



UNDERGROUND FACILITY LOCATOR COMPETENCY PROFILE

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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.

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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.

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ADDITIONS AND MODIFICATIONS

Transmission Pipeline Locator Skills	4
General Locating Knowledge	4
General Locating Skills.....	5
Information Source Knowledge	6
Information Source Skills.....	7
Transmission Pipeline Locating Documentation & Communication Knowledge	9
Transmission Pipeline Locating Documentation and Communication Skills	9
Transmission Pipeline Locator Safety Knowledge	9
Transmission Pipeline 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

Transmission Pipeline Locator Skills

1.0	General Locating Knowledge	Describe the history of transmission pipelines	Describe the uses of transmission pipelines	Describe the products that are transported by transmission pipelines	Describe gas products that are transported by transmission pipelines	Describe liquid products that are transported by transmission pipelines
		Describe high-pressure transmission pipelines	Define hazardous materials	Describe the properties of natural gas	Describe the properties of crude oil	Describe the properties of butane gas
		Describe the properties of propane gas	Describe the properties of ethane gas	Describe the composition of different types of transmission pipes	Describe conductive pipes	Describe non-conductive pipes
		Know pipe size conversions	Describe construction practices for transmission pipelines	Describe trenchless construction practices (HDD, boring)	Describe casings	Describe casing vents
		Know the transmission pipelines owners and operators in area of responsibility	Describe the transmission pipelines system model	Describe receipt points	Describe gas product storage	Describe liquid product storage
		Describe delivery points	Describe taps	Describe meter stations and their purpose	Describe compressor stations and their purpose	Describe pump stations and their purpose
		Describe common pipeline functions and associated pressures	Describe the infrastructure within a terminal / station	Describe the purpose of flanges, valves, fittings	Describe isolation valves	Describe where isolation valves are found
		Describe open or closed valves	Describe bypass pipes and valves	Describe where bypass pipes and valves are found	Describe emergency shut down (ESD) valves	Describe where emergency shut down (ESD) valves are found
		Describe emergency blow down valves	Describe where emergency blow down valves are found	Explain the purpose of odorizers for natural gas	Know abbreviations associated with transmission pipeline facilities	Describe CP (cathodic protection)
		Describe cathodic rectifier	Describe cathodic ground (anode) beds	Describe cathodic test points	Describe a cathodic isolating kit	Explain a right of way
		Explain a public right of way	Explain importance of establishing a right of way	Describe easements	Describe discontinued pipelines	Describe abandoned pipelines
		Describe future pipe	Describe dead-end pipe	Know the NEB Act and regulations relating to pipelines	Describe PHMSA regulations relating to pipelines	Know the provincial regulations regarding safe pipeline excavation
		Describe purpose of right-of-way maintenance	Explain NEB regulations for right-of-way maintenance	Explain Code of Federal Regulations (CFR) for right-of-way maintenance	Explain CSA standards for right-of-way maintenance	Explain NEB regulations for right-of-way monitoring
		Explain Alberta pipeline regulation for right-of-way monitoring	Explain Code of Federal Regulations (CFR) for right-of-way monitoring	Explain CSA standards for right-of-way monitoring	Know leak detection survey requirements for right-of-way monitoring	Know depth of cover requirements for right-of-way monitoring
		Explain gas leak detection survey report records for right-of-way monitoring	Describe purpose of right-of-way signs and markers	Explain Code of Federal Regulations (CFR) for right-of-way signs and markers	Explain CSA standards for right-of-way signs and markers	Explain company specific standards for right-of-way signs and markers
		Know warning signs requirements for right-of-way signs and markers	Know mainline color code requirements for right-of-way signs and markers	Know waterway requirements for right-of-way signs and markers	Describe purpose of facility signs and markers	Explain company specific standards for facility signs and markers

