



UNDERGROUND FACILITY LOCATOR COMPETENCY PROFILE

UNDERGROUND FACILITY LOCATOR COMPETENCY PROFILE

The Underground Facility Locator (UFL) Competency Profile (CP) was developed for the Canadian Association of Pipeline and Utility Locating Contractors (CAPULC). CAPULC will create a Competency Profile Committee (CPC) to review the Competency Profile and to send the CP out for public review and comment. CAPULC members may request to join the CPC by emailing competencies@capulc.ca.

Version 1.0 – 2015

DISCLAIMER

The information provided in this Competency Profile is intended for general application only and is not intended for use as a complete reference. Terms used in this Competency Profile may vary between facility owners/operators and jurisdictions. It is not a definitive guide to government regulations nor is it a guide to the practices and procedures wholly applicable to every locate circumstance. The appropriate regulations, company-specific work practices and manufacturers' equipment instructions must be consulted and applied with due diligence. The Canadian Association of Pipeline and Utility Locating Contractors (CAPULC) and Locate Management assume no responsibility whatsoever, for any injury, loss or damage arising from its use.

ACKNOWLEDGEMENTS

The competencies were developed by Locate Management for Underground Facility Locators (UFLs) with the assistance from the Canadian Association of Pipeline and Utility Locating Contractors (CAPULC) members, industry, facility owner/operators. Their collective input and dedication to the development of the UFL Competency Profile are greatly appreciated by CAPULC.

COPYRIGHT

All rights reserved. No part of this publication may be stored in a retrieval system, reproduced, or transmitted, in any form or by any means: photocopying, electronic, mechanical, recording, or otherwise, without prior written permission from Locate Management, a Division of Alberta Hot Line Inc.

© 2015 Locate Management

ADDITIONS AND MODIFICATIONS

Gas Distribution	4
General Gas Distribution Locating Knowledge	4
General Gas Distribution Locating Skills.....	4
Information Source Knowledge	6
Information Source Skills.....	7
Gas Distribution Locating Documentation and Communication Skills.....	9
Gas Distribution Locator Safety Knowledge	9
Gas Distribution Locator Safety Skills	10
Visual Inspection Knowledge	10
Visual Inspection Skills.....	12
Locating Methods Knowledge	15
Locating Methods Skills.....	16
Locator Marking Knowledge.....	18
Locator Marking Skills	18
Problem Solving Knowledge	19
Problem Solving Skills.....	19
Locator Drawing Knowledge	20
Locator Drawing Skills.....	20

Gas Distribution						
1.0	General Gas Distribution Locating Knowledge	Describe the history of gas distribution	Describe the properties of natural gas	Describe the purpose and application of odorizers in natural gas	Describe the uses of natural gas	Describe the users of natural gas
		Describe the sources of natural gas	Describe a natural gas well source	Describe a transmission gas source	Describe an LDC (local distribution company)	Describe where and how an LDC accesses its sources of natural gas
		Know the gas distribution owners and operators in a service area	Know customer products transported by the pipeline system	Describe the gas distribution system model	Describe repurposed legacy infrastructure in the gas distribution system model	Describe abandoned or discontinued legacy infrastructure in the gas distribution system model
		Describe rural gas distribution systems	Describe urban gas distribution systems	Describe metro gas distribution systems	Describe the composition of different types of gas distribution pipes	Describe conductive pipe composition
		Describe non-conductive pipe composition	Explain tracer wire, its application, and common configurations and locations	Describe common pipe functions and associated pressures	Describe various gas distribution pipe configurations	Describe construction practices for gas distribution facilities
		Know pipe size conversions	Describe the purpose of flanges, valves, fittings	Describe the types of connection or services (e.g., plastic, steel, encased, etc.)	Describe casing vents	Describe the purpose of risers and valves
		Describe isolation valves	Describe shutoff valves and where they are found	Describe open or closed valves	Describe gas distribution bypass pipes and valves	Describe a gas distribution valve box
		Describe gas valve box cover	Describe a gate key (valve shutoff tool)	Describe gas manhole access	Describe exhaust venting of subsurface regulators	Describe curb stop valves
		Explain a pipe transition fitting	Explain a gas distribution pipeline tee	Describe natural gas receipt points / delivery points	Explain the purpose of metering stations	Describe where metering stations are typically found
		Explain the purpose of regulator, metering, and odorizing (RMO) stations	Describe where RMO's are typically found	Explain the purpose of intermediate regulator stations (IRS)	Describe where IRS's are typically found	Explain a gas distribution pipeline tap
		Define a farm tap / service riser	Describe a service punch tee (SPT)	Describe hot tap	Describe a customer gas regulator	Describe a customer gas meter
		Describe an MDU (multi-dwelling unit) gas service	Describe a primary gas service	Describe a secondary (private) gas service	Describe future pipe	Describe dead-end pipe
		Describe gas distribution ancillary facilities (communication, electrical, CP, etc.)	Describe CP (cathodic protection)	Describe cathodic rectifier	Describe cathodic (anode) ground beds	Explain an isolation kit
		Describe cathodic protection test leads and stations	Describe a gas meter CP sacrificial anode	Explain a multi-party trench	Describe trenchless pipe installation technologies	Describe bell holes
		Explain signal application access points for gas distribution systems	Describe a squeeze-off tool			
2.0	General Gas Distribution Locating Skills	Demonstrate the ability to identify odorizers	Demonstrate the ability to identify uses of natural gas	Demonstrate the ability to identify users of natural gas	Demonstrate the ability to identify sources of natural gas	Demonstrate the ability to identify transmission sources of natural gas

Underground Facility Locator Competency Profile



Gas Distribution

Demonstrate the ability to identify an LDC (local distribution company)	Demonstrate the ability to identify an LDC (local distribution company) in a service area	Demonstrate the ability to identify the source of the LDC's natural gas	Demonstrate the ability to identify the products distributed by the LDC	Demonstrate the ability to identify the components and configuration of the gas distribution model
Demonstrate the ability to anticipate and identify repurposed legacy infrastructure in the gas system model	Demonstrate the ability to anticipate and identify abandoned legacy infrastructure in the gas system model	Demonstrate the ability to identify rural gas distribution systems	Demonstrate the ability to identify urban gas distribution systems	Demonstrate the ability to identify metro gas distribution systems
Demonstrate the ability to identify the composition of different types of gas distribution pipes	Demonstrate the ability to determine conductive pipes	Demonstrate the ability to determine non-conductive pipes	Demonstrate the ability to identify and utilize tracer wire	Demonstrate the ability to identify common pipeline functions and associated pressures
Demonstrate the ability to identify various gas distribution pipe configurations	Demonstrate the ability to identify various gas distribution facility construction practices	Demonstrate the ability to perform pipe size conversions	Demonstrate the ability to identify flanges, valves, fittings	Demonstrate the ability to identify the types of connection or services (e.g., plastic, steel, encased, etc.)
Demonstrate the ability to identify and utilize casing vents	Demonstrate the ability to identify and utilize risers and valves	Demonstrate the ability to identify and utilize isolation valves	Demonstrate the ability to identify and utilize shutoff valves	Demonstrate the ability to identify open or closed valves
Demonstrate the ability to identify gas distribution bypass pipes and valves	Demonstrate the ability to identify a gas distribution valve box	Demonstrate the ability to identify and access a gas valve box cover	Demonstrate the ability to identify and utilize a gate key (valve shutoff tool)	Demonstrate the ability to identify and access a gas manhole
Demonstrate the ability to identify exhaust venting of subsurface regulators	Demonstrate the ability to identify curb stop valves	Demonstrate the ability to identify a pipe transition fitting	Demonstrate the ability to identify a gas distribution pipeline tee	Demonstrate the ability to identify natural gas receipt points / delivery points
Demonstrate the ability to identify metering stations	Demonstrate the ability to identify regulator, metering, and odorizing (RMO) stations	Demonstrate the ability to identify intermediate regulator stations (IRS)	Demonstrate the ability to identify a gas distribution pipeline tap	Demonstrate the ability to identify a farm tap / service riser
Demonstrate the ability to identify a service punch tee (SPT)	Demonstrate the ability to identify a hot tap	Demonstrate the ability to identify a customer gas regulator	Demonstrate the ability to identify a customer gas meter	Demonstrate the ability to identify an MDU (multi-dwelling unit) gas service
Demonstrate the ability to identify a primary gas service	Demonstrate the ability to identify a secondary (private) gas service	Demonstrate the ability to identify future pipe	Demonstrate the ability to identify dead-end pipe	Demonstrate the ability to identify ancillary facilities (communication, electrical, CP, etc.)
Demonstrate the ability to identify CP (cathodic protection)	Demonstrate the ability to identify a cathodic rectifier	Demonstrate the ability to identify cathodic (anode) ground beds	Demonstrate the ability to identify an isolation kit	Demonstrate the ability to identify and utilize cathodic protection test leads and stations
Demonstrate the ability to identify a gas meter CP sacrificial anode	Demonstrate the ability to identify a multi-party trench	Demonstrate the ability to identify trenchless pipe installation	Demonstrate the ability to identify bell holes	Demonstrate the ability to perform the key elements of a good locate
Demonstrate the ability to identify and utilize signal access points for gas distribution systems	Demonstrate the ability to identify a squeeze-off tool			

