paper
- Pipeline Maintenance PowerPoint® Presentation Slides
- Computer
- Copies of the Module Examination and Performance Profile Sheets
- Vendor-supplied videos/DVDs showing excavating and backfilling (optional)
- TV/DVD player

Equipment and Materials for Laboratories and Performance Testing
- Local 811 Call Before You Dig / One-Call information

Additional Resources and References
This module presents thorough resources for task training. The following resource material is suggested for further study:

- American Public Works Association (APWA), www.apwa.net
- Occupational Safety and Health Administration (OSHA), 200 Constitution Avenue, NW, Washington, DC 20210. www.osha.gov

There are a number of online resources available for trainees who would like more information on excavating and backfilling. A search for additional information may be assigned as homework to interested trainees.
The lesson plan for this module is divided into two 2.5-hour sessions. Each session includes 10 minutes for administrative tasks and one 10-minute break.

**Session One**

Session One introduces the processes for line locating and marking, excavation, and backfilling a trench.

1. Show Session One PowerPoint® presentation slides.
2. Discuss the One-Call system and common operator responses to standard and emergency notifications.
3. Review the methods and equipment used to locate pipeline, including alignment sheets and drawings, GPS, and mechanical and electronic pipe-locating equipment.
4. Discuss the use of temporary and permanent markings and the procedures for installing, inspecting, and maintaining line markers.
5. Discuss the sloping requirements for an excavation.
6. Identify the three elements to a sound pipe installation.
7. Discuss the steps involved in backfilling a trench follow pipeline maintenance.
8. Have trainees practice and/or complete the tasks associated with Performance Task 1 and 2 in a hands-on session.

**Session Two**

Session Two is a review and testing session. Have trainees complete the module Review Questions and Trade Terms Quiz. (Alternatively, these may be assigned as homework at the end of Session One.) Answer any questions that trainees may have.

1. Have trainees complete the Module Examination. Any outstanding performance testing must be completed during this session.
2. Record the testing results on the Registration of Training Modules Form, and submit the report to your Training Program Sponsor.
## Materials Checklist for Module 62212-14,
Pipeline Maintenance OQ CT 32 and 39, Observation of Excavation Activities and Backfilling a Trench Following Maintenance

<table>
<thead>
<tr>
<th>Equipment and Materials</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Personal protective equipment:</strong></td>
</tr>
<tr>
<td>None</td>
</tr>
<tr>
<td>Whiteboard/chalkboard</td>
</tr>
<tr>
<td>Markers/chalk</td>
</tr>
<tr>
<td>Pencils and paper</td>
</tr>
<tr>
<td><em>Pipeline Maintenance</em></td>
</tr>
<tr>
<td><em>PowerPoint® Presentation Slides</em></td>
</tr>
<tr>
<td>TV/DVD player</td>
</tr>
<tr>
<td>Computer</td>
</tr>
<tr>
<td>Copies of the Module</td>
</tr>
<tr>
<td>Examination and Performance Profile Sheets</td>
</tr>
<tr>
<td>Vendor-supplied videos/DVDs showing release excavating and</td>
</tr>
<tr>
<td>backfilling (optional)</td>
</tr>
</tbody>
</table>

To the extent possible, and as required for performance testing, provide a selection of the tools listed for each session; alternatively, photos may be used to teach tool identification.
Module 62311-14 describes how to join pipe segments using flange fittings, as well as how to store and protect components prior to joining.

### Objectives

#### Learning Objective 1
1. Describe the proper way to store and protect pipe and fittings.
   a. Describe the proper way to store pipe and materials.
   b. Describe the proper way to protect pipe and fittings.

#### Learning Objective 2
2. Identify and describe the flanges used in pipeline applications.
   a. Identify and describe types of flanges.
   b. Identify and describe types of flange facings.

#### Learning Objective 3
3. Identify and describe types of flange gaskets and gasket materials.
   a. Identify and describe types of flange gaskets.
   b. Identify and describe gasket materials.

#### Learning Objective 4
4. Explain the procedures for installing pipe flanges.
   a. Explain the basic techniques involved in torquing and tensioning.
   b. Explain the preparation and procedures involved in installing gaskets.
   c. Explain the preparation and procedures involved in tightening flanges.

### Performance Tasks

**Performance Task 1**
(Learning Objective 4)
- Perform flange bolting/assembly.

### Teaching Time: 15 hours
(Six 2.5-hour Classroom sessions)
Session time may be adjusted to accommodate your class size, schedule, and teaching style.