Transmission Pipeline Locator Skills

2.0

General
Locating Skills

Know entrances/public access requirements for facility signs and markers	Know mainline color codes requirements for facility signs and markers	Know safety sign and marker requirements for facility signs and markers	Know security sign and marker requirements for facility signs and markers	Describe requirements for vehicular crossings of transmission pipelines
Demonstrate the ability to identify the uses of transmission pipelines	Demonstrate the ability to identify the products that are transported by transmission pipelines	Demonstrate the ability to identify gas products that are transported by transmission pipelines	Demonstrate the ability to identify liquid products that are transported by transmission pipelines	Demonstrate the ability to identify high-pressure transmission pipelines
Demonstrate the ability to identify hazardous materials	Demonstrate the ability to identify the properties of natural gas	Demonstrate the ability to identify the properties of crude oil	Demonstrate the ability to identify the properties of butane gas	Demonstrate the ability to identify the properties of propane gas
Demonstrate the ability to identify the properties of ethane gas	Demonstrate the ability to identify the composition of different types of transmission pipes	Demonstrate the ability to identify conductive pipes	Demonstrate the ability to identify non-conductive pipes	Demonstrate the ability to perform pipe size conversions
Demonstrate the ability to identify construction practices for transmission pipelines	Demonstrate the ability to identify trenchless construction practices (HDD, boring)	Demonstrate the ability to identify casings	Demonstrate the ability to identify casing vents	Demonstrate the ability to identify the transmission pipelines owners and operators in area of responsibility
Demonstrate the ability to identify receipt points	Demonstrate the ability to identify gas product storage	Demonstrate the ability to identify liquid product storage	Demonstrate the ability to identify delivery points	Demonstrate the ability to identify taps
Demonstrate the ability to identify meter stations and their purpose	Demonstrate the ability to identify compressor stations and their purpose	Demonstrate the ability to identify pump stations and their purpose	Demonstrate the ability to identify common pipeline functions and associated pressures	Demonstrate the ability to identify the infrastructure within a terminal / station
Demonstrate the ability to identify the purpose of flanges, valves, fittings	Demonstrate the ability to identify isolation valves	Demonstrate the ability to identify where isolation valves are found	Demonstrate the ability to identify open or closed valves	Demonstrate the ability to identify bypass pipes and valves
Demonstrate the ability to identify where bypass pipes and valves are found	Demonstrate the ability to identify emergency shut down (ESD) valves	Demonstrate the ability to identify where emergency shut down (ESD) valves are found	Demonstrate the ability to identify emergency blow down valves	Demonstrate the ability to identify where emergency blow down valves are found
Demonstrate the ability to identify natural gas odorizers	Demonstrate the ability to identify abbreviations associated with transmission pipeline facilities	Demonstrate the ability to identify cathodic protection (CP)	Demonstrate the ability to identify cathodic rectifier	Demonstrate the ability to identify cathodic ground (anode) beds
Demonstrate the ability to identify cathodic test points	Demonstrate the ability to identify a cathodic isolating kit	Demonstrate the ability to identify a surveyed right of way	Demonstrate the ability to identify a surveyed public right of way	Demonstrate the ability to re-establish a surveyed right of way
Demonstrate the ability to identify easements	Demonstrate the ability to identify discontinued pipelines	Demonstrate the ability to identify abandoned pipelines	Demonstrate the ability to identify future pipe	Demonstrate the ability to identify dead-end pipe
Demonstrate the ability to identify the NEB Act and regulations relating to pipelines	Demonstrate the ability to identify PHMSA regulations relating to pipelines	Demonstrate the ability to identify the provincial regulations regarding safe pipeline excavation	Demonstrate the ability to identify requirements for vehicular crossings of transmission pipelines	Demonstrate ability to identify the quality of existing right-of-way maintenance

Transmission Pipeline Locator Skills

3.0

Information Source Knowledge

Explain NEB regulations for right-of-way maintenance	Explain Code of Federal Regulations (CFR) for right-of-way maintenance	Explain CSA standards for right-of-way maintenance	Explain NEB regulations for right-of-way monitoring	Explain Alberta pipeline regulation for right-of-way monitoring
Explain Code of Federal Regulations (CFR) for right-of-way monitoring	Explain CSA standards for right-of-way monitoring	Know leak detection survey requirements for right-of-way monitoring	Know depth of cover requirements for right-of-way monitoring	Explain gas leak detection survey report records for right-of-way monitoring
Describe purpose of right-of-way signs and markers	Explain Code of Federal Regulations (CFR) for right-of-way signs and markers	Explain CSA standards for right-of-way signs and markers	Explain company specific standards for right-of-way signs and markers	Know warning signs requirements for right-of-way signs and markers
Know mainline color code requirements for right-of-way signs and markers	Know waterway requirements for right-of-way signs and markers	Describe purpose of facility signs and markers	Explain company specific standards for facility signs and markers	Know entrances/public access requirements for facility signs and markers
Know mainline color codes requirements for facility signs and markers	Know safety sign and marker requirements for facility signs and markers	Know security sign and marker requirements for facility signs and markers		
Explain map sources	Explain where to obtain various types of records	Explain training in reading and utilizing information source records	Explain transmission pipeline (TP) owner / operator records	Explain where TP owner/operator records can be obtained
Explain the importance of utilizing TP owner/operator records	Explain how to interpret information contained in a TP owner/operator record (e.g., legends, abbreviations, and symbols)	Explain how to interpret schematic representation (approximate relative alignment)	Explain how to interpret spatially accurate representation	Explain how to determine recorded distances between pipes and boundaries and property lines
Explain the formats that TP owner/operator records are found (e.g., hardcopy, digital)	Explain third party database	Explain survey plans	Explain as-builts drawings	Explain engineer plot plans
Explain provincial regulatory boards / agencies / commission plans	Explain land titles records	Explain municipal / county maps	Explain irrigation district maps	Explain petroleum producers' owner / operator records
Explain other utility owner / operator records	Explain locator company drawings	Explain GIS maps	Explain aerial / satellite photographs	Explain site photographs
Explain Google Maps/Google Earth	Explain internet-accessed mapping and photographs	Explain topographical maps	Explain use of one call system information	Explain importance of interviewing facility / field personnel
Describe the importance of obtaining information from landowners regarding facilities on their property	Explain the purpose and use of TP owner/operator index records	Explain how to identify transmission pipeline owner/operators on TP owner/operator records	Explain how to identify the transmission pipeline model on TP owner/operator records	Explain how to identify transmission systems on TP owner/operator records
Explain how to identify buried pipeline infrastructure found on TP owner/operator records	Explain how to identify transmission pipeline system components found on TP owner/operator records	Explain how to identify various transmission pipe configurations on TP owner/operator records	Explain how to identify above ground structures (e.g., stations, valves, meters) found on TP owner/operator records	Explain how to identify different functions and associated pressures of transmission pipes on TP owner/operator records