Gas Distribution						
3.0	Information Source Knowledge	Explain gas distribution owner / operator (LDC) records	Explain where LDC records can be obtained	Explain the critical importance of utilizing LDC records	Explain how to interpret information contained in an LDC record (e.g., legends and symbols)	Explain the formats that LDC records are found (e.g., hardcopy, digital)
		Explain the purpose and use of LDC index records	Explain how to identify gas distribution systems on LDC records	Explain how to identify above ground structures (e.g., stations, valves, meters) found on LDC records	Explain how to identify buried gas infrastructure found on LDC records	Explain how to identify gas distribution system components found on LDC records
		Explain how to identify various gas distribution pipe configurations on LDC records	Explain how to identify different functions and associated pressures of gas distribution pipes on LDC records	Explain how to identify the composition and sizes of lines found on LDC records	Explain how to identify the status of lines found on LDC records	Explain how to identify the approximate alignment of lines found on an LDC record
		Explain how to identify access points on LDC records	Explain how to identify crossings (foreign, road, etc.) found on LDC records	Explain how to identify transition points or fittings found on LDC records	Explain how to identify a change in pipe composition found on LDC records	Explain how to identify a change in pipe size found on LDC records
		Explain how to identify a change in pipe pressure found on LDC records	Explain how to identify property owner, property line, and property descriptions found on LDC records	Explain how to identify construction practices for gas distribution facilities on LDC records	Explain how to identify a multi-party trench on LDC records	Explain how to identify trenchless pipe installation on LDC records
		Explain how to identify the types of connection or services (e.g., plastic, steel, encased, etc.) on LDC records	Explain how to identify regulator, metering, and odorizing (RMO) stations on LDC records	Explain how to identify intermediate regulator stations (IRS) on LDC records	Explain how to identify and utilize shutoff valves on LDC records	Explain how to identify and utilize isolation valves on LDC records
		Explain how to identify gas distribution ancillary facilities (communication, electrical, CP) on LDC records	Explain how to identify and utilize casing vents on LDC records	Explain where to anticipate, based on LDC records, where tracer wires may be found	Explain how to identify CP (cathodic protection) on LDC records	Explain how to identify a cathodic rectifier on LDC records
		Explain how to identify cathodic (anode) ground beds on LDC records	Explain how to identify isolation points on LDC records	Explain how to identify cathodic protection test leads and stations on LDC records	Explain how to identify easements on LDC records	Explain how to identify a right of way on LDC records
		Explain how to identify buried facilities in public right of way on LDC records	Explain how to identify a gas distribution pipeline tap on LDC records	Explain how to identify a farm tap / service riser on LDC records	Explain how to identify a customer gas regulator on LDC records	Explain how to identify a customer gas meter on LDC records
		Explain how to identify a gas meter CP sacrificial anode on LDC records	Explain how to identify an MDU (multi-dwelling unit) gas service on LDC records	Explain how to identify a commercial gas service on LDC records	Explain how to identify an industrial gas service on LDC records	Explain how to identify and utilize risers and valves on LDC records
		Explain how to identify metering stations on LDC records	Explain how to identify open or closed valves on records	Explain how to identify gas distribution bypass pipes and valves on records	Explain how to identify a gas distribution valve box on records	Explain how to identify flanges, valves, fittings on records
		Explain how to identify a gas distribution pipeline tee on records	Explain how to identify a service punch tee (SPT) on records	Explain how to identify a hot tap on LDC records	Explain how to identify and access a gas manhole on records	Explain how to identify exhaust venting of subsurface regulators on records

Gas Distribution
4.0
**Information
Source Skills**

Explain how to identify curb stop valves on records	Explain how to identify a primary gas service on LDC records	Explain how to identify a secondary (private) gas service on LDC records	Explain how to identify future pipe on LDC records	Explain how to identify dead-end pipe on LDC records
Explain how to identify abbreviations and symbols on LDC records	Explain how to identify bell hole construction on LDC records	Explain map sources	Explain where to obtain various types of records	Explain other utility owner / operator records
Explain schematic representation (approximate relative alignment)	Explain the importance of spatially accurate representation	Explain the importance of recorded distances between pipes and from boundaries and property lines, etc.	Explain survey plans	Explain third party databases
Explain as-builts drawings	Explain provincial regulatory boards / agencies / commission plans	Explain land titles records	Explain topographical maps	Describe the importance of obtaining information from landowners regarding facilities on their property
Explain GIS maps	Explain aerial / satellite photographs	Explain site photographs	Explain internet-accessed mapping and photographs	Explain importance of interviewing facility / field personnel
Explain use of one call system information	Explain municipal / county maps	Explain irrigation district maps	Explain engineer plot plans	Explain locator company drawings
Describe a stake-out report / facility location request	Describe a ground disturbance package	Describe a job completion checklist	Describe a crossing report	Describe a stake-out report / facility location request
Demonstrate ability to utilize gas distribution owner / operator (LDC) records	Demonstrate the ability to obtain LDC records	Demonstrate the ability to interpret and utilize information on LDC records (e.g., legends and symbols)	Demonstrate the ability to utilize various formats of LDC records (e.g., hardcopy, digital)	Demonstrate the ability to utilize LDC index records
Demonstrate the ability to identify gas distribution systems on LDC records	Demonstrate ability to identify above ground structures (e.g., stations, valves, meters) on LDC records	Demonstrate the ability to identify buried gas infrastructure found on LDC records	Demonstrate the ability to identify gas distribution system components on LDC records	Demonstrate the ability to identify various gas distribution pipe configurations found on LDC records
Demonstrate the ability to identify the functions and associated pressures of gas pipes found on LDC records	Demonstrate the ability to identify the composition and size of lines found on LDC records	Demonstrate the ability to identify the composition and size of lines found on LDC records	Demonstrate the ability to identify the status of lines found on LDC records	Demonstrate the ability to identify the approximate alignment of lines found on LDC records
Demonstrate the ability to identify access points found on LDC records	Demonstrate the ability to identify crossings (foreign, road, etc.) found on LDC records	Demonstrate the ability to identify transition points or fittings found on LDC records	Demonstrate the ability to identify a change in composition of lines found on LDC records	Demonstrate the ability to identify a change in pipe size found on LDC records
Demonstrate the ability to identify a change in pipe pressure found on LDC records	Demonstrate the ability to identify property owner, property line, and property descriptions found on LDC records	Demonstrate the ability to identify recorded construction practices used to install gas distribution facilities	Demonstrate the ability to identify a multi-party trench found on LDC records	Demonstrate the ability to identify trenchless pipe installation on LDC records

