CAPULC

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.

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.

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ADDITIONS AND MODIFICATIONS

Electric Power

1.0	General Locating Knowledge	Explain the history of electric power	Explain the uses of electric power	Describe the users of electric power	Describe electric power systems	Describe electric power grids
		Explain electric power voltage	Explain electric power current	Explain a local power provider	Explain transmission power provider	Describe local grid connections to transmission grid
		Describe 3-phase electric power	Describe 2-phase electric power	Describe single-phase electric power	Describe transmission electric power	Describe feeder electric power lines
		Describe distribution electric power lines	Describe residential electric power lines	Know the electric power owners and operators in a service area	Describe the electric power system model	Describe the electric power grid model
		Describe radial distribution network	Describe interconnected distribution network	Describe industrial electric power customers and their requirements	Describe commercial electric power customers and their requirements	Describe residential electric power customers and their requirements
		Explain repurposed legacy infrastructure in the electric power system model	Explain abandoned or discontinued legacy infrastructure in the electric power system model	Describe types of electric power equipment	Describe rural electric power systems	Describe urban electric power systems
		Describe metro electric power systems	Describe the composition of conductive cable	Describe the composition of non-conductive cable	Describe fibre-optic cable	Explain tracer wire, its application, and common configurations and locations
		Explain common electric power cable functions	Describe various electric power cable configurations	Explain construction practices for electric power facilities	Describe a substation	Describe where electric power substations are typically found
		Describe electric power transformers	Describe where electric power transformers are typically found	Describe where electric power cable switchgear is typically found	Describe electric power load break centers	Describe where electric power load break centers are typically found
		Describe electric power enhancement devices (e.g., capacitors)	Describe where electric power enhancement devices (e.g., capacitors) are typically found	Describe electric power enhancement devices (e.g., capacitors)	Describe electric power splitters	Describe where electric power splitters are typically found
		Describe electric power taps	Describe where electric power taps are typically found	Describe where electric power cable splices are typically found	Describe electric power connection points	Describe underground cable
		Explain trenchless cable installation practices	Describe where trenchless installation is typically used	Describe bell holes	Describe where bell holes are typically used	Describe pedestals and cabinets
		Describe where pedestals and cabinets are typically found	Describe multi-access housings (MAH)	Describe where multi-access housings are typically found	Describe three-party pedestals	Explain where three-party pedestals are typically found
		Describe two-party pedestals	Describe where two-party pedestals are typically found	Describe two-party pedestals	Describe pole-mounted equipment	Describe a pole drop
		Describe where a pole drop is typically found	Describe surface-mounted equipment	Describe where hand holes, manholes, and vaults are typically found	Describe access to electric power hand hole, manhole, and vaults	Describe underground (hand hole, manhole, vault) installed equipment
		Describe conduit	Describe duct banks	Describe where duct banks are typically found	Describe a service drop	Describe where a service drop is typically found