Transmission Pipeline Locator Skills

	Explain how to identify the composition and sizes of lines found on TP owner/operator records	Explain how to identify the status of lines found on TP owner/operator records	Explain how to identify the approximate alignment of lines found on TP owner/operator records	Explain how to identify access points on TP owner/operator records	Explain how to identify crossings (foreign, road, etc.) found on TP owner/operator records
	Explain how to identify transition points or fittings found on TP owner/operator records	Explain how to identify a change in pipe composition found on TP owner/operator records	Explain how to identify a change in pipe size found on TP owner/operator records	Explain how to identify a change in pipe pressure found on TP owner/operator records	Explain how to identify property owner, property line, and property descriptions found on TP owner/operator records
	Explain how to identify construction practices for transmission facilities on TP owner/operator records	Explain how to identify trenchless pipe installation on TP owner/operator records	Explain how to identify possible bell hole sites on TP owner/operator records	Explain how to identify casings on TP owner/operator records	Explain how to identify casing vents on TP owner/operator records
	Explain how to identify receipt points on TP owner/operator records	Explain how to identify gas storage facilities on TP owner/operator records	Explain how to identify liquid storage facilities on TP owner/operator records	Explain how to identify delivery points on TP owner/operator records	Explain how to identify taps on TP owner/operator records
	Explain how to identify meter stations on TP owner/operator records	Explain how to identify compressor stations on TP owner/operator records	Explain how to identify pump stations on TP owner/operator records	Explain how to identify the function of pipelines and associated pressures on TP owner/operator records	Explain how to identify terminal / station infrastructure on TP owner/operator records
	Explain how to identify flanges, valves, and fittings on TP owner/operator records	Explain how to identify isolation valves on TP owner/operator records	Explain how to identify open/closed valves on TP owner/operator records	Explain how to identify bypass pipes and valves on TP owner/operator records	Explain how to identify emergency shut down valves on TP owner/operator records
	Explain how to identify emergency blow down valves on TP owner/operator records	Explain how to identify cathodic protection (CP) on TP owner/operator records	Explain how to identify cathodic rectifiers on TP owner/operator records	Explain how to identify cathodic ground (anode) beds on TP owner/operator records	Explain how to identify cathodic test points on TP owner/operator records
	Explain how to identify cathodic isolation on TP owner/operator records	Explain how to identify a right of way on TP owner/operator records	Explain how to identify a public right of way on TP owner/operator records	Explain how to identify easements on TP owner/operator records	Explain how to identify discontinued pipelines on TP owner/operator records
	Explain how to identify abandoned pipelines on TP owner/operator records	Explain how to identify future pipe on TP owner/operator records	Explain how to identify dead-end pipe on TP owner/operator records	Explain how to identify ancillary facilities (communication, electrical, CP) on TP owner/operator records	Describe a stake-out report / facility location request
	Describe a ground disturbance package	Describe a job completion checklist	Describe a crossing report		
4.0	Information Source Skills	Demonstrate ability to identify sources of mapping records	Demonstrate ability to access various types of records	Demonstrate ability to read and utilize information source records	Demonstrate ability to utilize TP owner / operator records