Gas Distribution

Demonstrate the ability to identify the types of connection or services (e.g., plastic, steel, encased, etc.) on LDC records	Demonstrate the ability to identify regulator, metering, and odorizing (RMO) stations on LDC records	Demonstrate the ability to identify intermediate regulator stations (IRS) on LDC records	Demonstrate the ability to identify and utilize shutoff valves found on LDC records	Demonstrate the ability to identify and utilize isolation valves on LDC records
Demonstrate the ability to identify distribution ancillary facilities on LDC records	Demonstrate the ability to identify and utilize casing vents found on LDC records	Demonstrate the ability to anticipate based on LDC records where tracer wires may be found	Demonstrate the ability to identify CP (cathodic protection) on LDC records	Demonstrate the ability to identify a cathodic rectifier on LDC records
Demonstrate the ability to identify cathodic (anode) ground beds on LDC records	Demonstrate the ability to identify isolation points on LDC records	Demonstrate the ability to identify cathodic protection test leads and stations on LDC records	Demonstrate the ability to identify easements on LDC records	Demonstrate the ability to identify a right of way on LDC records
Demonstrate the ability to identify buried facilities in public right of way on LDC records	Demonstrate the ability to identify a gas distribution pipeline tap on LDC records	Demonstrate the ability to identify a farm tap / service riser on LDC records	Demonstrate the ability to identify a customer gas regulator on LDC records	Demonstrate the ability to identify a customer gas meter on LDC records
Demonstrate the ability to identify a gas meter CP sacrificial anode on LDC records	Demonstrate the ability to identify an MDU (multi-dwelling unit) gas service on LDC records	Demonstrate the ability to identify a commercial gas service on LDC records	Demonstrate the ability to identify an industrial gas service on LDC records	Demonstrate the ability to identify and utilize risers and valves on LDC records
Demonstrate the ability to identify metering stations on LDC records	Demonstrate the ability to identify open or closed valves on LDC records	Demonstrate the ability to identify gas distribution bypass pipes and valves on LDC records	Demonstrate the ability to identify a gas distribution valve box on LDC records	Demonstrate the ability to identify flanges, valves, fittings on LDC records
Demonstrate the ability to identify a gas distribution pipeline tee on LDC records	Demonstrate the ability to identify a service punch tee (SPT) on LDC records	Demonstrate the ability to identify a hot tap on LDC records	Demonstrate the ability to identify and access a gas manhole on LDC records	Demonstrate the ability to identify exhaust venting of subsurface regulators on LDC records
Demonstrate the ability to identify curb stop valves on LDC records	Demonstrate the ability to identify a primary gas service on LDC records	Demonstrate the ability to identify a secondary (private) gas service on LDC records	Demonstrate the ability to identify future pipe on LDC records	Demonstrate the ability to identify dead-end pipe on LDC records
Demonstrate the ability to identify abbreviations and symbols on LDC records	Demonstrate the ability to identify bell hole construction on LDC records	Demonstrate ability to identify sources of mapping records	Demonstrate ability to access various types of records	Demonstrate the ability to access and utilize other utility owner / operator records
Demonstrate the ability to interpret schematic representation (approximate relative alignment)	Demonstrate the ability to interpret spatially accurate representation	Demonstrate the ability to determine recorded distances between pipes and boundaries and property lines	Demonstrate ability to access and utilize survey plans	Demonstrate ability to access and utilize third party database records
Demonstrate ability to access and utilize as-builts drawings	Demonstrate ability to access and utilize provincial regulatory boards / agencies / commission plans	Demonstrate ability to access and utilize land titles records	Demonstrate ability to access and utilize topographical maps	Demonstrate ability to obtain information from landowners regarding facilities on their property
Demonstrate ability to access and utilize GIS maps	Demonstrate ability to access and utilize aerial / satellite photographs	Demonstrate ability to utilize site photographs	Demonstrate ability to access and utilize internet-accessed mapping and photographs	Demonstrate ability to conduct interviews with facility / field personnel

Underground Facility Locator Competency Profile



Gas Distribution					
5.0		Demonstrate ability to access and utilize one-call system information	Demonstrate ability to access and utilize municipal / county maps	Demonstrate ability to access and utilize irrigation district maps	Demonstrate ability to access and utilize engineer plot plans
		Demonstrate the ability to utilize and complete a stake-out report / facility location request	Demonstrate the ability to utilize and complete a ground disturbance package	Demonstrate the ability to utilize and complete a job completion checklist	Demonstrate the ability to utilize and complete a crossing report
	Gas Distribution Locating Documentation and Communication Knowledge	Describe owner/operator notification procedures	Describe procedures to contact LDC owner/operators	Explain the locate request communication process	Describe hazard assessment, controls, and ERP records
		Describe a stake-out report / facility location request	Describe a ground disturbance package	Describe a crossing report	Describe a backfill report
	Gas Distribution Locating Documentation and Communication Skills	Demonstrate the ability to follow client notification procedures	Demonstrate the ability to contact LDC owner/operators	Demonstrate the ability to follow the locate request communication process	Demonstrate the ability to document and communicate hazard assessment, controls, and ERP records
6.0		Demonstrate the ability to document and communicate a stake-out report / facility location request	Demonstrate the ability to document and communicate a ground disturbance package	Demonstrate the ability to document and communicate a crossing report	Demonstrate the ability to document and communicate a backfill report
	Gas Distribution Locator Safety Knowledge	Describe corporate safety responsibilities	Describe employee safety responsibilities	Explain the facility owner / operator OHS&E policy	Explain the importance of hazardous gas detection training
		Explain the importance of fire safety training	Explain the importance of electrical safety training	Explain the importance of confined space safety training	Explain the importance of a client-specific safety orientation
		Explain the importance of owner-specific safety orientation	Explain the importance of site-specific safety orientation	Describe the importance and use of PPE (personal protective equipment)	Explain importance and operation of a four-way gas monitor
		Describe the purpose and content of tailgate safety meetings	Describe on-street locating safety procedures	Describe managing and channelling traffic	Describe manhole safety procedures
		Describe vault safety procedures	Describe gas and pressure release hazards	Describe continuous gas monitoring	Describe ventilation
		Describe SCBA (self-contained breathing apparatus)	Describe working alone procedures	Describe maintaining a safe distance from overhead electrical lines	Describe safe digging ground disturbance and damage prevention
		Describe the JCC (job completion checklist) process	Describe the safety / environmental incident investigation process		Describe the steps of proper safe digging

