

Lesson Plans for Module AOCFG-17

ABNORMAL OPERATING CONDITIONS – FIELD AND GAS

Module AOCFG-17 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 in the vicinity of 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 in the vicinity of 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 PowerPoint presentations from www.nccerirc.com. For information and updates about accessing the Module Examinations, visit www.nccer.org/testing. 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

The following recommended resources can provide additional helpful information related to the requirements for this covered task:

Code of Federal Regulations 49, Parts 192 and 195

OSHA Occupational Safety and Health Standards 1910, Subpart L, Standard 1910.157.

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.

Lesson Plans for Module AOCCC-17

ABNORMAL OPERATING CONDITIONS – CONTROL CENTER

Module AOCCC-17 describes how control center 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 in a control center for both gas and liquid pipelines.
 - a. Explain how to recognize abnormal facility conditions and pipeline system damage.
 - 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 in the vicinity of a pipeline.
 - f. Explain how to recognize hazardous liquid or gas encounters.
 - g. Explain how to recognize an unexplained flow rate/pressure change.

Learning Objective 2

- Describe the proper reaction to abnormal operating conditions in a control center for both gas and liquid pipelines.
 - a. Describe the proper reaction to abnormal facility conditions and pipeline system damage.
 - b. Describe the proper reaction to the activation of a safety device.
 - c. Describe the proper reaction to 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 in the vicinity of a pipeline.
 - f. Describe the proper reaction to hazardous liquid or gas encounters.
 - g. Describe the proper reaction to unexplained flow rate/pressure change.

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 PowerPoint presentations from www.nccerirc.com. For information and updates about accessing the Module Examinations, visit www.nccer.org/testing. 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

The following recommended resources can provide additional helpful information related to the requirements for this covered task:

Code of Federal Regulations 49, Parts 192 and 195

OSHA Occupational Safety and Health Standards 1910, Subpart L, Standard 1910.157.

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.

Lesson Plans for Module CT50_0-17

Purge Gas from a Pipeline

Module CT50_0-17 describes the methods and general procedures related to purging gas from a section of pipeline, and it explains abnormal operating conditions associated with purging gas from a pipeline.

Objective

Learning Objective 1

1. Describe how to purge gas from a pipeline (CT50_0-17).
 - a. Describe the process of purging gas from a pipeline.
 - b. Identify the knowledge and skills required to purge gas from a pipeline.

Performance Task

Performance Task 1 (Learning Objective 1)

1. Purge gas from a pipeline (CT50_0-17).
 - Identify potential abnormal operating conditions that may occur during performance of this CT, and know the appropriate actions to take in response to them.
 - Utilize the appropriate personal protective equipment according to relevant company procedures.
 - Complete a lockout/tagout procedure.
 - Purge the pipeline segment by injecting an inert gas or other substance into the line.
 - Use a vent pipe to direct purged vapors away from any ignition source.
 - Sample the vent stream with a combustible-gas indicator to determine when the pipeline has been purged of all hazardous vapors.
 - Complete appropriate documentation as required by operator's procedures.
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Teaching Time: 5 hours

(Two 2.5-Hour Sessions)

Session time and quantity 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 Performance Profile Sheets from www.nccerirc.com. For information and updates about accessing the Module Examinations, visit www.nccer.org/testing. The passing score for submission into NCCER's Registry is 70% or above for the Module Examination; performance testing is graded pass or fail.

Safety Considerations

This module requires that trainees work with pipeline systems carrying hazardous materials under high pressure. Electrical and mechanical safety must be emphasized at all times. Trainees should be carefully observed to ensure that they wear the proper PPE, follow safe practices, and remain aware of any potential abnormal operating conditions. Any deficiencies must be corrected to ensure trainee safety in the future. Work performed on or in the vicinity of functioning equipment must be completed under the direct supervision of the instructor.

Equipment, Materials, and Resources

- Whiteboard and markers
- Pencils and paper
- CT50_0-17 PowerPoint® Presentation
- DVD player
- LCD projector and screen
- Computer
- Internet access during class (*optional*)
- Module Review answer key
- Module Examinations
- Specific PPE required by the site
- Supply of nitrogen or other inert gas
- Lockout/tagout devices
- Combustible-gas indicator
- Hot work permit and/or confined space permit (*if required*)
- Copies of company purging procedures
- Copies of company shut-in procedures
- Copies of P&IDs of the segment being purged (*optional*)
- Copies of the Performance Profile sheets

Lesson Plans for Module CT51_0-17

Purge Air From a Gas Pipeline

Module CT51_0-17 describes the methods and general procedures related to purging air from a section of a gas pipeline, and it explains abnormal operating conditions associated with purging air from a gas pipeline.

Objective

Learning Objective 1

Describe how to purge air from a pipeline (CT51_0-17).

- a. Describe the process for purging air from a pipeline.
- b. Identify the prerequisites, competencies, and abnormal operating conditions associated with purging air from a pipeline.

Performance Task

Performance Task 1 (Learning Objective 1)

1. Purge air from a pipeline (CT51_0-17).
 - Identify potential abnormal operating conditions that may occur during performance of this CT, and know the appropriate actions to take in response to them.
 - Utilize the appropriate personal protective equipment according to relevant company procedures.
 - Purge the pipeline segment by allowing the air/gas mixture in the pipeline to vent safely into the atmosphere.
 - Use a vent pipe to direct purged vapors away from any ignition source.
 - Sample the atmosphere in the vent stream with a combustible gas indicator or portable gravitometer to determine when the vapor reaches 100% gas (the pipeline has been purged of all air).
 - Complete appropriate documentation as required by operator's procedures.
-

Teaching Time: 5 hours

(Two 2.5-Hour Sessions)

Session time and quantity 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 Performance Profile Sheets from www.nccerirc.com. For information and updates about accessing the Module Examinations, visit www.nccer.org/testing. The passing score for submission into NCCER's Registry is 70% or above for the Module Examination; performance testing is graded pass or fail.

Safety Considerations

This module requires that trainees work with pipeline systems carrying hazardous materials under high pressure. Electrical and mechanical safety must be emphasized at all times. Trainees should be carefully observed to ensure that they wear the proper PPE, follow safe practices, and remain aware of any potential abnormal operating conditions. Any deficiencies must be corrected to ensure trainee safety in the future. Work performed on or in the vicinity of functioning equipment must be completed under the direct supervision of the instructor.

Equipment, Materials, and Resources

- Whiteboard and markers
- Pencils and paper
- CT51_0-17 PowerPoint® Presentation
- DVD player
- LCD projector and screen
- Computer
- Internet access during class (*optional*)
- Module Review answer key
- Module Examinations
- Specific PPE required by the site
- Supply of nitrogen or other inert gas
- Lockout/tagout devices
- Combustible gas indicator
- Hot work permit and/or confined space permit (*if required*)
- Copies of company purging procedures
- Copies of company shut-in procedures
- Copies of P&IDs of the segment being purged (*optional*)
- Copies of the Performance Profile sheets

Lesson Plans for Module CT54_0-17

Test Remotely Controlled Shutdown Devices

Module CT54_0-17 introduces the methods and procedures related to testing remotely controlled shutdown devices. The knowledge and skills required to safely test RCSDs are discussed. Abnormal operating conditions associated with testing remotely controlled shutdown devices are described.