### Before You Begin
As you prepare for each session, allow sufficient time to review the course objectives, content, visual aids (including the PowerPoint® presentation), and these lesson plans, and to gather the required equipment and materials. Consider time required for demonstrations, laboratories, field trips, and testing.

To obtain access to all the Pipeline Maintenance Instructor Resources including exams, performance profile sheets, and PowerPoint® presentations from www.nccerirc.com, contact your Pearson sales representative for an Access Code Card. The passing score for submission into NCCER’s Registry is 70 percent or above for the Module Examination; performance testing is graded pass or fail.
### Classroom Equipment and Materials

- Whiteboard/chalkboard
- Markers/chalk
- Pencils and paper
- **Pipeline Maintenance**
- **PowerPoint® Presentation Slides**
- Computer
- Copies of the Module
- Examination and Performance Profile Sheets
- Vendor-supplied videos/DVDs showing techniques for joining pipe segments using flange fittings (optional)
- TV/DVD player

### Equipment and Materials for Laboratories and Performance Testing

- Appropriate PPE:
  - Eye protection
  - Gloves
  - Hard hat
  - Hearing protection
  - Respiratory protection
  - Safety shoes
- Copies of a bolt chart
  - Flange faces and flange facing finishes
  - Primary pressure ratings
- Copies of manufacturers’ instructions for torquing and tensioning tool(s) used in your company for handling fasteners and nuts on pipelines
- Copies of your company’s asbestos abatement procedures
- Copies of your company’s policies and procedures for storing and protecting pipe and materials
- Copies of your company’s procedures for performing flange bolting/assembly and/or copies of Covered Task Performance Verification FB
- Disk fasteners such as straps, bolts, and clips
- Drive ratchets
- Fastener lubrication
- Fasteners
- Flange fasteners
- Flange tightening tools, such as wrenches, drift and line up pins, and sockets
- Multifunctional hydraulic or pneumatic torquing and tensioning tools
- Ohmmeter
- Prefabricated insulated flange
- Protective disks made of various materials
- Sections of flanged pipe, including with and without threaded ends
- Thread protectors, such as press-on plastic and light metal caps

### Additional Resources and References

This module presents thorough resources for task training. The following resource material is suggested for further study:

- American National Standards Institute (ANSI), [www.ansi.org](http://www.ansi.org)
- American Society of Mechanical Engineers (ASME), [www.asme.org](http://www.asme.org)
- ASTM International (ASTM), [www.astm.org](http://www.astm.org)
- The most famous aboveground pipeline, Alyeska Pipeline Service COmpany, has a website at [http://www.alyeska-pipe.com](http://www.alyeska-pipe.com)

There are a number of online resources available for trainees who would like more information on joining pipe segments using flange fittings. A search for additional information may be assigned as homework to interested trainees.
The lesson plan for this module is divided into six 2.5-hour sessions. Each session includes 10 minutes for administrative tasks and one 10-minute break.

**Session One**
Session One introduces the procedures for storing and protecting pipe and materials.
1. Show Session One PowerPoint® presentation slides.
2. Introduce trainees to proper storage and protection techniques for pipe and materials.

**Sessions Two and Three**
Sessions Two and Three introduce flanges and flange gaskets used to join pipe.
1. Show Sessions Two and Three PowerPoint® presentation slides.
2. Introduce commonly used types of flanges and flange fittings.
3. Describe flange gasket materials and types.

**Sessions Four and Five**
Sessions Four and Five introduce the procedures for installing pipe flanges.
1. Show Sessions Four and Five PowerPoint® presentation slides.
2. Introduce the basics of torquing and tensioning.
3. Discuss the procedures for preparing flanged joints and installing gaskets.

**Session Six**
Session Six is a review and testing session. Have trainees complete the module Review Questions and Trade Terms Quiz. (Alternatively, these may be assigned as homework at the end of Session Five.) Answer any questions that trainees may have.
1. Have trainees complete the Module Examination. Any outstanding performance testing must be completed during this session.
2. Record the testing results on the Registration of Training Modules Form, and submit the report to your Training Program Sponsor.
# Materials Checklist for Module 62311-14, Pipeline Maintenance OQ CT FB, Flange Bolting