Gas Distribution						
8.0	Gas Distribution Locator Safety Skills	Demonstrate the ability to determine, appropriate, and follow applicable corporate safety responsibilities	Demonstrate the ability to determine and fulfill appropriate employee safety responsibilities	Demonstrate the ability to determine and follow applicable facility owner / operator OHS&E policy	Complete and demonstrate ability to apply hazardous gas detection training	Complete and demonstrate ability to apply H2S training
		Complete and demonstrate ability to apply fire safety training	Complete and demonstrate ability to apply electrical safety training	Complete and demonstrate ability to apply confined space safety training	Demonstrate the ability to determine and follow required emergency response processes	Demonstrate the ability to follow client-specific safety orientation requirements
		Demonstrate the ability to follow owner-specific safety orientation requirements	Demonstrate the ability to follow site-specific safety orientation requirements	Demonstrate the ability to determine and utilize required PPE (personal protective equipment)	Demonstrate the ability to operate a four-way gas monitor	Demonstrate the ability to follow the JSA (job safety analysis) process
		Demonstrate the ability to conduct/attend and follow requirements of tailgate safety meetings	Demonstrate the ability to follow on-street locating safety procedures	Demonstrate the ability to manage and channel traffic	Demonstrate the ability to follow manhole safety procedures	Demonstrate the ability to follow hand hole safety procedures
		Demonstrate the ability to follow vault safety procedures	Demonstrate the ability to protect against gas and pressure release hazards	Demonstrate the ability to follow continuous gas monitoring procedures	Demonstrate the ability to follow ventilation procedures	Demonstrate the ability to follow safety watch procedures
		Demonstrate the ability to utilize SCBA (self-contained breathing apparatus)	Demonstrate the ability to follow working alone procedures	Demonstrate the ability to follow electrical safety procedures	Demonstrate the ability to maintain safe distance from overhead electrical lines	Demonstrate the ability to follow safe digging ground disturbance and damage prevention procedures
		Demonstrate the ability to follow the steps of proper safe digging	Demonstrate the ability to utilize, document, and communicate the JCC (job completion checklist)	Demonstrate the ability to participate in the safety / environmental incident investigation process		
	Visual Inspection Knowledge	Explain the primary reason for performing a visual inspection	Describe the importance of using (LDC) records during the visual inspection	Describe how to utilize abbreviations and symbols as found on LDC records during the visual inspection	Describe visual signs that might indicate the presence of buried facilities	Describe how to recognize areas of previous ground disturbance
		Describe how to recognize trench or excavation scars	Describe how to recognize potential hazards	Describe warning signs used for gas distribution facilities	Describe information found on warning signs	Describe where warning signs are typically located
		Describe benefits of warning signs	Describe safety labels and signs used for buried gas distribution facilities	Describe information found on safety labels signs	Describe where safety labels and signs are typically located	Describe benefits of safety labels and signs
		Describe identification labels and tags used for buried gas distribution facilities	Describe information found on identification labels and tags	Describe where identification labels and tags are typically located	Describe benefits of identification labels and tags	Describe how to identify signal application points as found on LDC records
		Describe how to recognize gas distribution systems as found on (LDC) records	Describe how to identify above ground structures (e.g., stations, risers, valves, meters) as found on LDC records	Describe how to identify buried gas infrastructure as found on LDC records	Describe how to identify gas distribution system components as found on LDC records	Describe how to identify various gas distribution pipe configurations as found on LDC records

Gas Distribution

Describe how to identify different functions and associated pressures of gas lines as found on LDC records	Know the composition and sizes of gas distribution lines as found on LDC records	Know the status of gas distribution lines as found on LDC records	Describe how to identify the approximate alignment of lines as found on LDC records	Describe how to identify access points as found on LDC records
Describe how to identify crossings (foreign, road, etc.) as found on LDC records	Describe how to identify transition points or fittings as found on LDC records	Describe how to identify a change in pipe composition as found on LDC records	Describe how to identify a change in pipe size as found on LDC records	Describe how to identify a change in pipe pressure as found on LDC records
Describe how to identify property owner, property line, and property descriptions as found on LDC records	Describe how to identify recorded construction practices used to install gas distribution facilities	Describe how to identify a multi-party trench as found on LDC records	Describe how to identify trenchless pipe installation as found on LDC records	Describe how to identify bell hole construction as found on LDC records
Describe how to identify the types of connection or services (e.g., plastic, steel, encased, etc.) as found on LDC records	Describe how to identify regulator, metering, and odorizing (RMO) stations as found on LDC records	Describe how to identify intermediate regulator stations (IRS) as found on LDC records	Describe how to identify and utilize shutoff valves as found on LDC records	Describe how to identify and utilize isolation valves as found on LDC records
Describe how to identify gas distribution ancillary facilities as found on LDC records	Describe how to identify and utilize casing vents as found on records	Describe how to identify tracer wires	Describe how to identify CP (cathodic protection) as found on records	Describe how to identify a cathodic rectifier as found on LDC records
Describe how to identify cathodic (anode) ground beds as found on LDC records	Describe how to identify isolation points as found on LDC records	Describe how to identify cathodic protection test leads and stations as found on LDC records	Describe how to identify easements as found on LDC records	Describe how to identify a right of way as found on LDC records
Describe how to identify buried facilities in public right of way as found on LDC records	Describe how to identify a gas distribution pipeline tap as found on LDC records	Describe how to identify a farm tap / service riser as found on LDC records	Describe how to identify a customer gas regulator as found on LDC records	Describe how to identify a customer gas meter as found on LDC records
Describe how to identify a gas meter CP sacrificial anode as found on LDC records	Describe how to identify an MDU (multi-dwelling unit) gas service as found on LDC records	Describe how to identify a commercial gas service as found on LDC records	Describe how to identify an industrial gas service as found on LDC records	Describe how to identify and utilize risers and valves as found on LDC records
Describe how to identify metering stations as found on LDC records	Describe how to identify open or closed valves as found on LDC records	Describe how to identify gas distribution bypass pipes and valves as found on LDC records	Describe how to identify a gas distribution valve box as found on LDC records	Describe how to identify flanges, valves, fittings as found on LDC records
Describe how to identify a gas distribution pipeline tee as found on LDC records	Describe how to identify a service punch tee (SPT) as found on LDC records	Describe how to identify a hot tap as found on LDC records	Describe how to identify and access a gas manhole as found on LDC records	Describe how to identify exhaust venting of subsurface regulators as found on LDC records
Describe how to identify curb stop valves as found on LDC records	Demonstrate the ability to identify receipt points / delivery points (demarcation point)	Describe how to identify a primary gas service as found on LDC records	Describe how to identify a secondary (private) gas service as found on LDC records	Describe how to identify future pipe as found on LDC records