Objective

Learning Objective 1

1. Describe how to test remotely controlled shutdown devices (CT54_0-17).
 - a. Describe the process for testing remotely controlled shutdown devices.
 - b. Identify the knowledge and skills associated with testing remotely controlled shutdown devices.

Performance Task

Performance Task 1 (Learning Objective 1)

1. Test remotely controlled shutdown devices (CT54_0-17).
 - Identify potential abnormal operating conditions that may occur during performance of this CT, and know the appropriate actions to take in response to them.
 - Utilize the appropriate personal protective equipment according to relevant company procedures.
 - Review the procedure to perform the inspection.
 - Make appropriate notifications prior to beginning the inspection.
 - Notify the control center.
 - Activate the RCSD.
 - Inspect the RCSD.
 - Report and make any necessary repairs.
 - Reset the RCSD.
 - Make appropriate notifications.
 - Complete appropriate documentation as required by operator's procedures.

Teaching Time: 5 hours

(Two 2.5-hour sessions)

Session time and quantity 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 presentation), and these lesson plans, and to gather the required equipment and materials. Consider the time required for demonstrations, laboratories, field trips, and testing.

Using your access code, download the Performance Profile Sheets from www.nccerirc.com. For information and updates about accessing the Module Examinations, visit www.nccer.org/testing. 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 work with pipeline systems carrying hazardous materials under high pressure. Safety must be emphasized at all times. Trainees should be carefully observed to ensure that they use the required PPE, follow safe practices, and are fully aware of the potential hazards related to purging gas from a pipeline. Any deficiencies must be corrected to ensure trainee safety. All practice sessions and Performance Tasks must be completed under your direct supervision.

Equipment, Materials, and Resources

- Whiteboard
- Markers
- Pencils and paper
- CT54_0-17 PowerPoint® presentation
- LCD projector and screen
- Computer with internet access
- Performance Profile Sheets
- Required PPE
- Copies of company procedure for testing remotely controlled devices
- Access to a compressor station
- Copies of P&IDs of the compressor station where RCSDs are located (*optional*)

Additional Resources

The following recommended resources can provide additional helpful information related to the requirements for this covered task:

- API Recommended Practice 1161*, Third Edition, © 2014 American Petroleum Institute. API Publishing Services, 1220 L Street, NW, Washington, DC 20005. Distributed by Thompson Reuters (Scientific) LLC, www.techstreet.com.
- NCCER Module AOCCC-17, *Abnormal Operating Conditions Control Center*
- NCCER Module AOCFG-17, *Abnormal Operating Conditions Field and Gas*
- NCCER Module 62105-02, *Pipeline Documentation*
- NCCER Module 63104-02, *Piping and Mechanical Blueprint Reading*
- NCCER Module 63208-02, *Introduction to Gas Compressors*
- NCCER Module 63211-02, *Maintain and Repair Drivers*
- NCCER Module 63305-02, *Maintain, Troubleshoot, and Repair Gas Compressors*
- NCCER Module 64102-02, *Pipeline E&I Safety*
- NCCER Module 67102-15, *Basic Pipeline Pneumatics and Equipment*
- NCCER Module 67103-15, *Pipeline Communications*

Lesson Plans for Module CT56_0-17

Perform Incremental Pressure Increases to Uprate the MAOP

Module CT56_0-17 introduces the methods and procedures related to performing incremental pressure increases to uprate the maximum allowable operating pressure of a pipeline. The knowledge and skills required to safely uprate the MAOP are discussed, and abnormal operating conditions associated with uprating the MAOP are described.

Objective

Learning Objective 1

1. Describe how to perform incremental pressure increases to uprate the MAOP (CT56_0-17).
 - a. Describe how to perform incremental pressure increases to uprate the MAOP.
 - b. Identify the knowledge and skills needed to uprate the MAOP.

Performance Task

Performance Task 1 (Learning Objective 1)

1. Perform incremental pressure increases to uprate the MAOP (CT56_0-17).
 - Identify potential abnormal operating conditions (AOCs) that may occur during performance of this CT, and know the appropriate actions to take in response to them.
 - Utilize the appropriate personal protective equipment according to relevant company procedures.
 - Increase line pressure to the current system MAOP.
 - While monitoring, gradually increase line pressure to first predetermined setting and stop.
 - Record incremental pipeline increases on pressure test form.
 - Perform a leakage survey. If leaks are discovered, repair them before continuing.
 - Continue to incrementally increase line pressure and check for leaks.
 - Increase line pressure to final established pressure.
 - Complete appropriate documentation as required by operator's procedures

Teaching Time: 5 hours

(Two 2.5-hour sessions)

Session time and quantity 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 presentation), and these lesson plans, and to gather the required equipment and materials. Consider the time required for demonstrations, laboratories, field trips, and testing.

Using your access code, download the Performance Profile Sheets from www.nccerirc.com. For information and updates about accessing the Module Examinations, visit www.nccer.org/testing. 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 work with pipeline systems carrying hazardous materials under high pressure. Safety must be emphasized at all times. Trainees should be carefully observed to ensure that they use the required PPE, follow safe practices, and are fully aware of the potential hazards related to purging gas from a pipeline. Any deficiencies must be corrected to ensure trainee safety. All practice sessions and Performance Tasks must be completed under your direct supervision.

Equipment, Materials, and Resources

- Whiteboard
- Markers
- Pencils and paper
- CT56-15 PowerPoint® presentation
- LCD projector and screen
- Computer with internet access
- Performance Profile Sheets
- Required PPE
- Copies of company MAOP uprating plan
- Copies of form for documenting the uprating
- Copies of P&IDs of the segment being uprated (*optional*)

Additional Resources

The following recommended resources can provide additional helpful information related to the requirements for this covered task:

API Recommended Practice 1161, Third Edition, © 2014 American Petroleum Institute. API Publishing Services, 1220 L Street, NW, Washington, DC 20005. Distributed by Thompson Reuters (Scientific) LLC, www.techstreet.com.

49 CFR 192, Subpart K, www.ecfr.gov

NCCER Module AOCCC-17, *Abnormal Operating Conditions Control Center*

NCCER Module AOCFG-17, *Abnormal Operating Conditions Field & Gas*

NCCER Module 62105-02, *Pipeline Documentation*

NCCER Module 62206-14, *Leakage Survey*

NCCER Module 62304-02, *Pipeline Repair*

NCCER Module 63104-02, *Piping and Mechanical Blueprint Reading*

NCCER Module 63204-02, *Inspect and Repair Valves*

NCCER Module 64102-02, *Pipeline E&I Safety*

NCCER Module 67102-15, *Basic Pipeline Pneumatics and Equipment*

NCCER Module 67103-15, *Pipeline Communications*

NCCER Module 71101-14, *Field Abnormal Operating Conditions*

Lesson Plans for Module CT57_0-17

Operate Odorant Equipment

Module CT57_0-17 introduces the methods and procedures related to operating odorant equipment. Trainees will also review the knowledge, skills, and abnormal operating conditions associated with operating odorant equipment.