Transmission Pipeline Locator Skills

Demonstrate the ability to interpret and utilize information on TP records (e.g., legends, abbreviations, and symbols)	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 the ability to utilize various formats of TP records (e.g., hardcopy, digital)
Demonstrate ability to access and utilize third party database records	Demonstrate ability to access and utilize survey plans	Demonstrate ability to access and utilize as-builts drawings	Demonstrate ability to access and utilize engineer plot plans	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 municipal / county maps	Demonstrate ability to access and utilize irrigation district maps	Demonstrate the ability to access and utilize petroleum producers' owner / operator records	Demonstrate the ability to access and utilize other utility owner / operator records
Demonstrate ability to access and utilize locator company drawings	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 access and utilize topographical maps	Demonstrate ability to access and utilize one-call system information	Demonstrate ability to conduct interviews with facility / field personnel	Demonstrate ability to obtain information from landowners regarding facilities on their property	Demonstrate the ability to utilize transmission pipeline index records
Demonstrate the ability to identify owner/operators of transmission pipelines on TP records	Demonstrate the ability to identify the transmission pipelines system model on TP records	Demonstrate the ability to identify transmission systems on TP records	Demonstrate the ability to identify buried transmission infrastructure found on TP records	Demonstrate the ability to identify transmission system components on TP records
Demonstrate the ability to identify various transmission pipe configurations found on TP records	Demonstrate ability to identify above ground structures (e.g., stations, valves, meters) on TP records	Demonstrate the ability to identify the functions and associated pressures of pipes found on TP records	Demonstrate the ability to identify the composition and size of lines found on TP records	Demonstrate the ability to identify the status of lines found on TP records
Demonstrate the ability to identify the approximate alignment of lines found on TP records	Demonstrate the ability to identify access points found on TP records	Demonstrate the ability to identify crossings (foreign, road, etc.) found on TP records	Demonstrate the ability to identify transition points or fittings found on TP records	Demonstrate the ability to identify a change in composition of lines found on TP records
Demonstrate the ability to identify a change in pipe size found on TP records	Demonstrate the ability to identify a change in pipe pressure found on TP records	Demonstrate the ability to identify property owner, property line, and property descriptions found on TP records	Demonstrate the ability to identify recorded construction practices used to install TP facilities	Demonstrate the ability to identify trenchless pipe installation on TP records
Demonstrate the ability to identify bell hole construction on TP records	Demonstrate the ability to identify and utilize casings found on TP records	Demonstrate the ability to identify and utilize casing vents found on TP records	Demonstrate the ability to identify receipt points on TP records	Demonstrate the ability to identify gas storage facilities on TP records
Demonstrate the ability to identify liquid storage facilities on TP records	Demonstrate the ability to identify delivery points on TP records	Demonstrate the ability to identify taps on TP records	Demonstrate the ability to identify meter stations on TP records	Demonstrate the ability to identify compressor stations on TP records
Demonstrate the ability to identify pump stations on TP records	Demonstrate the ability to identify the function of pipelines and associated pressures on TP records	Demonstrate the ability to identify terminal/station infrastructure on TP records	Demonstrate the ability to identify flanges, valves, and fittings on TP records	Demonstrate the ability to identify isolation valves on TP records

Transmission Pipeline Locator Skills

		Demonstrate the ability to identify open/closed valves on TP records	Demonstrate the ability to identify bypass pipes and valves on TP records	Demonstrate the ability to identify emergency shutdown valves on TP records	Demonstrate the ability to identify emergency blowdown valves on TP records	Demonstrate the ability to identify cathodic protection on TP records
		Demonstrate the ability to identify cathodic rectifiers on TP records	Demonstrate the ability to identify cathodic ground (anode) beds on TP records	Demonstrate the ability to identify cathodic test points on TP records	Demonstrate the ability to identify cathodic isolation on TP records	Demonstrate the ability to identify a right of way on TP records
		Demonstrate the ability to identify a public right of way on TP records	Demonstrate the ability to identify easements on TP records	Demonstrate the ability to identify discontinued pipelines on TP records	Demonstrate the ability to identify abandoned pipelines on TP records	Demonstrate the ability to identify future pipe on TP records
		Demonstrate the ability to identify dead-end pipe on TP records	Demonstrate the ability to identify ancillary facilities (communication, electrical, CP) on TP records	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	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	
5.0	Transmission Pipeline Locating Documentation & Communication Knowledge	Describe owner/operator notification procedures	Describe procedures to contact transmission pipeline owner/operators	Explain the locate request communication process	Describe hazard assessment, controls, and ERP records	Describe locate sketch requirements
		Describe a stake-out report / facility location request	Describe a job completion checklist	Describe a ground disturbance package	Describe a crossing report	Describe a backfill report
6.0	Transmission Pipeline Locating Documentation and Communication Skills	Demonstrate the ability to follow client notification procedures	Demonstrate the ability to contact transmission pipeline 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	Demonstrate the ability to create a locate sketch fulfilling the documentation requirements
		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	Demonstrate the ability to document and communicate a backfill report
7.0	Transmission Pipeline Locator Safety Knowledge	Describe corporate safety responsibilities	Describe employee safety responsibilities	Explain the facility owner / operator occupational health, safety, and environment (OHS&E) policy	Explain the importance of hazardous gas detection training	Explain the importance of H2S 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 emergency response 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 JSA (job safety analysis) process
		Describe the purpose and content of tailgate safety meetings	Describe on-street locating safety procedures	Describe managing and channelling traffic	Describe caisson safety procedures	Describe gas and pressure release hazards