Gas Distribution					
10.0		Describe how to identify dead-end pipe as found on LDC records	Describe how to identify infrastructure and features as found on various types of records	Describe how to identify infrastructure and features as found on other utility owner / operator records	Describe how to apply the interpretation of schematic representation during the visual inspection
		Describe how to visually verify recorded distances between pipes and boundaries and property lines	Describe how to identify infrastructure and features as found on survey plans	Describe how to identify infrastructure and features as found on third party database records	Describe how to identify infrastructure and features as found on as-builts drawings
		Describe how to identify infrastructure and features as found on land titles records	Describe how to identify infrastructure and features as found on topographical maps	Describe how to utilize landowner information during the visual inspection	Describe the importance of obtaining landowner assistance and information during the visual inspection
		Describe how to identify infrastructure and features as found on aerial / satellite photographs	Describe how to identify infrastructure and features as found on site photographs	Describe how to identify infrastructure and features as found on internet-accessed mapping and photographs	Describe how to perform visual inspections with facility / field personnel
		Describe how to identify infrastructure and features as found on municipal / county maps	Describe how to identify infrastructure and features as found on irrigation district maps	Describe how to identify infrastructure and features as found on engineer plot plans	Describe how to identify infrastructure and features as found on locator company drawings
		Describe how to identify infrastructure and features recorded in a ground disturbance package	Describe how to identify infrastructure as required by a current facility location request	Describe the importance of documenting the visual inspection in a job completion checklist	Describe how to identify infrastructure and features found on previous crossing report
		Describe how to recognize changes in facilities	Describe how to recognize extreme environments	Describe how to recognize disruptive noises	Describe how to recognize inaccurate records
		Describe how to anticipate a possible location of a sharp drop in signal	Describe how to anticipate a possible location of a complete loss of signal	Describe how to anticipate a possible problem with tracer wire	Describe how to anticipate a possible location of changes in depth
		Describe how to anticipate possible areas of common-bonded facilities	Describe how to anticipate possible short facilities	Describe how to anticipate possible non-grounded facilities	Describe how to anticipate possible areas of facilities that are closer than normal
		Describe facility access obstacles and how to overcome them	Describe the importance of utilizing records during the visual inspection	Explain how to anticipate and determine unrecorded facilities	Describe the process of documenting and forwarding updated records to the facility owner/operator
		Explain how to anticipate and determine company mergers and name changes	Explain how to anticipate and determine unregistered facilities	Explain how to anticipate and determine privately-owned facilities	Explain how to anticipate and determine ancillary facilities
	Visual Inspection Skills	Demonstrate ability to utilize LDC records during the visual inspection	Demonstrate ability to utilize LDC records during the visual inspection	Demonstrate the ability to identify abbreviations and symbols as found on LDC records	Demonstrate ability to recognize visual signs that indicate the presence of buried facilities
					Demonstrate the ability to recognize areas of previous ground disturbance

Gas Distribution

Demonstrate the ability to recognize trench or excavation scars	Demonstrate the ability to recognize potential hazards	Demonstrate the ability to recognize and interpret warning signs	Demonstrate the ability to recognize and interpret safety labels and signs	Demonstrate the ability to recognize and interpret identification labels and tags
Demonstrate ability to recognize signal application access points as found on LDC records	Demonstrate ability to recognize gas distribution systems as found on LDC records	Demonstrate ability to identify above ground structures (e.g., stations, risers, valves, meters) as found on LDC records	Demonstrate the ability to identify buried gas infrastructure as found on LDC records	Demonstrate the ability to identify gas distribution system components as found on LDC records
Demonstrate the ability to identify various gas distribution pipe configurations as found on LDC records	Demonstrate the ability to identify different functions and associated pressures of gas lines as found on LDC records	Demonstrate the ability to identify the composition and sizes of distribution lines as found on LDC records	Demonstrate the ability to identify the status of distribution lines as found on LDC records	Demonstrate the ability to identify the approximate alignment of lines as found on LDC records
Demonstrate the ability to identify crossings (foreign, road, etc.) as found on LDC records	Demonstrate the ability to identify transition points or fittings as found on LDC records	Demonstrate the ability to identify a change in pipe composition as found on LDC records	Demonstrate the ability to identify a change in pipe size as found on LDC records	Demonstrate the ability to identify a change in pipe pressure as found on LDC records
Demonstrate the ability to identify property owner, property line, and property descriptions as found on LDC records	Demonstrate the ability to identify recorded construction practices used to install gas distribution facilities	Demonstrate the ability to identify a multi-party trench as found on LDC records	Demonstrate the ability to identify trenchless pipe installation as found on LDC records	Demonstrate the ability to identify bell hole construction as found on LDC records
Demonstrate the ability to identify the types of connection or services (e.g., plastic, steel, encased, etc.) as found on LDC records	Demonstrate the ability to identify regulator, metering, and odorizing (RMO) stations as found on LDC records	Demonstrate the ability to identify intermediate regulator stations (IRS) as found on LDC records	Demonstrate the ability to identify and utilize shutoff valves as found on LDC records	Demonstrate the ability to identify and utilize isolation valves as found on LDC records
Demonstrate the ability to identify gas distribution ancillary facilities as found on LDC records	Demonstrate the ability to identify and utilize casing vents as found on records	Demonstrate the ability to identify tracer wires	Demonstrate the ability to identify CP (cathodic protection) as found on records	Demonstrate the ability to identify a cathodic rectifier as found on LDC records
Demonstrate the ability to identify cathodic (anode) ground beds as found on LDC records	Demonstrate the ability to identify isolation points as found on LDC records	Demonstrate the ability to identify cathodic protection test leads and stations as found on LDC records	Demonstrate the ability to identify easements as found on LDC records	Demonstrate the ability to identify a right of way as found on LDC records
Demonstrate the ability to identify buried facilities in public right of way as found on LDC records	Demonstrate the ability to identify a gas distribution pipeline tap as found on LDC records	Demonstrate the ability to identify a farm tap / service riser as found on LDC records	Demonstrate the ability to identify a customer gas regulator as found on LDC records	Demonstrate the ability to identify a customer gas meter as found on LDC records
Demonstrate the ability to identify a gas meter CP sacrificial anode as found on LDC records	Demonstrate the ability to identify an MDU (multi-dwelling unit) gas service as found on LDC records	Demonstrate the ability to identify a commercial gas service as found on LDC records	Demonstrate the ability to identify an industrial gas service as found on LDC records	Demonstrate the ability to identify and utilize risers and valves as found on LDC records
Demonstrate the ability to identify metering stations as found on LDC records	Demonstrate the ability to identify open or closed valves as found on LDC records	Demonstrate the ability to identify gas distribution bypass pipes and valves as found on LDC records	Demonstrate the ability to identify a gas distribution valve box as found on LDC records	Demonstrate the ability to identify flanges, valves, fittings as found on LDC records

Gas Distribution

Demonstrate the ability to identify gas distribution pipeline tee as found on LDC records	Demonstrate the ability to identify a service punch tee (SPT) as found on LDC records	Demonstrate the ability to identify a hot tap as found on LDC records	Demonstrate the ability to identify and access a gas manhole as found on LDC records	Demonstrate the ability to identify exhaust venting of subsurface regulators as found on LDC records
Demonstrate the ability to identify curb stop valves as found on LDC records	Demonstrate the ability to identify receipt points / delivery points (demarcation point) as found on LDC records	Demonstrate the ability to identify a primary gas service as found on LDC records	Demonstrate the ability to identify a secondary (private) gas service as found on LDC records	Demonstrate the ability to identify future pipe as found on LDC records
Demonstrate the ability to identify dead-end pipe as found on LDC records	Demonstrate the ability to identify infrastructure and features as found on various types of records	Demonstrate the ability to identify infrastructure and features as found on other utility owner / operator records	Demonstrate the ability to interpret schematic representation during the visual inspection	Demonstrate the ability to interpret spatially accurate representation during the visual inspection
Demonstrate the ability to recognize distances between pipes and boundaries and property lines	Demonstrate ability to identify infrastructure and features as found on survey plans	Demonstrate ability to identify infrastructure and features as found on third party database records	Demonstrate ability to identify infrastructure and features as found on as-builts drawings	Demonstrate ability to identify features as found on provincial regulatory boards / agencies / commission plans
Demonstrate ability to identify infrastructure and features as found on land titles records	Demonstrate ability to identify infrastructure and features as found on topographical maps	Demonstrate ability to obtain information from landowners regarding facilities on their property	Demonstrate ability to identify infrastructure and features as found on GIS maps	Demonstrate ability to identify infrastructure and features as found on aerial / satellite photographs
Demonstrate ability to identify infrastructure and features as found on site photographs	Demonstrate ability to identify infrastructure and features as found on internet-accessed mapping and photographs	Demonstrate ability to perform visual inspections with facility / field personnel	Demonstrate ability to identify infrastructure and features as found on one call system information	Demonstrate ability to identify infrastructure and features as found on municipal / county maps
Demonstrate ability to identify infrastructure and features as found on irrigation district maps	Demonstrate ability to identify infrastructure and features as found on engineer plot plans	Demonstrate ability to identify infrastructure and features as found on locator company drawings	Demonstrate ability to identify infrastructure and features found on previous stake-out reports	Demonstrate ability to identify infrastructure and features recorded in a ground disturbance package
Demonstrate ability to identify infrastructure as required by a current facility location request	Demonstrate the importance of documenting the visual inspection in a job completion checklist	Demonstrate ability to identify infrastructure and features found on previous crossing report	Demonstrate ability to recognize obstacles to locating accuracy	Demonstrate ability to recognize changes in facilities
Describe how to recognize technology limitations	Demonstrate ability to recognize extreme environments	Demonstrate ability to recognize disruptive noises	Demonstrate ability to recognize inaccurate records	Demonstrate ability to recognize sources of unwanted coupling
Demonstrate ability to recognize a possible location of a sharp drop in signal	Demonstrate ability to recognize a possible location of a complete loss of signal	Demonstrate ability to anticipate and determine possible problems with tracer wire	Demonstrate ability to recognize a possible location of changes in depth	Demonstrate the ability to recognize the possible effects of locating near a guardrail
Demonstrate the ability to recognize the possible effects of locating near metal fencing	Demonstrate the ability to recognize the possible effects of locating near surface structures	Demonstrate the ability to recognize the possible location of pipe tees and Y-laterals	Demonstrate ability to recognize possible areas of common-bonded facilities	Demonstrate ability to recognize possible short facilities