Objective

Learning Objective 1

1. Describe how to operate odorant equipment (CT 57_0-17).
 - a. Describe the process and procedure for odorizing natural gas.
 - b. Identify the knowledge and skills associated with operating odorant equipment.

Performance Task

Performance Task 1 (Learning Objective 1)

1. Operate odorant equipment (CT 57_0-17).
 - Identify potential abnormal operating conditions that may occur during performance of this CT, and know the appropriate actions to take in response to them.
 - Utilize the appropriate personal protective equipment according to relevant company procedures.
 - Describe how the odorizer functions.
 - Compare the operation of the odorizer with its design limits.
 - Measure the intensity level of the odorant.
 - Determine if the injection of the odorant is on a consistent basis.
 - Complete appropriate documentation as required by operator's procedures.

Teaching Time: 5 hours

(Two 2.5-hour sessions)

Session time and quantity 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 presentation), and these lesson plans, and to gather the required equipment and materials. Consider the time required for demonstrations, laboratories, field trips, and testing.

Using your access code, download the Performance Profile Sheets from www.nccerirc.com. For information and updates about accessing the Module Examinations, visit www.nccer.org/testing. 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 work with pipeline systems carrying hazardous materials under high pressure. Safety must be emphasized at all times. Trainees should be carefully observed to ensure that they wear the proper PPE, follow safe practices, and give due respect to unseen hazards related to operating odorant equipment. Any deficiencies must be corrected to ensure future trainee safety. All practice sessions and Performance Tasks must be completed under your direct supervision.

Equipment, Materials, and Resources

- Whiteboard
- Markers
- Pencils and paper
- CT57_0-17 PowerPoint® presentation
- LCD projector and screen
- Computer with internet access
- Appropriate PPE
- Copies of company procedure for operating odorant equipment
- Manuals for odorizer operations (if available)
- Safety data sheet (SDS) for odorant used
- Odorometer
- Access to an odorizer
- Copies of P&IDs of the line to be odorized (optional)

Additional Resources

The following recommended resources can provide additional helpful information related to the requirements for this covered task:

- API Recommended Practice 1161*, Third Edition, © 2014 American Petroleum Institute. API Publishing Services, 1220 L Street, NW, Washington, DC 20005. Distributed by Thompson Reuters (Scientific) LLC, www.techstreet.com.
- NCCER Module AOCCC-17, *Abnormal Operating Conditions Control Center*
- NCCER Module AOCFG-17, *Abnormal Operating Conditions Field & Gas*
- NCCER Module CT58_0-17, *Monitor Odorant Levels*
- NCCER Module 62105-14, *Introduction to Pipeline Documents*
- NCCER Module 63104-02, *Piping and Mechanical Blueprint Reading*
- NCCER Module 67102-15, *Basic Pipeline Pneumatics and Equipment*
- NCCER Module 67103-15, *Pipeline Communications*

There are a number of online resources available for trainees who would like more information on operating odorant equipment. 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.

There may be videos available on the internet related to operating odorant equipment. These can be located by searching *operating odorant equipment* or similar terms and using the Video tab on the results page of your preferred search engine.

Instructors are also encouraged to locate additional audiovisual aids available on the internet, make personal videos, and take still pictures related to the subject matter and add them to the presentations throughout the program.

Lesson Plans for Module CT58_0-17

Monitor Odorant Level

Module CT58_0-17 introduces the trainees to the methods and procedures related to monitoring odorant levels. Trainees will also review the knowledge, skills, and abnormal operating conditions associated with monitoring odorant levels.

Objectives

Learning Objective 1

1. Describe how to monitor odorant levels (CT58_0-17).
 - a. Describe the process and procedure for odorizing natural gas.
 - b. Identify the knowledge and skills associated with monitoring odorant levels.

Performance Task

Performance Task 1 (Learning Objective 1)

1. Monitor odorant levels (CT58_0-17).
 - Identify potential abnormal operating conditions that may occur during performance of this CT, and know the appropriate actions to take in response to them.
 - Utilize the appropriate personal protective equipment according to relevant company procedures.
 - Turn on, calibrate, and operate odorant level measuring instrument to measure odorant intensity level per company procedures and manufacturer's recommendations.
 - Determine the amount of odorant used and calculate the ratio between usage and the volume of gas transported.
 - Complete appropriate documentation as required by operator's procedures.

Teaching Time: 5 hours

(Two 2.5-hour sessions)

Session time and quantity 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 presentation), and these lesson plans, and to gather the required equipment and materials. Consider the time required for demonstrations, laboratories, field trips, and testing.

Using your access code, download the Performance Profile Sheets from www.nccerirc.com. For information and updates about accessing the Module Examinations, visit www.nccer.org/testing. 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 work with pipeline systems carrying hazardous materials under high pressure. Safety must be emphasized at all times. Trainees should be carefully observed to ensure that they wear the proper PPE, follow safe practices, and give due respect to unseen hazards related to pipeline operations. Any deficiencies must be corrected to ensure future trainee safety. All practice sessions and Performance Tasks must be completed under your direct supervision.

Equipment, Materials, and Resources

- Whiteboard
- Markers
- Pencils and paper
- CT58_0-17 PowerPoint® presentation
- LCD projector and screen
- Computer with internet access
- Appropriate PPE
- Odorometer
- Copies of company procedure for monitoring odorant levels
- Access to a natural gas pipeline to be monitored
- Copies of P&IDs of the line to be monitored (optional)

Additional Resources

The following recommended resources can provide additional helpful information related to the requirements for this covered task:

- API Recommended Practice 1161*, Third Edition, © 2014 American Petroleum Institute. API Publishing Services, 1220 L Street, NW, Washington, DC 20005. Distributed by Thompson Reuters (Scientific) LLC, www.techstreet.com.
- NCCER Module AOCCC-17, *Abnormal Operating Conditions Control Center*
- NCCER Module AOCFG-17, *Abnormal Operating Conditions Field & Gas*
- NCCER Module CT57_0-17, *Operate Odorant Equipment*
- NCCER Module 62105-14, *Introduction to Pipeline Documentations*
- NCCER Module 63104-02, *Piping and Mechanical Blueprint Reading*
- NCCER Module 67102-15, *Basic Pipeline Pneumatics and Equipment*
- NCCER Module 67103-15, *Pipeline Communications*

Lesson Plans for Module CT63_1-17

Start-Up of a Liquid Pipeline (Field)

Module CT63_1-17 introduces the methods and procedures used by field operations personnel to start up a liquid pipeline. It describes the required knowledge and skills, as well as abnormal operating conditions associated with starting up a liquid pipeline.

