**Instructor Guide**

Tapping a Line

Table of Contents

[Overview and Goals 3](#_Toc359750936)

[Preparation – Facilitation Guidelines 3](#_Toc359750937)

[Materials 4](#_Toc359750938)

[Schedule 5](#_Toc359750939)

[Boot Camp Activities 7](#_Toc359750940)

[Activity Worksheet #1 – Tapping a Pipeline 7](#_Toc359750941)

[Appendix 1 8](#_Toc359750942)

[Appendix 1 – Performance Checklist–Tapping a Line (Instructor) 9](#_Toc359750943)

[Appendix 2 11](#_Toc359750944)

[Appendix 2 – Performance Checklist–Tapping a Line 12](#_Toc359750945)

Overview and Goals

Tapping a pipe means creating an opening in the pipe, if needed, for repairing a line, replacing a segment of line, new connections, or creating a bypass for metal and pipe lines.

In this unit of work the instructor will:

* Highlight the concepts introduced in the online course.
* Demonstrate how to use the relevant tools and reference guides applicable to the content and activities.
* Guide the participants through hands-on activities to work safely with natural gas, as a qualified operator would on the job.

Upon completion of this unit of work, participants will be able to:

* Explain tapping requirements.
* Define hot tapping.
* Set up the tapping equipment.
* Use pipeline maps and records to identify a tapping site and the number and size of taps for a bypass to be constructed.
* Tap a line, including:
  + Perform the leak test.
  + Remove tapping valve.
  + Install completion cap.
  + Complete documentation

Preparation – Facilitation Guidelines

Ensure the participants have completed:

* ASME-1081 Tapping a Pipeline, including the pre-test and the course assessment.

Conduct this training in a classroom setting, with a simulated lab and/or field site allowing the participants to work independently or in groups (dependent on number of participants) and then present findings to the workshop for further discussion.

Use a flipchart to capture key lessons learned from the group discussions, or to identify questions that will be answered in upcoming units of work or that require further research and discussion.

Reinforce the importance of damage prevention programs and the best practices and guidelines of the Compressed Gas Association (CGA), the Occupational Safety and Health Administration (OSHA), and the Federal Government.

Ensure the participants have a copy of the Common Ground Alliances (CGA) Best Practices guide: <http://www.commongroundalliance.com>

Review the following regulations as tasks are introduced, demonstrated, and practiced.

* §192.459 External corrosion control: Examination of buried pipeline when exposed.
* §192.479 Atmospheric corrosion control: General.
* §192.481 Atmospheric corrosion control: Monitoring.
* §195.569 Do I have to examine exposed portions of buried pipelines?
* §195.581 Which pipelines must I protect against atmospheric corrosion and what coating material may I use?
* §195.583 Atmospheric corrosion control: Monitoring. What must I do to monitor atmospheric corrosion control?

Materials

Provide the following to each participant:

* A copy of the Activity Worksheet and Appendix 2 Performance Checklist.
* Access to the Internet, as needed, for OSHA, federal, and industry resources/references supporting course related discussions, demonstrations, and hands-on activities.
* Access to manufacturers’ instructions as needed.

Provide the following materials and tools used locally for the lab demonstrations and hands-on practice

* Pipe (plastic and steel)
* Tapping machine
* Plug
* Supplies, materials for a leak test
* Pipeline maps, records, to identify:
* Tapping site
* Clearance around tapping area
* Personal Protective Equipment (see materials section: Hand and Power Tool Safety)
* Field lab set up to tap a line, including:
* Perform the leak test.
* Remove tapping valve.
* Install completion cap.
* Paperwork, reports necessary to document tap.

***Note****:*

*These items, and any other materials used for demonstrations and participant activities, will be determined by the materials and tools used at the training facility.*