Underground Facility Locator Competency Profile



Gas Distribution					
11.0		Demonstrate ability to recognize non-grounded facilities	Demonstrate ability to recognize a possible area of facilities that are closer than normal	Demonstrate ability to recognize possible areas where facilities are congested	Demonstrate the ability to identify facility access obstacles and how to overcome them
		Demonstrate the ability to identify unrecorded facilities	Demonstrate the ability to document and forward updated records to the facility owner/operator	Demonstrate the ability to anticipate and determine abandoned or discontinued facilities	Demonstrate the ability to anticipate and determine company mergers and name changes
		Demonstrate the ability to anticipate and determine privately-owned facilities	Demonstrate the ability to anticipate and determine ancillary facilities	Demonstrate the ability to detect gas odorizer (leaks)	
	Locating Methods Knowledge	Describe the procedures for locating from start to finish	Describe the procedures for the Direct Hook-up Method	Describe the procedures for the Inductive Clamp Method	Describe the procedures for the Inductive Method
		Describe the procedures for the Inductive Sweeping Method	Describe the procedures for the Inducting Multi-Angle Sweeping Method	Describe the procedures for the 360° Sweeping Method	Describe the procedures for the ALL (Advanced Line Locating) Method
		Describe the procedures for the Live Cable (Power) Mode	Describe the procedures for the Radio Mode	Describe the procedures for locating sondes	Describe the procedures for locating transmitter coils
		Describe the procedures for locating electronic markers	Describe the procedures for locating remotely-applied EM signals	Describe the procedures for the Measurement Method	Describe the procedures for the Point A to Point B Method
		Describe the procedures for the Survey Method	List the tools required to perform a generic direct hook-up signal application procedure	Describe safe procedures for grounding	Describe the general criteria for selecting an effective direct hook-up access point
		Describe the general criteria for selecting an effective direct hook-up grounding point	Describe the conditions that provide an optimal direct hook-up ground point	Describe the conditions that provide a poor direct hook-up ground point	Describe the procedures to improve a direct hook-up ground point
		Describe an extended or multi-point ground	Describe safe procedures for applying a direct hook-up to a conductive pipe	Describe safe procedures for applying a direct hook-up to a riser	Describe safe procedures for applying a direct hook-up to a flange
		Describe safe procedures for applying a direct hook-up to a tracer wire	Describe safe procedures for applying a direct hook-up to a metal casing pipe	Describe safe procedures for applying a direct hook-up to a (safe) electrical cable	Describe safe procedures for applying a direct hook-up to a (safe) cathodic cable
		Describe safe procedures for applying a direct hook-up to a curb stop valve	Explain proper procedure for direct hook-up method at hand holes	Describe the tools required to perform the direct hook-up method at manholes	Describe the tools required to perform the direct hook-up method at vaults
		Describe the general criteria for selecting an effective inductive clamping access point	Describe safe procedures for applying a signal using an inductive clamp	Describe the safe procedures for applying a signal to a metal pipe with an inductive clamp	Describe the safe procedures for applying a signal to a tracer wire with an inductive clamp
					Describe the procedures for the Parallel Line Check Method

Gas Distribution					
	Describe the safe procedures for applying a signal to a metal conduit with an inductive clamp	Describe the safe procedures for applying a signal to a cathodic cable with an inductive clamp	Describe the safe procedures for applying a signal to an electrical cable with an inductive clamp	Describe the safe procedures for applying a signal to a communication cable with an inductive clamp	Describe the safe procedures for applying a signal to a control cable with an inductive clamp
	Describe the criteria for selecting an effective general inductive signal application point	Describe the criteria for selecting an effective inductive signal application point for metal pipe	Describe the criteria for selecting an effective inductive signal application point for tracer wire	Describe the criteria for selecting an effective inductive signal application point for casing pipe	Describe the criteria for selecting an effective inductive signal application point for metal conduit
	Describe the criteria for selecting an effective inductive signal application point for cathodic cable	Describe the criteria for selecting an effective inductive signal application point for electrical cable	Describe the criteria for selecting an effective inductive signal application point for communication cable	Describe the criteria for selecting an effective inductive signal application point for control cable	Describe the criteria for selecting an effective inductive signal application point for transmission pipe
	Describe the criteria for selecting an effective inductive signal application point for mainline (transfer) pipe	Describe the criteria for selecting an effective inductive signal application point for distribution pipe	Describe the criteria for selecting an effective inductive signal application point for service (drop) pipe	Describe the procedures for tracing an EM signal	Describe procedures for verifying a previously located facility
	Explain how to properly identify a target facility	Explain how to verify locates of gas distribution facilities within easements and ROWs.	Describe the procedures for locating buried objects with a magnetic locator	Describe the procedures for locating a metal access cover with a magnetic locator	Describe the procedures for locating metal infrastructure with a magnetic locator
	Describe the procedures for locating a curb stop valve with a magnetic locator	Describe the procedures for locating a metal gas valve cover with a magnetic locator	Describe the procedures for locating a metal manhole cover with a magnetic locator	Describe the procedures for locating a metal hand-hole cover with a magnetic locator	Describe the procedures for locating a buried tank with a magnetic locator
	Describe the procedures for locating a pipe transition with a magnetic locator	Describe the importance of measuring and recording distances between facilities and structures	Describe the importance of recording GPS information for work area and locates	Describe the importance of photographing work area and locates	
	Demonstrate the procedures for locating from start to finish	Demonstrate the procedures for the Direct Hook-up Method	Demonstrate the procedures for the Inductive Clamp Method	Demonstrate the procedures for the Inductive Method	Demonstrate the procedures for the Parallel Line Check Method
	Demonstrate the procedures for the Inductive Sweeping Method	Demonstrate the procedures for the Inducting Multi-Angle Sweeping Method	Demonstrate the procedures for the 360° Sweeping Method	Demonstrate the procedures for the ALL (Advanced Line Locating) Method	Demonstrate the procedures for the CPS (Cathodic Protection System) Locating Mode
	Demonstrate the procedures for the Live Cable (Power) Locating Mode	Demonstrate the procedures for the Radio Locating Mode	Demonstrate the procedures for locating sondes	Demonstrate the procedures for locating transmitter coils	Demonstrate the procedures for locating conductive rodding tools
12.0	Demonstrate the procedures for locating electronic markers	Demonstrate the procedures for locating a remotely-applied EM signal	Demonstrate the procedures for the Measurement Method	Demonstrate the procedures for the Point A to Point B Method	Demonstrate the procedures for the Visual Evidence Method