Objectives

Learning Objective 1

1. Describe how to start up a liquid pipeline (CT63_1-17).
 - a. Describe how to start up a liquid pipeline.
 - b. Identify the prerequisites, competencies, and abnormal operating conditions associated with starting up a liquid pipeline.

Performance Task

Performance Task 1 (Learning Objective 1)

1. Start up a liquid pipeline (CT63_1-17).
 - Identify potential abnormal operating conditions that may occur during performance of this CT, and know the appropriate actions to take in response to them.
 - Utilize the appropriate personal protective equipment according to relevant company procedures.
 - Verify that flows, pressures, and product characteristics are within normal range.
 - Ensure that upstream and downstream stations are prepared to bring the pipeline up before beginning the start-up procedure.
 - Confirm that the flow path is correct.
 - Maintain orderly start-up of the line by activating units beginning at the origination point and proceeding downstream to the delivery point. (Activate units at downstream stations upon arrival of a pressure rise from the upstream station.)
 - Complete appropriate documentation as required by operator's procedures.

Teaching Time: 5 hours

(Two 2.5-Hour Sessions)

Session time and quantity 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 presentation), and these lesson plans, and to gather the required equipment and materials. Consider the time required for demonstrations, laboratories, field trips, and testing.

Using your access code, download the Performance Profile Sheets from www.nccerirc.com. For information and updates about accessing the Module Examinations, visit www.nccer.org/testing. The passing score for submission into NCCER's Registry is 70% or above for the Module Examination; performance testing is graded pass or fail.

Safety Considerations

This module requires that trainees work with pipeline systems carrying hazardous liquids under high pressure. Safety must be emphasized at all times. Trainees should be carefully observed to ensure that they wear the proper PPE, follow safe practices, and give due respect to unseen hazards related to starting up a pipeline. Any deficiencies must be corrected to ensure trainee safety in the future. All practice sessions and Performance Tasks must be completed under your direct supervision.

Equipment, Materials, and Resources

- Whiteboard
- Markers
- Pencils and paper
- CT63_1-17 PowerPoint® presentation
- LCD projector and screen
- Computer with Internet access
- Module Review answer key
- Module Examinations
- Specific PPE required by the site
- Copies of the Performance Profile sheets

Lesson Plans for Module CT63_2-17

Shutdown of a Liquid Pipeline (Field)

Module CT63_2-17 introduces the methods and procedures related to shutting down a liquid pipeline. It describes the knowledge, skills, and abnormal operating conditions associated with shutting down a liquid pipeline.

Objectives

Learning Objective 1

1. Describe how to shut down a liquid pipeline (CT63_2-17).
 - a. Describe how to shut down a liquid pipeline.
 - b. Identify prerequisites, competencies, and abnormal operating conditions associated with shutting down a liquid pipeline.

Performance Task

Performance Task 1 (Learning Objective 1)

1. Shut down a liquid pipeline (CT63_2-17).
 - Identify potential abnormal operating conditions that may occur during performance of this CT, and know the appropriate actions to take in response to them.
 - Utilize the appropriate personal protective equipment according to relevant company procedures.
 - Ensure familiarity with desired pressure to keep on a static line in accordance with company policies.
 - Shut down pump units or compressor units beginning at the origination point and proceeding downstream to the destination. Shut down in conjunction with valve closures at intermediate and terminal delivery points in accordance with company policies.
 - Complete appropriate documentation as required by operator's procedures.

Teaching Time: 5 hours

(Two 2.5-Hour Sessions)

Session time and quantity 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 presentation), and these lesson plans, and to gather the required equipment and materials. Consider the time required for demonstrations, laboratories, field trips, and testing.

Using your access code, download the Performance Profile Sheets from www.nccerirc.com. For information and updates about accessing the Module Examinations, visit www.nccer.org/testing. The passing score for submission into NCCER's Registry is 70% or above for the Module Examination; performance testing is graded pass or fail.

Safety Considerations

This module requires that trainees work with pipeline systems carrying hazardous liquids under high pressure. Safety must be emphasized at all times. Trainees should be carefully observed to ensure that they wear the proper PPE, follow safe practices, and give due respect to unseen hazards related to starting up a pipeline. Any deficiencies must be corrected to ensure trainee safety in the future. All practice sessions and Performance Tasks must be completed under your direct supervision.

Equipment, Materials, and Resources

- Whiteboard
- Markers
- Pencils and paper
- CT63_2-17 PowerPoint® Presentation
- LCD projector and screen
- Computer with Internet access
- Module Review answer key
- Module Examinations
- Specific PPE required by the site
- Copies of company shutdown procedures
- Copies of the Performance Profile sheets

Lesson Plans for Module CT63_3-17

Monitoring Pipeline Operations

CT63_3-17 introduces the trainees to the procedures for monitoring pipeline parameters, safety devices, alarms, and purging operations. The module also introduces the trainees to the procedures for monitoring remote locations and weather conditions.

Objectives

Learning Objective 1

1. Explain how to monitor alarms, and describe pipeline monitoring systems.
 - a. Describe how to respond to and monitor pipeline alarms and abnormal operating conditions.
 - b. Describe the purpose of computational pipeline monitoring (CPM).

Learning Objective 2

2. Explain how to monitor pipeline parameters, operations, and safety device alarms (CT63_3-17).
 - a. Identify the types of safety devices.
 - b. Identify types of detection systems.
 - c. Describe pipeline purging and purge monitoring.
 - d. Describe the general procedure and skills associated with monitoring a pipeline.

Learning Objective 3

3. Explain how remote locations and weather are monitored.
 - a. Describe how remote video surveillance is performed.
 - b. Describe how aerial surveillance is performed.
 - c. Describe how weather conditions are monitored.

Performance Tasks

Performance Task 1 (Learning Objective 2)

1. Monitor pressures, flows, communications, and line integrity and maintain them within allowable limits on a liquid pipeline system (field). (CT63_3-17)
 - Identify potential abnormal operating conditions (AOCs) that may occur during performance of this CT, and know the appropriate actions to take in response to them.
 - Utilize the appropriate personal protective equipment (PPE) according to relevant company procedures.
 - Verify that the flows, pressures, and product characteristics are within normal range.
 - Continuously monitor, by whatever means available (SCADA, pressure gauge, meter), the pressures and flow rates of the pipeline to look for any changes.
 - If pressures, flows, and line balance are not within normal range, determine the cause of variation from normal and correct the situation if possible.
 - Complete appropriate documentation as required by operator's procedures.

Teaching Time: 15 hours

(Six 2.5-Hour Sessions)

Session time and quantity 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 presentation), and these lesson plans, and to gather the required equipment and materials. Consider the time required for demonstrations, laboratories, field trips, and testing.

Using your access code, download the performance profile sheets from www.nccerirc.com. For information and updates about accessing the Module Examinations, visit www.nccer.org/testing. The passing score for submission into NCCER's Registry is 70% or above for the written examination; performance testing is graded pass or fail.