Transmission Pipeline Locator Skills					
8.0	Transmission Pipeline Locator Safety Skills	Describe continuous gas monitoring	Describe ventilation	Describe safety watch	Describe SCBA (self-contained breathing apparatus)
		Describe maintaining a safe distance from overhead electrical lines	Describe safe digging ground disturbance and damage prevention	Describe the steps of proper safe digging	Describe the JCC (job completion checklist) process
		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 occupational health, safety, and environment (OHS&E) policy	Complete and demonstrate ability to apply hazardous gas detection 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 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 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 caisson safety procedures
		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 follow SCBA (self-contained breathing apparatus)
		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)
		Explain the primary reason for performing a visual inspection	Describe the importance of using transmission pipeline (TP) records during the visual inspection	Describe how to utilize abbreviations and symbols as found on TP records during the visual inspection	Describe visual signs that might indicate the presence of buried facilities
		Describe how to recognize trench or excavation scars	Describe how to recognize potential hazards	Describe warning signs used for transmission pipeline facilities	Describe information found on warning signs
9.0	Visual Inspection Knowledge	Describe benefits of warning signs	Describe safety labels and signs used for buried transmission pipeline facilities	Describe information found on safety labels signs	Describe where safety labels and signs are typically located
		Describe identification labels and tags used for buried transmission pipeline 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

Transmission Pipeline Locator Skills

Describe how to identify the transmission pipelines system model on TP records	Describe how to recognize transmission pipeline systems as found on TP records	Describe how to identify transmission pipeline system components as found on TP records	Describe how to identify various transmission pipeline pipe configurations as found on TP records	Describe how to identify above ground structures (e.g., stations, risers, valves, meters) as found on TP records
Describe how to identify buried pipeline infrastructure as found on TP records	Describe how to identify different functions and associated pressures of transmission pipelines as found on TP records	Know the composition and sizes of transmission pipelines as found on TP records	Know the status of transmission pipelines as found on TP records	Describe how to identify the approximate alignment of lines as found on TP records
Describe how to identify access points as found on TP records	Describe how to identify crossings (foreign, road, etc.) as found on TP records	Describe how to identify transition points or fittings as found on TP records	Describe how to identify a change in pipe composition as found on TP records	Describe how to identify a change in pipe size as found on TP records
Describe how to identify a change in pipe pressure as found on TP records	Describe how to identify property owner, property line, and property descriptions as found on TP records	Describe how to recognize recorded distances between pipes and boundaries and property lines as found on TP records	Describe how to identify recorded construction practices used to install transmission pipeline facilities	Describe how to identify trenchless pipe installation as found on TP records
Describe how to identify bell hole construction as found on TP records	Describe how to identify casings as found on TP records	Describe how to identify casing vents as found on TP records	Explain how to recognize receipt points as found on TP records	Explain how to recognize gas storage facilities as found on TP records
Explain how to recognize liquid storage facilities as found on TP records	Explain how to recognize delivery points as found on TP records	Explain how to recognize taps as found on TP records	Describe how to identify meter stations as found on TP records	Describe how to identify compressor stations as found on TP records
Describe how to identify pump stations as found on TP records	Describe how to identify terminal/station infrastructure as found on TP records	Describe how to identify flanges, valves, fittings as found on TP records	Describe how to identify and utilize isolation valves as found on TP records	Describe how to identify and utilize open/closed valves as found on TP records
Describe how to identify and utilize bypass pipes and valves as found on TP records	Describe how to identify and utilize emergency shutdown valves as found on TP records	Describe how to identify and utilize emergency blowdown valves as found on TP records	Describe how to identify CP (cathodic protection) as found on TP records	Describe how to identify a cathodic rectifier as found on TP records
Describe how to identify cathodic (anode) ground beds as found on TP records	Describe how to identify cathodic isolation points as found on TP records	Describe how to identify cathodic protection test leads and stations as found on TP records	Describe how to identify a local CP sacrificial anode as found on TP records	Describe how to identify a right of way as found on TP records
Describe how to identify buried facilities in public right of way as found on TP records	Describe how to identify easements as found on TP records	Explain how to recognize discontinued infrastructure as found on TP records	Explain how to recognize abandoned infrastructure as found on TP records	Explain how to recognize future pipe as found on TP records
Explain how to recognize dead-end pipe as found on TP records	Describe how to identify transmission pipeline ancillary facilities as found on TP records	Explain how to recognize non-conductive facilities as found on TP records	Explain how to recognize non-conductive facilities as found on electric power records	Explain how to recognize tracer wire applications