Gas Distribution

Demonstrate the procedures for the Survey Method	Demonstrate the ability to select the tools required to perform a generic direct hook-up signal application procedure	Demonstrate safe procedures for grounding	Demonstrate the ability to select an effective direct hook-up access point	Demonstrate safe procedures for applying a signal using a direct hook-up
Demonstrate the ability to select an effective direct hook-up grounding point	Demonstrate the ability to select an optimal direct hook-up ground point	Demonstrate the ability to improve a direct hook-up ground point	Demonstrate the use of a ground rod and ground plate	Demonstrate the use of an extended or multi-point ground
Demonstrate safe procedures for applying a direct hook-up to a conductive pipe	Demonstrate safe procedures for applying a direct hook-up to a riser	Demonstrate safe procedures for applying a direct hook-up to a flange	Demonstrate safe procedures for applying a direct hook-up to a valve	Demonstrate safe procedures for applying a direct hook-up to a tracer wire
Demonstrate safe procedures for applying a direct hook-up to a metal casing pipe	Demonstrate safe procedures for applying a direct hook-up to a (safe) electrical cable	Demonstrate safe procedures for applying a direct hook-up to a (safe) cathodic cable	Demonstrate safe procedures for applying a direct hook-up to a (safe) control cable	Demonstrate safe procedures for applying a direct hook-up to a curb stop valve
Demonstrate proper procedure for direct hook-up method at hand holes	Demonstrate the ability to select the tools required to perform the direct hook-up method at manholes	Demonstrate the ability to select the tools required to perform the direct hook-up method at vaults	Demonstrate the ability to select the tools required to perform a generic inductive clamping signal application procedure	Demonstrate the ability to select an effective inductive clamping access point
Demonstrate safe procedures for applying a signal using an inductive clamp	Demonstrate the safe procedures for applying a signal to a metal pipe with an inductive clamp	Demonstrate the safe procedures for applying a signal to a tracer wire with an inductive clamp	Demonstrate the safe procedures for applying a signal to a metal casing pipe with an inductive clamp	Demonstrate the safe procedures for applying a signal to a metal conduit with an inductive clamp
Demonstrate the safe procedures for applying a signal to a cathodic cable with an inductive clamp	Demonstrate the safe procedures for applying a signal to an electrical cable with an inductive clamp	Demonstrate the safe procedures for applying a signal to a communication cable with an inductive clamp	Demonstrate the safe procedures for applying a signal to a control cable with an inductive clamp	Demonstrate the ability to select an effective general inductive signal application point
Demonstrate the ability to select an effective inductive signal application point for metal pipe	Demonstrate the ability to select an effective inductive signal application point for tracer wire	Demonstrate the ability to select an effective inductive signal application point for casing pipe	Demonstrate the ability to select an effective inductive signal application point for metal conduit	Demonstrate the ability to select an effective inductive signal application point for cathodic cable
Demonstrate the ability to select an effective inductive signal application point for electrical cable	Describe the criteria for selecting an effective inductive signal application point for communication cable	Demonstrate the ability to select an effective inductive signal application point for control cable	Demonstrate the ability to select an effective inductive signal application point for transmission pipe	Demonstrate the ability to select an effective inductive signal application point for mainline (transfer) pipe
Demonstrate the ability to select an effective inductive signal application point for service distribution pipe	Demonstrate the ability to select an effective inductive signal application point for service (drop) pipe	Demonstrate the procedures for tracing an EM signal	Demonstrate procedures for verifying a previously located facility	Demonstrate how to properly identify a target facility
Demonstrate how to verify locates of gas distribution facilities within easements and ROWs.	Demonstrate the procedures for locating buried objects with a magnetic locator	Demonstrate the procedures for locating a metal access cover with a magnetic locator	Demonstrate the procedures for locating metal infrastructure with a magnetic locator	Demonstrate the procedures for locating a curb stop valve with a magnetic locator

Gas Distribution						
13.0	Locator Marking Knowledge	Demonstrate the procedures for locating a metal gas valve cover with a magnetic locator	Demonstrate the procedures for locating a metal manhole cover with a magnetic locator	Demonstrate the procedures for locating a metal hand-hole cover with a magnetic locator	Demonstrate the procedures for locating a buried tank with a magnetic locator	Demonstrate the procedures for locating a pipe transition with a magnetic locator
		Demonstrate the ability to measure and record distances between facilities and structures	Demonstrate the ability to record GPS information for work area and locates	Demonstrate the ability to photograph work area and locates	Demonstrate the ability to locate a metal gas valve cover with a magnetic locator	Demonstrate the ability to locate a metal manhole cover with a magnetic locator
		Demonstrate the ability to locate a metal hand-hole cover with a magnetic locator	Demonstrate ability to properly identify a target facility	Demonstrate the appropriate method for connection at an access point	Demonstrate the proper procedure for direct hook-up of tracer wire	Demonstrate the direct hook-up method for steel/aluminum pipelines
		Demonstrate the direct hook-up method for hand-holes / manholes				
		Explain marking gas distribution pipes using the APWA Uniform Color Code	Explain marking gas distribution ancillary infrastructure using the APWA Uniform Color Code	Explain the CGA guidelines for marking practices	Describe marking gas distribution pipes using CGA common abbreviations	Describe marking gas distribution infrastructure using CGA common abbreviations
		Describe situations where other marking systems may be used	Explain operator's identifier marking	Explain facility detail marking	Describe different marking materials	Describe criteria for selecting marking materials
		Explain ground and environment conditions that affect locate marks	Explain painted offset marking	Explain staked offset marking	Explain changes in direction marking	Explain lateral (tees & Y-lats) connection marking
	Locator Marking Skills	Explain facilities installed in a vault / inlet / lift station marking	Explain structure markings (e.g., vault, inlet, lift station)	Explain loss of signal / termination / dead ends marking	Explain no conflict marking	Explain importance of marking abandoned facilities
		Explain proper marking in navigable waterways	Explain single facility marking	Explain multiple facility marking	Explain conduit marking	Explain corridor marking
		Explain markings for long distances				
		Demonstrate proper ground marking using the APWA Uniform Color Code	Demonstrate marking gas distribution ancillary infrastructure using the APWA Uniform Color Code	Demonstrate marking gas distribution infrastructure using CGA marking practices	Demonstrate marking gas distribution infrastructure using CGA common abbreviations	Demonstrate situations where other marking systems may be used
		Demonstrate marking gas distribution infrastructure using operator's identifier marking	Demonstrate facility detail marking	Demonstrate proper selection of marking materials	Demonstrate painted offset marking	Demonstrate staked offset marking
		Demonstrate changes in direction marking	Demonstrate lateral connection (tees & Y-lats) marking	Demonstrate facilities installed in a vault / inlet / lift station marking	Demonstrate structure markings (e.g., vault, inlet, lift station)	Demonstrate loss of signal / termination / dead ends marking
		Demonstrate no conflict marking	Demonstrate single facility marking	Demonstrate multiple facility marking	Demonstrate conduit marking	Demonstrate corridor marking
		Demonstrate proper facility distance marking	Demonstrate proper stake / lath marking	Demonstrate proper pin flag marking	Demonstrate proper whisker marking	Demonstrate proper marking in navigable waterways