Schedule

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| **Time** | **Topics for Discussion, Demonstrations, and Activities** |
| **60 minutes** | **Introduction**  Explain   * Tapping is the process of creating an opening in a pipe. * Tapping operations may be required as part of pipeline repair, segment replacement, or facility abandonment. * Taps are also required in the connection of a new service branch, bypass creation, or installation of other system devices. * “Hot tapping” is the process of creating an opening while the line is pressurized. * Factors in tapping equipment selection include pipe size and type, liquid medium, system pressure, operating method, and special considerations as indicated in project requirements. * Procedures for installation and removal of a tapping valve and tapping equipment are based on location, feed system, service line connection, system load, time of day, affected customers, and pipe characteristics.   Review installation and emphasize safety requirements, including:   * Federal regulations for tapping requirements (§192.151). * OSHA requires employees are trained in the use of PPE. * Personnel awareness of project plan/training needed for projects under normal and abnormal operating conditions (§192.267). * Maximum Allowable Operating Pressure (MAOP) of the facility.   Emphasize that each joint must be made in accordance with written procedures to ensure strong gas-tight joints for similar and different grades of pipe and ensure fused joints meet joint strength and stress testing standards.  ***Note****: The tools, PPE and materials used in the demonstrations will be determined by the materials and tools used at the training facility.* |
| **60 minutes** | **Tapping**  **Demonstration**  Demonstrate how to set up the tapping equipment following manufacturer’s guidelines and federal regulations (see above) along with company guidelines and best practices:   * Tapping machine (for taps greater and less than two inches).   Show the participants examples of the following and explain how they are used and when.   * Tap fittings * Tap isolation valve   + Reinforce how a full opening valve is used during hot tapping. |

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| **Time** | **Topics for Discussion, Demonstrations, and Activities** |
| **45 minutes** | **Tapping**  **Demonstration**  Use pipeline maps, records, etc. and the lab materials and equipment to:   * Determine the number and size of taps for a bypass to be constructed. * Identify tapping site and determine needed clearance around tapping area.   Reinforce: the importance of One-call for locating facilities and following the company guidelines and manufacturer’s instructions. |
| **120 minutes** | **Tap a Line**  **Demonstration**  Demonstrate how to tap a line, following the steps below.   1. Prepare tapping equipment (calibrate and perform an operations check) 2. Review pipeline data to determine the condition of the pipe to be tapped. 3. Inspect pipe  * For steel: corrosion * For plastic: cuts, gouges, scratches  1. Measure distance to complete the tap. 2. Install a gauge on each side of the isolated section, calibrate and test the gauge. 3. Install fittings and valves  * Refer to the tap fitting manufacturer's instructions for the recommended minimum distance between the face of the stopper and the location where cutting or welding is done.  1. Attach tapping machine (following manufacturer’s guidelines) 2. Perform the tap (following manufacturer’s guidelines). 3. Remove:    * Coupon (following manufacturer’s guidelines).   *Refer to Module 4, page 11 for diagram and typical process. (Processes vary slightly by manufacturer.)*   * + Chips, if steel.  1. Conduct a segment isolation, for example: line stopping, purging, and venting (per company guidelines). 2. Install a completion plug and complete the tap. 3. Perform the leak test. 4. Remove tapping valve. 5. Install completion cap. 6. Complete the documentation.   Emphasize, through “real-world” examples conditions/troubleshooting to be aware of during the tapping process.  Instruct participants to complete **Activity Worksheet #1.** |

Boot Camp Activities

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| |  |  | | --- | --- | | Working with a partner or partners, complete the following tasks, using the materials and equipment in your lab. Be sure to follow the industry guidelines and manufacturers’ instructions. Activity Worksheet #1 – Tapping a Pipeline | | | Lab | * Use Appendix 2-Performance Checklist Tapping a Line   + Perform the tasks.   + Identify the materials, tools and instructions used to complete the task(s).   + Answer any question presented. * Take notes in the sections below (as needed). * Be prepared to participate in workshop discussions. | | Tools used  PPE |  | |  | |  | |  | | Steps -actions |  | |  | |  | |  | | References-guidelines-tools used, including  CFR (If applicable)  Indicate, if applicable measures to respond report and document potential problems and AOCs. |  | |  | |  | |  | |  | |  | |  | |  | |  | | Lessons learned |  | |  | |  | |  | |  | |  | | General discussion questions or notes |  | |  | |  | |  | |  |

# Appendix 1

Appendix 1 – Performance Checklist–Tapping a Line (Instructor)

Participants will complete the task(s) and answer the question(s). When finished, provide appropriate feedback.