Transmission Pipeline Locator Skills

		Describe how to identify tracer wires	Describe how to identify infrastructure and features as found on various kinds 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 apply the interpret spatially accurate representation during the visual inspection
		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 provincial regulatory boards / agencies / commission plans	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 GIS maps	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 one call system information	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 found on previous stake-out reports	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 obstacles to locating accuracy	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 recognize sources of unwanted coupling	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 the possible location of pipe tees and Y-laterals	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 how to anticipate possible areas where facilities are congested	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 abandoned or discontinued facilities	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		
10.0	Visual Inspection Skills	Demonstrate ability to identify potential hazards	Demonstrate ability to identify warning signs	Demonstrate ability to identify facility right of ways	Demonstrate ability to recognize a public right of way	Demonstrate ability to recognize an easement

Transmission Pipeline Locator Skills

Demonstrate ability to identify safety labels and signs	Demonstrate ability to identify plant features	Demonstrate ability to match records with site facilities	Demonstrate ability to recognize types, materials and sizes of buried transmission pipeline facilities	Demonstrate ability to recognize visual signs that indicate the presence of buried facilities
Demonstrate ability to recognize identification labels and tags	Demonstrate ability to identify trench or excavation scars	Demonstrate ability to identify areas of previous ground disturbance in the work area	Demonstrate ability to recognize buried transmission pipelines when exposed	Demonstrate ability to recognize above ground transmission pipelines
Demonstrate ability to identify a "dip" in visual inspection and on prints	Demonstrate ability to recognize above ground signs of underground facilities	Demonstrate who to notify or contact if a visual observation of a site reveals unsafe site conditions	Demonstrate who to notify or contact if a visual observation of a site reveals errors or omissions	Demonstrate marking and locating in adverse conditions while adhering to safety
Demonstrate facility methods of design	Demonstrate the ability to distinguish receipt points / delivery points	Demonstrate ability to recognize risers / valves / flanges	Demonstrate ability to recognize tracer wire	Demonstrate ability to recognize an isolating kit
Demonstrate ability to recognize cathodic protection	Demonstrate ability to recognize cathodic rectifier	Demonstrate ability to recognize a test point	Demonstrate ability to recognize cathodic ground beds	Demonstrate ability to recognize infrastructure within a terminal / station
Demonstrate ability to recognize compressor stations	Demonstrate ability to recognize meter stations	Demonstrate the ability to recognize RMO stations	Demonstrate ability to recognize access points on a transmission pipeline system	Demonstrate ability to utilize transmission pipeline records during the visual inspection
Demonstrate the ability to identify abbreviations and symbols as found on TP records	Demonstrate ability to recognize visual signs that indicate the presence of buried facilities	Demonstrate the ability to recognize areas of previous ground disturbance	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 TP records	Demonstrate ability to recognize transmission pipeline system model as found on TP records
Demonstrate ability to recognize transmission pipeline systems as found on TP records	Demonstrate the ability to identify transmission pipeline system components as found on TP records	Demonstrate the ability to identify various transmission pipeline configurations as found on TP records	Demonstrate ability to identify above ground structures (e.g., stations, risers, valves, meters) as found on TP records	Demonstrate the ability to identify buried transmission pipeline infrastructure as found on TP records
Demonstrate the ability to identify different functions and associated pressures of transmission pipeline as found on TP records	Demonstrate the ability to identify the composition and sizes of transmission pipelines as found on TP records	Demonstrate the ability to identify the status of transmission pipelines as found on TP records	Demonstrate the ability to identify the approximate alignment of transmission pipelines as found on TP records	Demonstrate the ability to identify crossings (foreign, road, etc.) as found on TP records
Demonstrate the ability to identify transition points or fittings as found on TP records	Demonstrate the ability to identify a change in pipe composition as found on TP records	Demonstrate the ability to identify a change in pipe size as found on TP records	Demonstrate the ability to identify a change in pipe pressure as found on TP records	Demonstrate the ability to identify property owner, property line, and property descriptions as found on TP records