Gas Distribution						
15.0	Problem Solving Knowledge	Demonstrate the ability to mark facilities under adverse ground and environment conditions	Demonstrate the ability to mark facilities with site specific markings			
		Explain the importance of anticipating problem locate conditions	Explain the importance of determining problem locate conditions	Explain the importance of following industry best practices to overcome problem locates	Explain the importance of following company procedures to overcome problem locates	Explain the importance of OJT (on-the-job training) to overcome problem locates
		Explain the importance of methodical troubleshooting procedures to overcome problem locates	Explain the importance of understanding system configuration	Explain the effects of system configuration on the EM signal and locate accuracy	Explain the effects of joint system/network installations on locate accuracy	Describe the effects of obstacles and problems on EM signals and locate accuracy
		Explain the effects of work site conditions on locate accuracy	Explain the capabilities of locate equipment to overcome problems	Explain the importance of establishing survey boundaries to verify locates	Describe the importance of utilizing records to verify locates	Explain the effects of broken tracer wire on the EM signal
		Explain the effects of pipe ends on the EM signal	Explain the effects of corroded pipe on the EM signal	Explain the effects of pipe tees or Y-laterals on the EM signal	Explain the effects of cathodic protection on locate accuracy	Explain the effects of pipe size transitions on the EM signal
		Explain the effects of pipe material transitions on the EM signal	Explain the effects of rebar on locate accuracy	Explain the effects of slack loop/ butt splice construction on locate accuracy	Explain the effects of unknown laterals on locate accuracy	Describe the effects on facility identification by limited or restricted access to facilities
		Explain the effects of cathodic isolators on the EM signal	Explain the effects of common-bonding on the EM signal	Explain how abandoned or discontinued facilities complicates identification and locate accuracy	Explain how company mergers and name changes complicates facility identification	Explain how unregistered facilities complicates identification and locate accuracy
	Problem Solving Skills	Explain how privately-owned facilities complicates identification and locate accuracy	Explain importance of third party contract locators	Describe the importance of record verification	Describe the process of documenting and forwarding updated records to the facility owner/operator	
		Demonstrate the ability to anticipate problem locate conditions	Demonstrate the ability to determine problem locate conditions	Demonstrate the ability to follow industry best practices to overcome problem locates	Demonstrate the ability to follow company procedures to overcome problem locates	Demonstrate the ability to utilize past OJT (on-the-job training) to overcome problem locates
		Demonstrate the ability to utilize methodical troubleshooting procedures to overcome problem locates	Demonstrate the ability to apply understanding of system configuration while troubleshooting locates	Demonstrate understanding and overcome the effects on EM signals in various system configurations	Demonstrate understanding and overcome the effects of joint system / network installations on locate accuracy	Demonstrate the ability to overcome the effects of obstacles and problems on EM signals and locate accuracy
		Demonstrate the ability to identify and overcome the effects of signal distortion on locate accuracy	Demonstrate the ability to identify and overcome the effects of facility characteristics on the EM signal	Demonstrate the ability to identify and overcome the effects of multiple facilities on the EM signal	Demonstrate the ability to identify and overcome the effects of ancillary facilities on locate accuracy	Demonstrate the ability to identify and overcome the effects of weather and the environment on locate accuracy

Gas Distribution							
17.0		Demonstrate the ability to identify and overcome the effects of work site conditions on locate accuracy	Demonstrate the ability to identify and utilize the capabilities of locate equipment to overcome problems	Demonstrate the ability to utilize survey boundaries to verify locates	Demonstrate the ability to utilize records to verify locates	Demonstrate the ability to identify and overcome the effects of broken tracer wire on the EM signal	
		Demonstrate the ability to identify and overcome the effects of pipe ends on the EM signal	Demonstrate the ability to identify and overcome the effects of corroded pipe on the EM signal	Demonstrate the ability to identify and overcome the effects of pipe tees or Y-laterals on the EM signal	Demonstrate the ability to identify and overcome the effects of cathodic protection on locate accuracy	Demonstrate the ability to identify and overcome the effects of pipe size transitions on the EM signal	
		Demonstrate the ability to identify and overcome the effects of pipe material transitions on the EM signal	Demonstrate the ability to identify and overcome the effects of rebar on locate accuracy	Demonstrate the ability to identify and overcome the effects slack loop/ butt splice construction on locate accuracy	Demonstrate the ability to locate and identify unknown laterals	Demonstrate the ability to obtain access to facilities or to overcome limited or restricted access	
		Demonstrate the ability to identify and overcome the effects of cathodic isolators on the EM signal	Demonstrate the ability to identify and overcome the effects of common-bonding on the EM signal	Demonstrate the ability to anticipate, locate, and identify abandoned or discontinued facilities	Demonstrate the ability to research ownership information and follow company mergers and name changes	Demonstrate the ability to anticipate, determine, and overcome complications from unregistered facilities	
		Demonstrate the ability to anticipate, determine, and overcome complications from private facilities	Demonstrate the ability to determine the need for a third-party contract locate	Demonstrate the ability to conduct third-party contract locates	Demonstrate the ability to use records to verify locates and to verify the accuracy of the records	Demonstrate the ability to document and forward updated records to the facility owner/operator	
	Locator Drawing Knowledge	Explain hand sketch locator drawings	Explain computer generated locator drawings	Explain drawing procedures	Explain drawing process	Explain client specific drawing requirements	
		Explain company specific drawing requirements	Explain the multiple uses of a locate drawing	Explain symbology for gas distribution	Explain mapping terminology for locator drawings	Explain the key elements that must be labeled on a drawing	
		Explain the importance of measurements from gas facilities to other known facilities	Explain the importance of measurements from gas facilities to surface structure	Explain the importance of incorporating information from other facility records in locator drawings	Explain the importance of incorporating GIS and/or GPS information in locator drawings	Explain the importance of incorporating survey information in locator drawings	
		Explain the importance of accurate locate drawings	Explain the importance of documenting facility record errors on locate drawings	Explain the differences of spatially accurate locate drawings	Explain the differences of schematic representation locate drawings		
		18.0	Locator Drawing Skills	Demonstrate the ability to create hand sketch locator drawings	Demonstrate the ability to create computer generated locator drawings	Demonstrate the ability to identify and utilize drawing procedures	Demonstrate the ability to identify and utilize drawing process
Demonstrate the ability to identify and utilize company specific drawing requirements				Demonstrate the ability to identify and utilize multiple uses of a locate drawing	Demonstrate the ability to identify and utilize symbology for gas distribution	Demonstrate the ability to identify and utilize mapping terminology for locator drawings	Demonstrate the ability to identify and label the key elements on a drawing
Demonstrate the ability to identify and record measurements from gas facilities to other known facilities	Demonstrate the ability to identify and record measurements from gas facilities to surface structure			Demonstrate the ability to incorporate information from other facility records in locator drawings	Demonstrate the ability to incorporate GIS and/or GPS information in locator drawings	Demonstrate the ability to incorporate survey information in locator drawings	

Gas Distribution

Demonstrate the ability to identify, utilize, and create accurate locate drawings	Demonstrate the ability to document facility record errors on locate drawings	Demonstrate the ability to identify, utilize, and create spatially accurate locate drawings	Demonstrate the ability to identify, utilize, and create schematic representation locate drawings
---	---	---	---