Safety Considerations

Safety must be emphasized at all times. Trainees should be carefully observed to ensure that they wear the proper PPE, follow safe practices, and give due respect to unseen hazards. Any deficiencies must be corrected to ensure future trainee safety. All practice sessions and Performance Tasks must be completed under your direct supervision.

Classroom Equipment, Materials, and Resources

Whiteboard

Markers

Pencils and paper

Liquid Pipeline Field Operations PowerPoint® presentation

LCD projector and screen

Computer with Internet access

Module Examinations

Appropriate PPE to include the following:

Safety glasses

Work gloves

Proper footwear as designated by the instructor or training facility provider

Hearing protection as designated by the instructor or training facility provider

Hard hat as designated by the instructor or training facility provider

Copies of Performance Profile Sheets

Lesson Plans for Module CT63_4-17

Locally Operate Valves on a Liquid Pipeline System

Module CT63_4-17 describes the methods and general procedures used to locally operate valves on a liquid pipeline. It explains the knowledge, skills, and abnormal operating conditions associated with operating valves locally on a liquid pipeline system.

Objective

Learning Objective 1

1. Describe how to locally operate valves on a liquid pipeline system (CT63_4-17).
 - a. Describe how to locally operate valves.
 - b. Identify the prerequisites, competencies, and abnormal operating conditions associated with locally operating valves.

Performance Task

Performance Task 1 (Learning Objective 1)

1. Locally operate valves on a liquid pipeline system (CT63_4-17).
 - Identify potential abnormal operating conditions that may occur during performance of this CT, and know the appropriate actions to take in response to them.
 - Utilize the appropriate personal protective equipment according to relevant company procedures.
 - Verify that flows, pressures, and product characteristics are within normal range.
 - Identify the valve(s) to be operated, and identify the intended flow path.
 - Operate the valve in accordance with company policy and procedures.
 - Check that the desired result was achieved. (If it was not, contact appropriate personnel.)
 - Complete appropriate documentation as required by operator's procedures.

Teaching Time: 5 hours

(Two 2.5-Hour Sessions)

Session time and quantity 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 Performance Profile Sheets from www.nccerirc.com. For information and updates about accessing the Module Examinations, visit www.nccer.org/testing. The passing score for submission into NCCER's Registry is 70% or above for the Module Examination; performance testing is graded pass or fail.

Safety Considerations

This module requires that trainees work with pipeline systems carrying hazardous liquids under high pressure. Electrical and mechanical safety must be emphasized at all times. Trainees should be carefully observed to ensure that they wear the proper PPE, follow safe practices, and remain aware of any potential abnormal operating conditions. Any deficiencies must be corrected to ensure trainee safety in the future. Work performed on or in the vicinity of functioning equipment must be completed under the direct supervision of the instructor.

Equipment, Materials, and Resources

- Whiteboard
- Markers
- Pencils and paper
- CT63_4-17 PowerPoint® presentation
- LCD projector and screen
- Computer with Internet access
- Module Review answer key
- Module Examinations
- Specific PPE required by the site
- Copies of appropriate valve alignment charts
- Copies of a P&ID (*optional*)
- Copies of the Performance Profile sheets

Lesson Plans for Module CT64_1-17

Start-Up of a Liquid Pipeline (Control Center)

Module CT64_1-17 introduces the methods and procedures used by control center operations personnel to start up a liquid pipeline. It identifies key liquid pipeline components and describes their function and operation. This module explains the required knowledge and skills, as well as abnormal operating conditions associated with starting up a liquid pipeline.

Objectives

Learning Objective 1

1. Describe key liquid pipeline components and their operations.
 - a. Describe tanks and the operations associated with them.
 - b. Describe manifolds and the valve operations associated with them.
 - c. Describe pumps and the operations associated with them.

Learning Objective 2

2. Describe the requirements and procedures for starting up a liquid pipeline (CT 64_1-17).
 - a. Identify the prerequisites, competencies, and abnormal operating conditions associated with starting up a liquid pipeline.
 - b. Describe the procedures used to start up a liquid pipeline.

Performance Task

Performance Task 1 (Learning Objective 2)

1. Start up a liquid pipeline (CT 64_1-17).
 - Identify potential abnormal operating conditions that may occur during performance of this CT, and know the appropriate actions to take in response to them.
 - Utilize the appropriate personal protective equipment according to relevant company procedures.
 - Verify that the flows, pressures, and product characteristics are within normal range.
 - Ensure that upstream and downstream stations are prepared to bring the pipeline up before beginning the start-up procedure.
 - Activate (start-up) units beginning at the origination point and proceeding downstream to the delivery point.
 - Activate units at downstream stations upon arrival of a pressure rise from the upstream station.
 - Perform proper operation according to company policy and procedures.
 - Verify that the desired result was achieved.
 - Complete appropriate documentation as required by operator's procedures.

Teaching Time: 5 hours

(Two 2.5-Hour Sessions)

Session time and quantity 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 presentation), and these lesson plans, and to gather the required equipment and materials. Consider the time required for demonstrations, laboratories, field trips, and testing.

Using your access code, download the Performance Profile Sheets from www.nccerirc.com. For information and updates about accessing the Module Examinations, visit www.nccer.org/testing. The passing score for submission into NCCER's Registry is 70% or above for the Module Examination; performance testing is graded pass or fail.

Safety Considerations

This module requires that trainees work with equipment that could directly affect energized pipeline equipment. Safety must be emphasized at all times. Trainees should be carefully observed to ensure that they wear the proper PPE, follow safe practices, and follow directions meticulously. Any deficiencies must be corrected to ensure trainee safety in the future. All practice sessions and Performance Tasks must be completed under your direct supervision.

Equipment, Materials, and Resources

- Whiteboard
- Dry-erase markers
- Pencils and paper
- Poster board
- Flip chart
- CT64_1-17 PowerPoint® Presentation
- LCD projector and screen
- Computer (Internet access optional but recommended)
- Module Review answer key
- Module Examinations
- Specific PPE required by the site, which may include:
 - Hard hat
 - Hearing protection
 - Natural fiber clothing with no metal fasteners
 - Personal monitors (when required)
 - Proper footwear
 - Safety glasses
- Examples of tank gauges (handline, ATG, radar, etc.)
- Examples of common valves
- Example PLC and/or RTU
- Example flow computer
- Pipeline control center training facility
- Copies of the Performance Profile sheets

Lesson Plans for Module CT64_2-17

Shutdown of a Liquid Pipeline (Control Center)

Module CT64_2-17 introduces the methods and procedures used by control center operations personnel to shut down a liquid pipeline. It identifies key liquid pipeline components and describes their function and operation. This module explains the required knowledge and skills, as well as abnormal operating conditions associated with shutting down a liquid pipeline.

Objectives

Learning Objective 1

1. Describe key liquid pipeline components and their operations.
 - a. Describe tanks and the operations associated with them.
 - b. Describe manifolds and the valve operations associated with them.
 - c. Describe pumps and the operations associated with them.