Electric Power

		Describe a customer meter (demarcation point)	Describe where customer meters (demarcation point) are typically found	Describe an MDU (multi-dwelling unit) electric power service	Describe a primary electric power service	Describe a secondary (private) electric power service
		Describe future cable	Describe dead-end cable	Describe electric power ancillary facilities (e.g., telemetry communications)	Explain maintaining a safe distance	Describe bonding
		Describe bonding ground rods	Describe bonding grounding cable sheaths	Describe ground grids	Describe unregistered electric power facilities	Describe privately-owned/operated electric power systems
		Explain signal application access points for electric power systems				
2.0	General Locating Skills	Demonstrate the ability to identify the uses of electric power	Demonstrate the ability to identify the users of electric power	Demonstrate the ability to identify electric power systems	Demonstrate the ability to identify electric power grids	Demonstrate the ability to identify electric power voltage
		Demonstrate the ability to identify electric power current	Demonstrate the ability to identify local power providers	Demonstrate the ability to identify transmission power provider	Demonstrate the ability to identify local grid connections to transmission grid	Demonstrate the ability to identify 3-phase electric power
		Demonstrate the ability to identify 2-phase electric power	Demonstrate the ability to identify single-phase electric power	Demonstrate the ability to identify transmission electric power	Demonstrate the ability to identify feeder electric power lines	Demonstrate the ability to identify distribution electric power lines
		Demonstrate the ability to identify residential electric power lines	Demonstrate the ability to identify the electric power owners and operators in a service area	Demonstrate the ability to identify the electric power system model	Demonstrate the ability to identify the electric power grid model	Demonstrate the ability to identify radial distribution network
		Demonstrate the ability to identify interconnected distribution network	Demonstrate the ability to identify industrial electric power customers and their requirements	Demonstrate the ability to identify commercial electric power customers and their requirements	Demonstrate the ability to identify residential electric power customers and their requirements	Demonstrate the ability to identify repurposed legacy infrastructure in the electric power system model
		Demonstrate the ability to identify abandoned or discontinued legacy infrastructure in the electric power system model	Demonstrate the ability to identify types of electric power equipment	Demonstrate the ability to identify rural electric power systems	Demonstrate the ability to identify urban electric power systems	Demonstrate the ability to identify metro electric power systems
		Demonstrate the ability to identify the composition of conductive cable	Demonstrate the ability to identify the composition of non-conductive cable	Demonstrate the ability to identify fibre-optic cable	Demonstrate the ability to identify tracer wire, its application, and common configurations and locations	Demonstrate the ability to identify common electric power cable functions
		Demonstrate the ability to identify various electric power cable configurations	Demonstrate the ability to identify construction practices for electric power facilities	Demonstrate the ability to identify a substation	Demonstrate the ability to identify where electric power substations are typically found	Demonstrate the ability to identify electric power transformers
		Demonstrate the ability to identify where electric power transformers are typically found	Demonstrate the ability to identify electric power cable switchgear	Demonstrate the ability to identify where electric power transformers are typically found	Demonstrate the ability to identify where electric power cable switchgear is typically found	Demonstrate the ability to identify electric power load break centers

Electric Power						
		Demonstrate the ability to identify where electric power load break centers are typically found	Demonstrate the ability to identify electric power enhancement devices (e.g., capacitors)	Demonstrate the ability to identify where electric power enhancement devices (e.g., capacitors) are typically found	Demonstrate the ability to identify electric power splitters	Demonstrate the ability to identify where electric power splitters are typically found
		Demonstrate the ability to identify electric power taps	Demonstrate the ability to identify where electric power taps are typically found	Demonstrate the ability to identify electric power cable splices	Demonstrate the ability to identify where electric power cable splices are typically found	Demonstrate the ability to identify electric power connection points
		Demonstrate the ability to identify underground cable	Demonstrate the ability to identify trenchless cable installation practices	Demonstrate the ability to identify where trenchless installation is typically used	Demonstrate the ability to identify bell holes	Demonstrate the ability to identify where bell holes are typically used
		Demonstrate the ability to identify pedestals and cabinets	Demonstrate the ability to identify where pedestals and cabinets are typically found	Demonstrate the ability to identify multi-access housings (MAH)	Demonstrate the ability to identify where multi-access housings are typically found	Demonstrate the ability to identify three-party pedestals
		Explain where three-party pedestals are typically found	Demonstrate the ability to identify two-party pedestals	Demonstrate the ability to identify where two-party pedestals are typically found	Demonstrate the ability to identify pole-mounted equipment	Demonstrate the ability to identify a pole drop
		Demonstrate the ability to identify where a pole drop is typically found	Demonstrate the ability to identify surface-mounted equipment	Demonstrate the ability to identify hand holes, manholes, and vaults	Demonstrate the ability to identify where hand holes, manholes, and vaults are typically found	Demonstrate the ability to safely access to electric power hand hole, manhole, and vaults
		Demonstrate the ability to identify underground (hand hole, manhole, vault) installed equipment	Demonstrate the ability to identify conduit	Demonstrate the ability to identify duct banks	Demonstrate the ability to identify where duct banks are typically found	Demonstrate the ability to identify a service drop
		Demonstrate the ability to identify where a service drop is typically found	Demonstrate the ability to identify a customer meter (demarcation point)	Demonstrate the ability to identify where customer meters (demarcation point) are typically found	Demonstrate the ability to identify an MDU (multi-dwelling unit) electric power service	Demonstrate the ability to identify a primary electric power service
		Demonstrate the ability to identify a secondary (private) electric power service	Demonstrate the ability to identify future cable	Demonstrate the ability to identify dead-end cable	Demonstrate the ability to identify electric power ancillary facilities (e.g., telemetry communications)	Demonstrate the ability to maintain a safe distance
		Demonstrate the ability to identify bonding	Demonstrate the ability to identify bonding to ground rods	Demonstrate the ability to identify bonding to grounding cable sheaths	Demonstrate the ability to identify ground grids	Demonstrate the ability to identify unregistered electric power facilities
		Demonstrate the ability to identify privately-owned/operated electric power systems	Demonstrate the ability to identify signal application access points for electric power systems			
3.0	Information Source Knowledge	Explain where to obtain various types of records	Explain map sources	Explain survey plans	Explain third party database	Explain as-builts drawings