<table>
<thead>
<tr>
<th>Equipment and Materials</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Personal protective equipment:</strong></td>
<td></td>
</tr>
<tr>
<td>Eye protection</td>
<td>Fastener lubrication</td>
</tr>
<tr>
<td>Gloves</td>
<td>Flange fasteners</td>
</tr>
<tr>
<td>Hard hat</td>
<td>Ohmmeter</td>
</tr>
<tr>
<td>Hearing protection</td>
<td>Disk fasteners such as straps, bolts, and clips</td>
</tr>
<tr>
<td>Respiratory protection</td>
<td>Thread protectors, such as press-on plastic and light metal caps</td>
</tr>
<tr>
<td>Safety shoes</td>
<td>Multifunctional hydraulic or pneumatic torquing and tensioning tools</td>
</tr>
<tr>
<td>Whiteboard/chalkboard</td>
<td>Copies of manufacturers’ instructions for torquing and tensioning tool(s) used in your company for handling fasteners and nuts on pipelines</td>
</tr>
</tbody>
</table>
• Flange faces and flange facing finishes  
• Primary pressure ratings |
| Pencils and paper | | |
| *Pipeline Maintenance* PowerPoint® Presentation Slides | | |
| TV/DVD player | | |
| Computer | | |
| Copies of the Module Examination and Performance Profile Sheets | | |
| Vendor-supplied videos/DVDs showing techniques for joining pipe segments using flange fittings (optional) | | |

To the extent possible, and as required for performance testing, provide a selection of the tools listed for each session; alternatively, photos may be used to teach tool identification.
Module 62211-14 describes the vapor-isolation method known as mud plugging. The procedure for safely and properly mixing the mud, forming the mud balls, and installing the mud plug is presented in this module.

Objectives

Learning Objective 1
• Explain the proper procedures for preparing the mud mixture.
  a. Explain how to determine the Bentonite-to-water ratio.
  b. Explain how to mix the mud and form the mud balls.
  c. Explain how to store the mud balls properly.

Learning Objective 2
• Explain the proper procedures for installing a mud plug.
  a. Explain how to prepare the pipe for a mud plug.
  b. Explain how to pack the mud to create the mud plug.
  c. Describe the proper reaction to abnormal operating conditions (AOCs) that can occur.

Performance Tasks

Performance Task 1
(Learning Objective 2)
• Form and install a mud plug.

Teaching Time: 5 hours
(Two 2.5-hour Classroom sessions)
Session time may be adjusted to accommodate your class size, schedule, and teaching style.

Before You Begin
As you prepare for each session, allow sufficient time to review the course objectives, content, visual aids (including the PowerPoint® presentation), and these lesson plans, and to gather the required equipment and materials. Consider time required for demonstrations, laboratories, field trips, and testing.

To obtain access to all the Pipeline Maintenance Instructor Resources including exams, performance profile sheets, and PowerPoint® presentations from www.nccerirc.com, contact your Pearson sales representative for an Access Code Card. The passing score for submission into NCCER’s Registry is 70 percent or above for the Module Examination; performance testing is graded pass or fail.
**Safety Considerations**
This module requires that trainees properly form and install a mud plug. Safety is paramount in the pipeline maintenance industry and safe habits and practices must be emphasized whenever possible. Performance Tasks must be completed under your supervision. Each trainee must use required PPE and follow safe tool practices and procedures.

**Classroom Equipment and Materials**
- Whiteboard/chalkboard
- Markers/chalk
- Pencils and paper
- *Pipeline Maintenance*
- PowerPoint® Presentation Slides
- Computer
- Copies of the Module
- Examination and Performance Profile Sheets
- Vendor-supplied videos/DVDs showing mud plugging *(optional)*
- TV/DVD player

**Equipment and Materials for Laboratories and Performance Testing**
- Appropriate PPE:
  - Dust mask
  - Eye protection
  - Hand protection
  - 3.75 gallons of water
  - 31.25 lbs of Bentonite
  - Baseball
- Clean bucket, washtub, or wheelbarrow
- Cooler
- Measuring utensils
- Scale
- Spade
- Three-foot section of 10-inch pipe

**Additional Resources and References**
This module presents thorough resources for task training. The following resource material is suggested for further study:


There are a number of online resources available for trainees who would like more information on mud plugging. A search for additional information may be assigned as homework to interested trainees.
The lesson plan for this module is divided into two 2.5-hour sessions. Each session includes 10 minutes for administrative tasks and one 10-minute break.

**Session One**

Session One introduces the proper procedures for preparing and installing mud plugs.