Transmission Pipeline Locator Skills

Demonstrate the ability to recognize distances between pipes and boundaries and property lines	Demonstrate the ability to identify recorded construction practices used to install transmission pipeline facilities	Demonstrate the ability to identify trenchless pipe installation as found on TP records	Demonstrate the ability to identify bell hole construction as found on TP records	Demonstrate the ability to identify and utilize casings as found on TP records
Demonstrate the ability to identify and utilize casing vents as found on TP records	Demonstrate the ability to identify receipt points as found on TP records	Demonstrate the ability to identify gas storage facilities as found on TP records	Demonstrate the ability to identify liquid storage facilities as found on TP records	Demonstrate the ability to identify delivery points as found on TP records
Demonstrate the ability to identify taps as found on TP records	Demonstrate the ability to identify meter stations as found on TP records	Demonstrate the ability to identify compressor stations as found on TP records	Demonstrate the ability to identify pump stations as found on TP records	Demonstrate the ability to identify terminal/station infrastructure as found on TP records
Demonstrate the ability to identify flanges, valves, fittings as found on TP records	Demonstrate the ability to identify and utilize isolation valves as found on TP records	Demonstrate the ability to identify open or closed valves as found on TP records	Demonstrate the ability to identify bypass pipes and valves as found on TP records	Demonstrate the ability to identify and utilize emergency shutdown valves as found on TP records
Demonstrate the ability to identify and utilize emergency blowdown valves as found on TP records	Demonstrate the ability to identify CP (cathodic protection) as found on TP records	Demonstrate the ability to identify a cathodic rectifier as found on TP records	Demonstrate the ability to identify cathodic (anode) ground beds as found on TP records	Demonstrate the ability to identify isolation points as found on TP records
Demonstrate the ability to identify cathodic protection test leads and stations as found on TP records	Demonstrate the ability to identify local sacrificial anodes as found on TP records	Demonstrate the ability to identify a right of way as found on TP records	Demonstrate the ability to identify buried facilities in public right of way as found on TP records	Demonstrate the ability to identify easements as found on TP records
Demonstrate the ability to identify discontinued infrastructure as found on TP records	Demonstrate the ability to identify abandoned infrastructure as found on LDC records	Demonstrate the ability to identify future pipe as found on TP records	Demonstrate the ability to identify dead-end pipe as found on TP records	Demonstrate the ability to identify transmission pipeline ancillary facilities as found on TP records
Demonstrate the ability to identify and conductive facilities as found on TP records	Demonstrate the ability to identify and non-conductive facilities as found on TP records	Demonstrate the ability to identify tracer wires	Demonstrate ability to identify infrastructure and features as found on various kinds 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 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 the ability to utilize landowner information during the visual inspection	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

Underground Facility Locator Competency Profile



Transmission Pipeline Locator Skills

11.0	Locating Methods Knowledge	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 guard rail	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	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 unregistered facilities
		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)		
		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 Parallel Line Check 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 CPS (Cathodic Protection System) Locating Mode
		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 conductive rodding tools
		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 Visual Evidence 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 safe procedures for applying a signal using a direct hook-up

Transmission Pipeline Locator Skills

12.0	Locating Methods Skills	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 a ground rod and ground plate
		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 valve
		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 (safe) control cable
		Describe the tools required to perform the direct hook-up method at caissons	List the tools required to perform a generic inductive clamping signal application procedure	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 safe procedures for applying a signal to a metal casing pipe with an inductive clamp	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 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 transmission pipeline 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 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

Transmission Pipeline Locator Skills

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
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
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 the ability to select the tools required to perform the direct hook-up method at caissons
Demonstrate the ability to perform the direct method at caissons	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 transmission 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 transmission pipeline 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

Transmission Pipeline Locator Skills					
13.0	Locator Marking Knowledge	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 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 hand-holes / manholes			
		Explain marking transmission pipelines using the APWA Uniform Color Code	Explain marking transmission pipelines ancillary infrastructure using the APWA Uniform Color Code	Explain the CGA guidelines for marking practices	Describe marking transmission pipelines 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
		Explain ground and environment conditions that affect locate marks	Explain painted offset marking	Explain staked offset marking	Explain changes in direction marking
		Explain facilities installed in a caisson marking	Explain structure markings (e.g., caisson)	Explain loss of signal / termination / dead ends marking	Explain no conflict marking
	Locator Marking Skills	Explain proper marking in navigable waterways	Explain single facility marking	Explain multiple facility marking	Explain conduit marking
		Explain markings for long distances			
		Demonstrate proper ground marking using the APWA Uniform Color Code	Demonstrate marking telecommunication ancillary infrastructure using the APWA Uniform Color Code	Demonstrate marking telecommunication infrastructure using CGA marking practices	Demonstrate marking telecommunications infrastructure using CGA common abbreviations
		Demonstrate marking telecommunication infrastructure using operator's identifier marking	Demonstrate facility detail marking	Demonstrate proper selection of marking materials	Demonstrate painted offset marking
		Demonstrate changes in direction marking	Demonstrate lateral connection (tees & Y-lats) marking	Demonstrate facilities installed in a caisson marking	Demonstrate structure markings (e.g., caisson)
		Demonstrate no conflict marking	Demonstrate single facility marking	Demonstrate multiple facility marking	Demonstrate conduit marking
		Demonstrate proper facility distance marking	Demonstrate proper stake / lath marking	Demonstrate proper pin flag marking	Demonstrate proper whisker marking
		Demonstrate the ability to mark facilities under adverse ground and environment conditions	Demonstrate the ability to mark facilities with site specific markings		