Learning Objective 2

2. Describe the requirements and procedures for shutting down a liquid pipeline (CT 64_2-17).
 - a. Identify the prerequisites, competencies, and abnormal operating conditions associated with shutting down a liquid pipeline.
 - b. Describe the procedures used to shut down a liquid pipeline.

Performance Task

Performance Task 1 (Learning Objective 2)

1. Shut down a liquid pipeline (CT 64_2-17).
 - Identify potential abnormal operating conditions that may occur during performance of this CT, and know the appropriate actions to take in response to them.
 - Utilize the appropriate personal protective equipment according to relevant company procedures.
 - In accordance with company policies, be familiar with the desired pressure to keep on a non-running line and the desired pressure to keep on a static line.
 - Shut down pump units or compressor units beginning at the origination point and proceeding downstream to the destination. Depending on the line profile, sufficient units at the source station and at the other stations may be kept operational. Then shut down in conjunction with valve closure at the delivery terminals or stations to satisfy the policies on maintaining minimum pressures on shutdown of the particular line.
 - The closure of isolation valves at intermediate delivery points should occur in conjunction with the shutdown of that station's units unless otherwise specified in company policy or procedure.
 - Perform proper operation according to company policy and procedures.
 - Verify that the desired result was achieved.
 - Complete appropriate documentation as required by operator's procedures.

Teaching Time: 5 hours

(Two 2.5-Hour Sessions)

Session time and quantity 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 presentation), and these lesson plans, and to gather the required equipment and materials. Consider the time required for demonstrations, laboratories, field trips, and testing.

Using your access code, download the Performance Profile Sheets from www.nccerirc.com. For information and updates about accessing the Module Examinations, visit www.nccer.org/testing. The passing score for submission into NCCER's Registry is 70% or above for the Module Examination; performance testing is graded pass or fail.

Safety Considerations

This module requires that trainees work with equipment that could directly affect energized pipeline equipment. Safety must be emphasized at all times. Trainees should be carefully observed to ensure that they wear the proper PPE, follow safe practices, and follow directions meticulously. Any deficiencies must be corrected to ensure trainee safety in the future. All practice sessions and Performance Tasks must be completed under your direct supervision.

Equipment, Materials, and Resources

- Whiteboard
- Dry-erase markers
- Pencils and paper
- Poster board
- Flip chart
- CT64_2-17 PowerPoint® Presentation
- LCD projector and screen
- Computer (Internet access optional but recommended)
- Module Review answer key
- Module Examinations
- Specific PPE required by the site, which may include:
 - Hard hat
 - Hearing protection
 - Natural fiber clothing with no metal fasteners
 - Personal monitors (when required)
 - Proper footwear
 - Safety glasses
- Examples of tank gauges (handline, ATG, radar, etc.)
- Examples of common valves
- Example PLC and/or RTU
- Example flow computer
- Pipeline control center training facility
- Copies of the Performance Profile sheets

Lesson Plans for Module CT64_3-17

Monitor Pressures, Flows, Communication, and Line Integrity and Maintain Them Within Allowable Limits on a Liquid Pipeline (Control Center)

Module CT64_3-17 introduces the technologies that pipeline controllers use to monitor the pipeline and maintain safe and efficient operation. This module explains the general procedures involved in monitoring pipeline conditions and maintaining them within normal operating limits. It describes potential abnormal operating conditions that can occur during these procedures.

Objectives

Learning Objective 1

1. Describe key liquid pipeline monitoring components and their operations.
 - a. Describe the SCADA system and explain its role in monitoring and controlling the liquid pipeline.
 - b. Summarize various monitoring tools and the computational pipeline monitoring (CPM) system.
 - c. List and describe common liquid pipeline safety devices and alarms.
 - d. Describe the pipeline purging process and the purposes that it serves.
 - e. Explain liquid pipeline surveillance and weather monitoring techniques.

Learning Objective 2

2. Describe the requirements and procedures for monitoring and maintaining the liquid pipeline (CT 64_3-17).
 - a. Identify the prerequisites, competencies, and abnormal operating conditions associated with monitoring and maintaining the liquid pipeline.
 - b. Describe the procedures used to monitor and maintain the liquid pipeline.

Performance Task

Performance Task 1 (Learning Objective 2)

1. Monitor pressures, flows, communications, and line integrity and maintain them within allowable limits on a liquid pipeline system (CT 64_3-17).
 - Identify potential abnormal operating conditions that may occur during performance of this CT, and know the appropriate actions to take in response to them.
 - Utilize the appropriate personal protective equipment according to relevant company procedures.
 - Be familiar with the normal operating pressures, flows, and linefill for the pipeline under similar conditions. Verify that the flows, pressures, and product characteristics are within normal range.
 - Continuously monitor, by whatever means available (SCADA, pressure gauge, meter), the pressures and flow rates of the pipeline to look for any changes. Monitor the line balance for changes by monitoring volume in and volume out for liquid pipelines and line pack in gas pipelines. Monitor storage facilities. Verify continuous communications and that data is accurate and updated.
 - If pressures, flows, and/or line balance are not within normal range, determine the cause of variation from normal and correct the situation if possible. For communications variations, maintain monitored operations by using alternative communication methods. If necessary, seek assistance from and make notifications to proper personnel.
 - Perform proper operation according to company policy and procedures.
 - Verify that the desired result was achieved.
 - Complete appropriate documentation as required by operator's procedures.

Teaching Time: 5 hours

(Two 2.5-Hour Sessions)

Session time and quantity 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 presentation), and these lesson plans, and to gather the required equipment and materials. Consider the time required for demonstrations, laboratories, field trips, and testing.

Using your access code, download the Performance Profile Sheets from www.nccerirc.com. For information and updates about accessing the Module Examinations, visit www.nccer.org/testing. The passing score for submission into NCCER's Registry is 70% or above for the Module Examination; performance testing is graded pass or fail.

Safety Considerations

This module requires that trainees work with equipment that could directly affect energized pipeline equipment. Safety must be emphasized at all times. Trainees should be carefully observed to ensure that they wear the proper PPE, follow safe practices, and follow directions meticulously. Any deficiencies must be corrected to ensure trainee safety in the future. All practice sessions and Performance Tasks must be completed under your direct supervision.

Equipment, Materials, and Resources

- Whiteboard
- Dry-erase markers
- Pencils and paper
- Poster board
- Flip chart
- CT64_3-17 PowerPoint® Presentation
- LCD projector and screen
- Computer (Internet access optional but recommended)
- Module Review answer key
- Module Examinations
- Specific PPE required by the site, which may include:
 - Hard hat
 - Hearing protection
 - Natural fiber clothing with no metal fasteners
 - Personal monitors (when required)
 - Proper footwear
 - Safety glasses
- Example PLC and/or RTU
- Example HMI
- Example hazardous atmosphere detector
- Examples of security devices
- Pipeline control center training facility
- Copies of the Performance Profile sheets

Lesson Plans for Module CT64_4-17

Remotely Operate Valves on a Liquid Pipeline System

Module CT64_4-17 introduces valves used to control product as it flows through the different components of a pipeline. It describes different types of valves and explains how they operate. Pumps are also introduced as the pipeline's power source, and supervisory control is discussed as the means of coordinating pipeline operations. This module presents the general procedures used to operate valves remotely, and describes abnormal operating conditions that may occur during valve operation.