Electric Power

Explain provincial regulatory boards / agencies / commission plans	Explain land titles records	Explain oil and gas owner/operator records	Describe the importance of obtaining information from landowners regarding facilities on their property	Explain GIS maps
Explain aerial / satellite photographs	Explain Google Maps/Google Earth	Explain importance of interviewing facility / field personnel	Explain engineer plot plans	Explain locator company drawings
	Explain use of one call system information	Explain municipal / county maps	Explain topographical maps	Explain site photographs
Explain training in reading and utilizing information source records	Explain other utility owner / operator records	Explain internet-accessed mapping and photographs	Explain electric power owner / operator records	Explain where electric power owner/operator records can be obtained
Explain the critical importance of utilizing electric power owner/operator records	Explain how to interpret information contained in an electric power record (e.g., legends, abbreviations, and symbols)	Explain the formats that electric power records are found (e.g., hardcopy, digital)	Explain the purpose and use of electric power index records	Explain how to identify property owner, property line, and property descriptions found on electric power records
Explain the importance of recorded distances between cables and from boundaries and property lines, etc.	Explain how to identify easements on electric power records	Explain how to identify a right of way on electric power records	Explain how to identify buried facilities in public right of way on electric power records	Explain schematic representation (approximate relative alignment)
Explain the importance of spatially accurate representation	Explain how to identify crossings (foreign, road, etc.) found on electric power records	Explain how to identify the approximate alignment of lines found on an electric power record	Explain how to identify the providers of electric power on electric power records	Explain how to identify the users of electric power on electric power records
Explain how to identify electric power systems on electric power records	Explain how to identify electric power grids on electric power records	Explain how to identify electric power voltage on electric power records	Explain how to identify electric power current on electric power records	Explain how to identify local power providers on electric power records
Explain how to identify transmission power providers on electric power records	Explain how to identify local grid connections to transmission grid on electric power records	Explain how to identify 3-phase electric power on electric power records	Explain how to identify 2-phase electric power on electric power records	Explain how to identify single-phase electric power on electric power records
Explain how to identify transmission electric power on electric power records	Explain how to identify feeder electric power lines on electric power records	Explain how to identify distribution electric power lines on electric power records	Explain how to identify residential electric power lines on electric power records	Explain how to identify the electric power owners and operators in a service area on electric power records
Explain how to identify the electric power system model on electric power records	Explain how to identify the electric power grid model on electric power records	Explain how to identify radial distribution network on electric power records	Explain how to identify interconnected distribution network on electric power records	Explain how to identify industrial electric power customers and their requirements on electric power records