Underground Facility Locator Competency Profile



Transmission Pipeline Locator Skills						
15.0	Problem Solving Knowledge	Describe the effects of obstacles and problems on EM signals and locate accuracy	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 transmission pipeline system configuration	Explain the effects of transmission pipeline system configuration on the EM signal and locate accuracy	Explain the effects of common-trench installations on locate accuracy
		Explain why various facilities and compositions require their own locating techniques	Explain the effects of transmission pipeline type transitions on the EM signal	Explain the effects of expansion loops on locate accuracy	Explain the capabilities of locate equipment to overcome problems	Explain procedures used to locate in adverse site conditions
		Explain procedures to locate in high-traffic areas	Explain the effects of work site conditions on locate accuracy	Describe how inaccurate records can affect locate accuracy	Describe how unwanted coupling affects locate signals	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 facility depth on locate accuracy	Explain the effects of surface structures on the EM signal and locate accuracy	Explain the effects of buried tees and Y-laterals on the EM signal	Explain the effects of unknown laterals (buried tees and Y-laterals) on locate accuracy
		Explain the effects of common-bonding on the EM signal	Describe the effects of short facilities on the EM signal	Describe the effects of non-grounded facilities on the EM signal	Describe the effects of closer-than-normal facilities on the EM signal	Describe the effects of congested facilities on the EM signal
		Explain how ancillary facilities complicates identification and locate accuracy	Explain the effects of high-voltage interference on the EM signal	Explain the effects of cathodic protection on locate accuracy	Explain how unregistered facilities complicates identification and locate accuracy	Explain how privately-owned facilities complicates identification and locate accuracy
		Explain how company mergers and name changes complicates facility identification	Explain how abandoned or discontinued facilities complicates identification and locate accuracy	Describe the effects on facility identification by limited or restricted access to facilities	Explain procedures to avoid air coupling	Describe the importance of utilizing records to verify locates
		Describe the importance of record verification	Describe the process of documenting and forwarding updated records to the facility owner/operator	Describe the importance of verifying a locate is within the proper right of way	Explain importance of third party contract locators	
16.0	Problem Solving Skills	Demonstrate the ability to overcome the effects of obstacles and problems on EM signals and locate accuracy	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 transmission pipeline 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 common-trench installations on 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 facility deflections on the EM signal	Demonstrate the ability to identify and overcome the effects expansion loop construction on locate accuracy	Demonstrate the ability to identify and utilize the capabilities of locate equipment to overcome problems

Transmission Pipeline Locator Skills					
	Demonstrate the ability to identify and overcome the effects of weather and the environment on locate accuracy	Demonstrate the ability to identify and overcome the effects of work site conditions on locate accuracy	Demonstrate the ability to identify and overcome the effects of inaccurate records on locate accuracy	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 common-bonding on the EM signal
	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 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 facility depth on the EM signal	Demonstrate the ability to identify and overcome the effects of surface structures 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 locate and identify unknown laterals	Demonstrate the ability to identify and overcome the effects of short facilities on the EM signal
	Demonstrate the ability to identify and overcome the effects of non-grounded facilities on the EM signal	Demonstrate the ability to identify and overcome the effects of closer-than-normal facilities on the EM signal	Demonstrate the ability to identify and overcome the effects of congested 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 high-voltage interference 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 cathodic isolators on the EM signal	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 research ownership information and follow company mergers and name changes
	Demonstrate the ability to anticipate, locate, and identify abandoned or discontinued facilities	Demonstrate the ability to obtain access to facilities or to overcome limited or restricted access	Demonstrate the ability to avoid and overcome the effects of air-coupling on locate accuracy	Demonstrate the ability to utilize 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
	Demonstrate the ability to utilize survey boundaries to verify locates	Demonstrate the ability to determine the need for a third-party contract locate	Demonstrate the ability to conduct third-party contract locates		
17.0	Locator Drawing Knowledge	Explain hand sketch locator drawings	Explain computer generated locator drawings	Explain drawing procedures	Explain drawing process
		Explain company specific drawing requirements	Explain the multiple uses of a locate drawing	Explain symbology for transmission pipelines	Explain mapping terminology for locator drawings
		Explain the importance of measurements from transmission pipeline facilities to other known facilities	Explain the importance of measurements from transmission pipeline 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 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 drawing process	Demonstrate the ability to identify and utilize client specific drawing requirements

Transmission Pipeline Locator Skills

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 transmission pipelines	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 transmission pipeline facilities to other known facilities	Demonstrate the ability to identify and record measurements from transmission pipeline 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
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	