Objectives

Learning Objective 1

1. Describe key liquid pipeline components and their operations.
 - a. Describe manifolds and the valve operations associated with them.
 - b. Describe pumps and the operations associated with them.
 - c. Describe SCADA technology and its role in valve control.

Learning Objective 2

2. Describe the requirements and procedures for operating valves remotely (CT 64_4-17).
 - a. Identify the prerequisites, competencies, and abnormal operating conditions associated with remote valve operation.
 - b. Describe the procedures used to operate valves remotely.

Performance Task

Performance Task 1 (Learning Objective 2)

1. Remotely operate valves on a liquid pipeline (CT 64_4-17).
 - Identify potential abnormal operating conditions that may occur during performance of this CT, and know the appropriate actions to take in response to them.
 - Utilize the appropriate personal protective equipment according to relevant company procedures.
 - Verify that the flows, pressures, and product characteristics are within normal range.
 - Identify the need to open or close a valve or start or stop a unit to control flow or pressure and to maintain safe operation of the pipeline system.
 - Identify the applicable valve, unit, or the appropriate control device.
 - Perform proper operation according to company policy and procedures.
 - Verify that the desired result was achieved.
 - Complete appropriate documentation as required by operator's procedures.

Teaching Time: 5 hours

(Two 2.5-Hour Sessions)

Session time and quantity 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 presentation), and these lesson plans, and to gather the required equipment and materials. Consider the time required for demonstrations, laboratories, field trips, and testing.

Using your access code, download the Performance Profile Sheets from www.nccerirc.com. For information and updates about accessing the Module Examinations, visit www.nccer.org/testing. The passing score for submission into NCCER's Registry is 70% or above for the Module Examination; performance testing is graded pass or fail.

Safety Considerations

This module requires that trainees work with equipment that could directly affect energized pipeline equipment. Safety must be emphasized at all times. Trainees should be carefully observed to ensure that they wear the proper PPE, follow safe practices, and follow directions meticulously. Any deficiencies must be corrected to ensure trainee safety in the future. All practice sessions and Performance Tasks must be completed under your direct supervision.

Equipment, Materials, and Resources

- Whiteboard
- Dry-erase markers
- Pencils and paper
- Poster board
- Flip chart
- CT64_4-17 PowerPoint® Presentation
- LCD projector and screen
- Computer (Internet access optional but recommended)
- Module Review answer key
- Module Examinations
- Specific PPE required by the site, which may include:
 - Hard hat
 - Hearing protection
 - Natural fiber clothing with no metal fasteners
 - Personal monitors (when required)
 - Proper footwear
 - Safety glasses
- Examples of common valves
- Example valve actuator
- Example PLC and/or RTU
- Example flow computer
- Example HMI
- Pipeline control center training facility
- Copies of the Performance Profile sheets

Lesson Plans for Module CT65_1-17

Start-Up of a Gas Pipeline

Module CT65_1-17 describes the methods and general procedures used to start up a gas pipeline. It explains the knowledge, skills, and abnormal operating conditions associated with gas pipeline start-up.

Objective

Learning Objective 1

1. Describe how to start up a gas pipeline (CT65_1-17).
 - a. Describe the process for starting up a gas pipeline.
 - b. Identify the skills and knowledge required to start up a gas pipeline.

Performance Task

Performance Task 1 (Learning Objective 1)

1. Demonstrate how to start up a gas pipeline (CT65_1-17).
 - Identify potential abnormal operating conditions that may occur during performance of this CT, and know the appropriate actions to take in response to them.
 - Utilize the appropriate personal protective equipment according to relevant company procedures.
 - Verify that the flows, pressures, and product characteristics are within normal range.
 - Ensure that upstream and downstream stations are prepared to bring the pipeline up before beginning the start-up procedure.
 - Units shall be activated (started up) beginning at the origination point and proceeding downstream to the delivery point. Units at downstream stations are to be activated upon arrival of a pressure rise from the upstream station.
 - Complete appropriate documentation as required by operator's procedures.

Teaching Time: 5 hours

(Two 2.5-Hour Sessions)

Session time and quantity 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 Performance Profile Sheets from www.nccerirc.com. For information and updates about accessing the Module Examinations, visit www.nccer.org/testing. The passing score for submission into NCCER's Registry is 70% or above for the Module Examination; performance testing is graded pass or fail.

Safety Considerations

This module requires that trainees work with pipeline systems carrying hazardous liquids under high pressure. Electrical and mechanical safety must be emphasized at all times. Trainees should be carefully observed to ensure that they wear the proper PPE, follow safe practices, and remain aware of any potential abnormal operating conditions. Any deficiencies must be corrected to ensure trainee safety in the future. Work performed on or in the vicinity of functioning equipment must be completed under the direct supervision of the instructor.

Equipment, Materials, and Resources

- Whiteboard
- Markers
- Pencils and paper
- CT65_1-17 PowerPoint® presentation
- LCD projector and screen
- Computer with internet access
- Module Review answer key
- Module Examinations
- Specific PPE required by the site
- Copies of company pipeline start-up procedure
- Copies of company compressor start-up procedure
- Copies of P&IDs of the segment being started (*optional*)
- Copies of the Performance Profile sheets

Lesson Plans for Module CT65_2-17

Shutdown of a Gas Pipeline

Module CT65_2-17 describes the methods and general procedures used to shut down a gas pipeline. It explains the knowledge, skills, and abnormal operating conditions associated with gas pipeline shutdown.

Objective

Learning Objective 1

1. Describe how to shut down a gas pipeline (CT65_2-17).
 - a. Describe how to shut down a gas pipeline.
 - b. Identify the prerequisites, competencies, and abnormal operating conditions associated with shutting down a gas pipeline.

Performance Task

Performance Task 1 (Learning Objective 1)

1. Shut down a gas pipeline (CT65_2-17).
 - Identify potential abnormal operating conditions that may occur during performance of this CT, and know the appropriate actions to take in response to them.
 - Utilize the appropriate personal protective equipment according to relevant company procedures.
 - Understand the desired pressure to keep on a non-running line in accordance with company policies.
 - Understand the desired pressure to keep on a static line in accordance with company policies.
 - Shut down pump units or compressor units beginning at the origination point and proceeding downstream to the destination. Depending on the line profile, sufficient units at the source station and at the other stations may be kept operational. Then shut down in conjunction with valve closure at the delivery terminals or stations to satisfy the policies on maintaining minimum pressures on shutdown of the particular line.
 - The closure of isolation valves at intermediate delivery points should occur in conjunction with the shutdown of that station's units unless otherwise specified in company policy or procedure.
 - Complete appropriate documentation as required by operator's procedures.