1. Show Session One PowerPoint® presentation slides.
2. Calculate the amounts of water and Bentonite needed for pipes of various sizes. Determine the appropriate length of the mud plugs for these pipes.
3. Ensure that you and the trainees are wearing appropriate PPE.
4. Demonstrate how properly to mix the mud mixture and to form mud balls.
5. Have trainees form mud balls. This laboratory corresponds with Performance Task 1.
6. Demonstrate how to pack the mud into a pipe to create a mud plug.
7. Have trainees install a mud plug in a section of 10-inch pipe. This laboratory corresponds with Performance Task 1.

**Session Two**

Session Two is a review and testing session. Have trainees complete the module Review Questions and Trade Terms Quiz. (Alternatively, these may be assigned as homework at the end of Session One.) Answer any questions that trainees may have.

1. Have trainees complete the Module Examination. Any outstanding performance testing must be completed during this session.
2. Record the testing results on the Registration of Training Modules Form, and submit the report to your Training Program Sponsor.
# Materials Checklist for Module 62211-14, Pipeline Maintenance OQ CT MP, Mud Plugging

<table>
<thead>
<tr>
<th>Equipment and Materials</th>
<th>3.75 gallons of water</th>
<th>31.25 lbs of Bentonite</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Personal protective equipment:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dust mask</td>
<td>Baseball</td>
<td>Cooler</td>
</tr>
<tr>
<td>Eye protection</td>
<td>Measuring utensils</td>
<td>Scale</td>
</tr>
<tr>
<td>Hand protection</td>
<td>Three-foot section of 10-inch pipe</td>
<td>Clean bucket, washtub, or wheelbarrow</td>
</tr>
<tr>
<td>Whiteboard/chalkboard</td>
<td>Spade</td>
<td></td>
</tr>
<tr>
<td>Markers/chalk</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pencils and paper</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Pipeline Maintenance PowerPoint® Presentation Slides</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TV/DVD player</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Computer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Copies of the Module Examination and Performance Profile Sheets</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vendor-supplied videos/ DVDs showing mud plugging (optional)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

To the extent possible, and as required for performance testing, provide a selection of the tools listed for each session; alternatively, photos may be used to teach tool identification.
Module 62208-14 describes the sizes and types of tubing commonly used in pipeline maintenance and the safe and proper way to store and handle tubing. The text reviews the tools and methods for cutting, bending, joining, and installing tubing.

### Objectives

#### Learning Objective 1
- Describe the sizes and types of tubing used.
  - a. Explain the advantages of tubing.
  - b. Describe sizing measurements.
  - c. Describe tubing materials used in the pipeline industry.
  - d. Explain tubing standards and specifications.

#### Learning Objective 2
- Explain the proper and safe methods for storing and handling tubing.
  - a. Explain the proper and safe methods for storing tubing.
  - b. Explain the proper and safe methods for handling tubing.

#### Learning Objective 3
- Describe the procedures and components used in tubing fabrication.
  - a. Describe the tools and methods used to cut tubing.
  - b. Describe the tools and methods used to bend tubing.
  - c. Describe the tools and methods used to connect tubing.

#### Learning Objective 4
- Explain the tubing installation process.
  - a. Explain how to inspect tubing components before installation.
  - b. Explain how to properly install tubing with associated fittings and supports.
  - c. Explain how to inspect tubing after installation.

### Performance Tasks

#### Performance Task 1 (Learning Objective 4)
- Install tubing, including pre-installation inspection, proper selection and fabrication of a tubing system, and final inspection of installation, including either a pressure or leak test.

### Teaching Time: 7.5 hours

(Three 2.5-hour Classroom sessions)

Session time may be adjusted to accommodate your class size, schedule, and teaching style.

### Before You Begin

As you prepare for each session, allow sufficient time to review the course objectives, content, visual aids (including the PowerPoint® presentation), and these lesson plans, and to gather the required equipment and materials. Consider time required for demonstrations, laboratories, field trips, and testing.

To obtain access to all the Pipeline Maintenance Instructor Resources including exams, performance profile sheets, and PowerPoint® presentations from www.nccerirc.com, contact your Pearson sales representative for an Access Code Card. The passing score for submission into NCCER’s Registry is 70 percent or above for the Module Examination; performance testing is graded pass or fail.
**Safety Considerations**

This module requires that trainees properly install tubing with associated fittings and supports. Safety is paramount in the pipeline industry and safe habits and practices must be emphasized whenever possible. Performance Tasks must be completed under your supervision. Each trainee must use required PPE and follow safe tool practices and procedures.