Electric Power

Explain how to identify commercial electric power customers and their requirements on electric power records	Explain how to identify residential electric power customers and their requirements on electric power records	Explain how to identify repurposed legacy infrastructure in the electric power system model on electric power records	Explain how to identify abandoned or discontinued legacy infrastructure in the electric power system model on electric power records	Explain how to identify types of electric power equipment on electric power records
Explain how to identify rural electric power systems on electric power records	Explain how to identify urban electric power systems on electric power records	Explain how to identify metro electric power systems on electric power records	Explain how to identify the composition of conductive cable on electric power records	Explain how to identify the composition of non-conductive cable on electric power records
Explain how to identify fibre-optic cable on electric power records	Explain how to anticipate possible tracer wire applications on electric power records	Explain how to identify common electric power cable functions on electric power records	Explain how to identify various electric power cable configurations on electric power records	Explain how to identify construction practices for electric power facilities on electric power records
Explain how to identify the voltage and current capacities of lines found on electric power records	Explain how to identify the status of lines found on electric power records	Explain how to identify a change in system voltage found on electric power records	Explain how to identify a change in current capacity found on electric power records	Explain how to identify phase change on electric power records
Explain how to identify a substation on electric power records	Explain how to identify electric power transformers on electric power records	Explain how to identify electric power cable switchgear on electric power records	Explain how to identify electric power load break centers on electric power records	Explain how to identify electric power enhancement devices (e.g., capacitors) on electric power records
Explain how to identify electric power splitters on electric power records	Explain how to identify electric power taps on electric power records	Explain how to identify electric power cable splice points on electric power records	Explain how to identify electric power connection points on electric power records	Explain how to identify underground cable on electric power records
Explain how to anticipate possible trenchless cable installation sites on electric power records	Explain how to identify a multi-party trench on electric power records	Explain how to anticipate possible bell hole sites on electric power records	Explain how to identify pedestals and cabinets on electric power records	Explain how to identify multi-access housings (MAH) on electric power records
Explain how to identify three-party pedestals on electric power records	Explain how to identify two-party pedestals on electric power records	Explain how to identify pole-mounted equipment on electric power records	Explain how to identify a pole drop on electric power records	Explain how to identify surface-mounted equipment on electric power records
Explain how to identify hand holes, manholes, and vaults on electric power records	Explain how to identify underground (hand hole, manhole, vault) installed equipment on electric power records	Explain how to identify conduit on electric power records	Explain how to identify duct banks on electric power records	Explain how to identify a service drop on electric power records
Explain how to identify a customer meter (demarcation point) on electric power records	Explain how to identify an MDU (multi-dwelling unit) electric power service on electric power records	Explain how to identify a primary electric power service on electric power records	Explain how to identify a secondary (private) electric power service on electric power records	Explain how to identify future cable on electric power records
Explain how to identify dead-end cable on electric power records	Explain how to identify electric power ancillary facilities (e.g., telemetry communications) on electric power records	Explain how to identify bonding points on electric power records	Explain how to identify ground cables on electric power records	Explain how to identify ground rods on electric power records