Teaching Time: 5 hours

(Two 2.5-Hour Sessions)

Session time and quantity 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 Performance Profile Sheets from www.nccerirc.com. For information and updates about accessing the Module Examinations, visit www.nccer.org/testing. The passing score for submission into NCCER's Registry is 70% or above for the Module Examination; performance testing is graded pass or fail.

Safety Considerations

This module requires that trainees work with pipeline systems carrying hazardous liquids under high pressure. Electrical and mechanical safety must be emphasized at all times. Trainees should be carefully observed to ensure that they wear the proper PPE, follow safe practices, and remain aware of any potential abnormal operating conditions. Any deficiencies must be corrected to ensure trainee safety in the future. Work performed on or in the vicinity of functioning equipment must be completed under the direct supervision of the instructor.

Equipment, Materials, and Resources

- Whiteboard
- Markers
- Pencils and paper
- CT65_2-17 PowerPoint® presentation
- LCD projector and screen
- Computer with internet access
- Module Review answer key
- Module Examinations
- Specific PPE required by the site
- Copies of company pipeline shutdown procedure
- Copies of company and/or manufacturer compressor shutdown procedure
- Copies of P&IDs of the segment being shut down (*optional*)
- Copies of the Performance Profile sheets

Lesson Plans for Module CT65_3-17

Monitor Pressures, Flows, Communications, and Line Integrity and Maintain Them Within Allowable Limits (Gas)

Module CT65_3-17 introduces the trainees to the methods and procedures related to monitoring pipeline parameters. Trainees will also review the knowledge, skills, and abnormal operating conditions associated with monitoring pipeline parameters.

Objective

Learning Objective 1

1. Describe how to monitor pipeline parameters (CT65_3-17).
 - a. Describe how to monitor and maintain pipeline pressure.
 - b. Describe how to monitor compressor stations.
 - c. Describe how to monitor pipeline right-of-way (ROW).
 - d. Describe how to monitor weather conditions.
 - e. Describe how to document pipeline activities.

2. Identify the knowledge and skills required to monitor pipeline parameters.
 - a. Identify the prerequisites, competencies, and abnormal operating conditions associated with monitoring pipeline parameters.
 - b. Describe the procedure for monitoring pipeline parameters.

Performance Task

Performance Task 1 (Learning Objective 2)

1. Monitor pipeline parameters (CT65_3-17).
 - Identify potential abnormal operating conditions (AOCS) that may occur during performance of this CT, and know the appropriate actions to take in response to them.
 - Utilize the appropriate personal protective equipment (PPE) according to relevant company procedures.
 - Verify that the flows, pressures, and product characteristics are within normal range.
 - Continuously monitor, by whatever means available (SCADA, pressure gauge, meter), the pressures and flow rates of the pipeline to look for any changes. Monitor the line balance for changes by monitoring line pack in gas pipelines. Monitor storage facilities. Verify continuous communications and that data is accurate and updated.
 - Determine whether the pressures, flows, and line balance are within normal range and whether you have communication capabilities.
 - If necessary, determine the cause of variation from normal. Correct the situation if possible. For pressure or flow variations, use corrective methods such as starting and/or stopping pumps/units or using adjustable control devices such as control valves, back pressure valves, and variable speed drives for electric motors or using throttle controls for combustion engines. For communications variations, maintain monitored operations by using alternative communication methods. If necessary, seek assistance from and make notifications to proper personnel.
 - Complete appropriate documentation as required by operator's procedures.

Teaching Time: 5 hours

(Two 2.5-hour sessions)

Session time and quantity 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 presentation), and these lesson plans, and to gather the required equipment and materials. Consider the time required for demonstrations, laboratories, field trips, and testing.

Using your access code, download the Performance Profile Sheets from www.nccerirc.com. For information and updates about accessing the Module Examinations, visit www.nccer.org/testing. 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 work with pipeline systems carrying hazardous materials under high pressure. Safety must be emphasized at all times. Trainees should be carefully observed to ensure that they wear the proper PPE, follow safe practices, and give due respect to unseen hazards related to monitoring pipeline parameters. Any deficiencies must be corrected to ensure future trainee safety. All practice sessions and Performance Tasks must be completed under your direct supervision.

Equipment, Materials, and Resources

- Whiteboard
- Markers
- Pencils and paper
- CT65.3-15 PowerPoint® presentation
- LCD projector and screen
- Computer with internet access
- Performance Profile Sheets
- Appropriate PPE
- Copies of company policies and/or procedures for monitoring pipeline parameters
- Access to a control center and/or pipeline facilities to be monitored
- Copies of P&IDs of the line to be monitored (optional)

Lesson Plans for Module CT65_4-17

Manually or Remotely Open or Close Valves or Other Equipment

Module CT65_4-17 describes the procedures for manually or remotely opening and closing valves, starting and stopping compressors, and monitoring the compressor drivers. It also reviews the knowledge, skills, and abnormal operating conditions associated with valve operation.

Objectives

Learning Objective 1

Describe how to manually or remotely open or close valves or other equipment (CT65_4-17).

- a. Describe how to operate valves.
- b. Describe how to start and stop compressors.
- c. Identify the knowledge and skills required to manually or remotely open or close valves or other equipment.

Performance Tasks

Performance Task 1 (Learning Objective 1)

1. Manually or remotely open or close valves or other equipment (CT65_4-17)
 - Identify potential abnormal operating conditions (AOCs) that may occur during performance of this CT, and know the appropriate actions to take in response to them.
 - Utilize the appropriate personal protective equipment (PPE) according to relevant company procedures.
 - Verify that the flows, pressures, and product characteristics are within normal range.
 - Identify the need to open or close a valve or start or stop a unit to control flow or pressure and to maintain safe operation of the pipeline system.
 - Identify the applicable valve, unit, or the appropriate control device.
 - Perform proper operation according to company policy and procedures.
 - Verify that the desired result was achieved.
 - Complete appropriate documentation as required by operator's procedures.

Teaching Time: 5 hours

(Two 2.5-hour sessions)

Session time and quantity 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 presentation), and these lesson plans, and to gather the required equipment and materials. Consider the time required for demonstrations, laboratories, field trips, and testing.

Using your access code, download the Performance Profile Sheets from www.nccerirc.com. For information and updates about accessing the Module Examinations, visit www.nccer.org/testing. 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 work with pipeline systems carrying hazardous materials under high pressure. Safety must be emphasized at all times. Trainees should be carefully observed to ensure that they wear the proper PPE, follow safe practices, and give due respect to unseen hazards related to operating valves and other equipment. Any deficiencies must be corrected to ensure future trainee safety. All practice sessions and Performance Tasks must be completed under your direct supervision.

Equipment, Materials, and Resources

- Whiteboard
- Markers
- Pencils and paper
- CT65_4-17 PowerPoint® presentation
- LCD projector and screen
- Computer with internet access
- Performance Profile Sheets
- Appropriate PPE
- Valve alignment charts
- Copies of company procedure for operating compressors
- Copies of manufacturers' compressor and driver operating procedures
- Portable valve operator
- Access to a valves and compressors
- Copies of P&IDs of the line to be monitored (optional)