**Classroom Equipment and Materials**
- Whiteboard/chalkboard
- Markers/chalk
- Pencils and paper
- Pipeline Maintenance
- PowerPoint® Presentation Slides
- Computer
- Copies of the Module Examination and Performance Profile Sheets
- Vendor-supplied videos/DVDs showing the cutting, bending, installation, and inspection of tubing (optional)
- TV/DVD player

**Equipment and Materials for Laboratories and Performance Testing**
- Appropriate PPE:
  - Eye protection
  - Cut-resistant gloves
  - Compression-type hand bender
  - Different types and sizes of tubing cutters
  - Examples of good and poor tubing bends
  - Examples of various types of fittings, including flare, compression, socket-welded, and butt-welded
- Gap inspection gauge
- One-inch diameter tubing or smaller
- Pre-swaging tool
- Rule, outside caliper, or vernier caliper
- Sharp pencil, colored felt-tip pen, or silver marking pencil
- Small brush
- Soap solution
- Various types and sizes of tubing
- Wrench

**Additional Resources and References**

This module presents thorough resources for task training. The following resource material is suggested for further study:

- ASME standard B31.3, Process Piping, American Society of Mechanical Engineers (ASME), www.asme.org
- Standards and Specifications for Tubing. New York: American Society of Mechanical Engineers (ASME), www.asme.org

There are a number of online resources available for trainees who would like more information on tubing. A search for additional information may be assigned as homework to interested trainees.
The lesson plan for this module is divided into three 2.5-hour sessions. Each session includes 10 minutes for administrative tasks and one 10-minute break.

**Session One**

Session One introduces the different sizes and types of tubing available and the proper and safe methods for storing, handing, and cutting tubing.
1. Show Session One PowerPoint® presentation slides.
2. Discuss the sizing measurements used in tubing, and demonstrate how to obtain an OD measurement.
3. Discuss the characteristics, applications, and specifications of various types of tubing.
4. Discuss safe and proper methods for storing and handling tubing.
5. Discuss and demonstrate the proper procedure for cutting tubing.

**Session Two**

Session Two introduces the proper and safe methods for bending, connecting, and installing tubing.
1. Show Session Two PowerPoint® presentation slides.
2. Discuss tubing bends, and demonstrate how to properly use a compression-type hand bender.
3. Discuss the use of various types of fittings in the pipeline industry.
4. Discuss and demonstrate the proper and safe methods for inspecting, installing, and checking tubing connections.

**Session Three**

Session Three is a review and testing session. Have trainees complete the module Review Questions and Trade Terms Quiz. (Alternatively, these may be assigned as homework at the end of Session Two.) Answer any questions that trainees may have.
1. Have trainees complete the Module Examination. Any outstanding performance testing must be completed during this session.
2. Record the testing results on the Registration of Training Modules Form, and submit the report to your Training Program Sponsor.
### Materials Checklist for Module 62208-14, Pipeline Maintenance OQ CT TB, Tubing

<table>
<thead>
<tr>
<th>Equipment and Materials</th>
<th>Compression-type hand bender</th>
<th>Different types and sizes of tubing cutters</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Personal protective equipment:</strong></td>
<td>Eye protection</td>
<td>Various types and sizes of tubing</td>
</tr>
<tr>
<td></td>
<td>Cut-resistant gloves</td>
<td>Examples of good and poor tubing bends</td>
</tr>
<tr>
<td></td>
<td>Whiteboard/chalkboard</td>
<td>Gap inspection gauge</td>
</tr>
<tr>
<td></td>
<td>Markers/chalk</td>
<td>One-inch diameter tubing or smaller</td>
</tr>
<tr>
<td></td>
<td>Pencils and paper</td>
<td>Rule, outside caliper, or vernier caliper</td>
</tr>
<tr>
<td><strong>Pipeline Maintenance PowerPoint® Presentation Slides</strong></td>
<td>Small brush</td>
<td></td>
</tr>
<tr>
<td><strong>LCD projector and screen</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Computer</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Copies of the Module Examination and Performance Profile Sheets</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Vendor-supplied videos/DVDs showing the cutting, bending, installation, and inspection of tubing (optional)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>TV/DVD player</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

To the extent possible, and as required for performance testing, provide a selection of the tools listed for each session; alternatively, photos may be used to teach tool identification.