Electric Power

		Explain how to identify ground grids on electric power records	Explain how to identify unregistered electric power facilities on electric power records	Explain how to identify privately-owned/operated electric power systems on electric power records	Explain how to identify signal application access points for electric power systems on electric power records	
4.0	Information Source Skills	Demonstrate where to obtain various types of records	Demonstrate ability to research map sources	Demonstrate ability to utilize survey plans	Demonstrate ability to utilize third party database records	Demonstrate ability to utilize as-builts drawings
		Demonstrate ability to utilize provincial regulatory boards / agencies / commission plans	Demonstrate ability to utilize land titles records	Demonstrate ability to utilize oil and gas owner/operator records	Demonstrate ability to obtain and utilize information from landowners regarding facilities on their property	Demonstrate ability to utilize GIS maps
		Demonstrate the ability to utilize aerial / satellite photographs	Demonstrate the ability to utilize Google Maps/Google Earth	Demonstrate ability to obtain and utilize information from facility / field personnel	Demonstrate the ability to utilize engineer plot plans	Demonstrate the ability to utilize locator company drawings
		Demonstrate the ability to utilize one call system information	Demonstrate the ability to utilize municipal / county maps	Demonstrate the ability to utilize topographical maps	Demonstrate the ability to utilize site photographs	Demonstrate the ability to read and utilize information source records
		Demonstrate the ability to utilize other utility owner / operator records	Demonstrate the ability to utilize internet-accessed mapping and photographs	Demonstrate the ability to utilize electric power owner / operator records	Demonstrate the ability to utilize where electric power owner/operator records can be obtained	Demonstrate the ability to interpret information contained in an electric power record (e.g., legends, abbreviations, and symbols)
		Demonstrate the ability to utilize the various formats that electric power records are found (e.g., hardcopy, digital)	Demonstrate the ability to utilize electric power index records	Demonstrate the ability to identify property owner, property line, and property descriptions found on electric power records	Demonstrate the ability to identify recorded distances between cables and from boundaries and property lines, etc.	Demonstrate the ability to identify easements on electric power records
		Demonstrate the ability to identify a right of way on electric power records	Demonstrate the ability to identify buried facilities in public right of way on electric power records	Demonstrate the ability to identify schematic representation (approximate relative alignment)	Demonstrate the ability to identify spatially accurate representation	Demonstrate the ability to identify crossings (foreign, road, etc.) found on electric power records
		Demonstrate the ability to identify the approximate alignment of lines found on an electric power record	Demonstrate the ability to identify the providers of electric power on electric power records	Demonstrate the ability to identify the users of electric power on electric power records	Demonstrate the ability to identify electric power systems on electric power records	Demonstrate the ability to identify electric power grids on electric power records
		Demonstrate the ability to identify electric power voltage on electric power records	Demonstrate the ability to identify electric power current on electric power records	Demonstrate the ability to identify local power providers on electric power records	Demonstrate the ability to identify transmission power providers on electric power records	Demonstrate the ability to identify local grid connections to transmission grid on electric power records
		Demonstrate the ability to identify 3-phase electric power on electric power records	Demonstrate the ability to identify 2-phase electric power on electric power records	Demonstrate the ability to identify single-phase electric power on electric power records	Demonstrate the ability to identify transmission electric power on electric power records	Demonstrate the ability to identify feeder electric power lines on electric power records