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|  | **Tasks** | **Actions and Questions** | | **Answers** | |
| 1 | Hot tapping | Answer the following.  When hot tapping a line list the guidelines to follow for:   * The operator’s personal safety. * The safety of the surrounding personnel and property. | | *Answers will depend on the supplies and equipment used and the manufacturer’s instructions* | |
| 2 | Set up the tapping machine for taps **greater** than two inches. | List the steps in the chart below to set up the mapping machine for taps greater than two inches.   |  |  | | --- | --- | | **Steps** | **Notes** | |  |  | |  |  | |  |  | |  |  | |  |  | | | *Answers will depend on the supplies and equipment used and the manufacturer’s instructions.*   |  |  | | --- | --- | | **Steps** | **Successful Y/N** | |  |  | |  |  | |  |  | |  |  | |  |  | | |
| 3 | Set up the tapping machine for taps l**ess** than two inches. | List the steps in the chart below to set up the mapping machine for taps less than two inches.   |  |  | | --- | --- | | **Steps** | **Notes** | |  |  | |  |  | |  |  | |  |  | |  |  | | | *Answers will depend on the supplies and equipment used and the manufacturer’s instructions.*   |  |  | | --- | --- | | **Steps** | **Successful Y/N** | |  |  | |  |  | |  |  | |  |  | |  |  | | |
| 4 | Tap a pipeline | List the steps in the chart below to tap a pipeline.   |  |  | | --- | --- | | **Steps** | **Notes** | |  |  | |  |  | |  |  | |  |  | |  |  | |  |  | |  |  | |  |  | |  |  | |  |  | |  |  | |  |  | |  |  | |  |  | |  |  | | | |  |  | | --- | --- | | **Steps** | **Successful Y/N** | | 1. *Prepare tapping equipment*   *calibrate/ perform operations check)* |  | | 1. *Review pipeline data re: condition of the pipe to be tapped.* |  | | 1. *Inspect pipe*  * *For steel: corrosion* * *For plastic: cuts, gouges, scratches* |  | | 1. *Measure distance to complete the tap* |  | | 1. *Install a gauge on each side of the isolated section, calibrate and test the gauge.* |  | | 1. *Install fittings and valve.* |  | | 1. *Attach tapping machine (following manufacturer’s guidelines)* |  | | 1. *Perform the tap (following manufacturer’s guidelines).* |  | | 1. *Remove:*  * *Coupon (following manufacturer’s guidelines).* * *Chips, If steel pipe* |  | | 1. *Conduct a segment isolation, for example: line stopping, purging, and venting (per company guidelines).* |  | | 1. *Install a completion plug and complete the tap.* |  | | 1. *Perform leak test* |  | | 1. *Remove tapping valve.* |  | | 1. *Install completion cap* |  | | 1. *Complete documentation* |  | | |
| 5 | Check for leaks | 1. Indicate how to check for leaks.    * If the materials are available, run the test and present the results. 2. If the fitting fails, what actions must you take? | *Specific answers will depend on company guidelines and facilitator.* | |
| 6 | Troubleshooting | Answer the following question:  If a visual inspection of the fitting and adjoining pipe indicates any damage and/or improper installation, what should you do? | *Specific answers will depend on company guidelines and facilitator. However, the pipe should be destroyed so it is not used.* | |

# Appendix 2

Appendix 2 – Performance Checklist–Tapping a Line

Complete the task(s) and answer the question(s). The instructor will provide appropriate feedback.

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|  | **Tasks** | **Actions and Questions** | **Answers** |
| 1 | Hot tapping | Answer the following.  When hot tapping a line list the guidelines to follow for:   * The operator’s personal safety. * The safety of the surrounding personnel and property. |  |
| 2 | Set up the tapping machine for taps **greater** than two inches. | List the steps in the chart below to set up the mapping machine for taps greater than two inches.   |  |  | | --- | --- | | **Steps** | **Notes** | |  |  | |  |  | |  |  | |  |  | |  |  | |  |
| 3 | Set up the tapping machine for taps l**ess** than two inches. | List the steps in the chart below to set up the mapping machine for taps less than two inches.   |  |  | | --- | --- | | **Steps** | **Notes** | |  |  | |  |  | |  |  | |  |  | |  |  | |  |
| 4 | Tap a pipeline | List the steps in the chart below to tap a pipeline.   |  |  | | --- | --- | | **Steps** | **Notes** | |  |  | |  |  | |  |  | |  |  | |  |  | |  |  | |  |  | |  |  | |  |  | |  |  | |  |  | |  |  | |  |  | |  |  | |  |  | |  |
| 5 | Check for leaks | 1. Indicate how to check for leaks.    * If the materials are available, run the test and present the results. 2. If the fitting fails, what actions must you take? |  |
| 5 | Troubleshooting | Answer the following question:  If a visual inspection of the fitting and adjoining pipe indicates any damage and/or improper installation, what should you do? |  |