Electric Power

Demonstrate the ability to identify distribution electric power lines on electric power records	Demonstrate the ability to identify residential electric power lines on electric power records	Demonstrate the ability to identify the electric power owners and operators in a service area on electric power records	Demonstrate the ability to identify the electric power system model on electric power records	Demonstrate the ability to identify the electric power grid model on electric power records
Demonstrate the ability to identify radial distribution network on electric power records	Demonstrate the ability to identify interconnected distribution network on electric power records	Demonstrate the ability to identify industrial electric power customers and their requirements on electric power records	Demonstrate the ability to identify commercial electric power customers and their requirements on electric power records	Demonstrate the ability to identify residential electric power customers and their requirements on electric power records
Demonstrate the ability to identify repurposed legacy infrastructure in the electric power system model on electric power records	Demonstrate the ability to identify abandoned or discontinued legacy infrastructure in the electric power system model on electric power records	Demonstrate the ability to identify types of electric power equipment on electric power records	Demonstrate the ability to identify rural electric power systems on electric power records	Demonstrate the ability to identify urban electric power systems on electric power records
Demonstrate the ability to identify metro electric power systems on electric power records	Demonstrate the ability to identify the composition of conductive cable on electric power records	Demonstrate the ability to identify the composition of non-conductive cable on electric power records	Demonstrate the ability to identify fibre-optic cable on electric power records	Demonstrate the ability to anticipate possible tracer wire applications on electric power records
Demonstrate the ability to identify common electric power cable functions on electric power records	Demonstrate the ability to identify various electric power cable configurations on electric power records	Demonstrate the ability to identify construction practices for electric power facilities on electric power records	Explain how to identify the voltage and current capacities of lines found on electric power records	Explain how to identify the status of lines found on electric power records
Explain how to identify a change in system voltage found on electric power records	Explain how to identify a change in current capacity found on electric power records	Explain how to identify phase change on electric power records	Demonstrate the ability to identify a substation on electric power records	Demonstrate the ability to identify electric power transformers on electric power records
Demonstrate the ability to identify electric power cable switchgear	Demonstrate the ability to identify electric power load break centers on electric power records	Demonstrate the ability to identify electric power enhancement devices (e.g., capacitors) on electric power records	Demonstrate the ability to identify electric power splitters on electric power records	Demonstrate the ability to identify electric power taps on electric power records
Demonstrate the ability to identify electric power cable splice points on electric power records	Demonstrate the ability to identify electric power connection points on electric power records	Demonstrate the ability to identify underground cable on electric power records	Demonstrate the ability to anticipate possible trenchless cable installation sites on electric power records	Demonstrate the ability to identify a multi-party trench on electric power records
Demonstrate the ability to anticipate possible bell hole sites on electric power records	Demonstrate the ability to identify pedestals and cabinets on electric power records	Demonstrate the ability to identify multi-access housings (MAH) on electric power records	Demonstrate the ability to identify three-party pedestals on electric power records	Demonstrate the ability to identify two-party pedestals on electric power records
Demonstrate the ability to identify pole-mounted equipment on electric power records	Demonstrate the ability to identify a pole drop on electric power records	Demonstrate the ability to identify surface-mounted equipment on electric power records	Demonstrate the ability to identify hand holes, manholes, and vaults on electric power records	Demonstrate the ability to identify underground (hand hole, manhole, vault) installed equipment on electric power records

Electric Power

		Demonstrate the ability to identify conduit on electric power records	Demonstrate the ability to identify duct banks on electric power records	Demonstrate the ability to identify a service drop on electric power records	Demonstrate the ability to identify a customer meter (demarcation point) on electric power records	Demonstrate the ability to identify an MDU (multi-dwelling unit) electric power service on electric power records
		Demonstrate the ability to identify a primary electric power service on electric power records	Demonstrate the ability to identify a secondary (private) electric power service on electric power records	Demonstrate the ability to identify future cable on electric power records	Demonstrate the ability to identify dead-end cable on electric power records	Demonstrate the ability to identify electric power ancillary facilities (e.g., telemetry communications) on electric power records
		Demonstrate the ability to identify bonding points on electric power records	Demonstrate the ability to identify ground cables on electric power records	Demonstrate the ability to identify ground rods on electric power records	Demonstrate the ability to identify ground grids on electric power records	Demonstrate the ability to identify unregistered electric power facilities on electric power records
		Demonstrate the ability to identify privately-owned/operated electric power systems on electric power records	Demonstrate the ability to identify signal application access points for electric power systems on electric power records			
5.0	Electric Power Locating Documentation and Communication Knowledge	Describe owner/operator notification procedures	Describe procedures to contact electric power 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	Electric Power Locating Documentation and Communication Skills	Demonstrate the ability to follow client notification procedures	Demonstrate the ability to contact electric power 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	Electric Power 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	Explain the importance and use of PPE (personal protective equipment)	Explain importance and operation of AC electrical test equipment	Explain importance and operation of DC electrical test 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 manhole safety procedures	Describe hand hole safety procedures	Describe vault safety procedures	Describe ventilation procedures	Describe safety watch

Electric Power

		Describe self-contained breathing apparatus (SCBA)	Describe working alone procedures	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 job completion checklist (JCC) process	Describe the safety / environmental incident investigation process	Describe sources / types of electric power injuries	Describe causes of electrical power injuries	Explain electrical safety procedures
		Describe the importance of ground points, cables, and grids				
8.0	Electric Power 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 occupational health, safety, and environment (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 AC electricity test equipment	Demonstrate the ability to operate DC electricity test equipment
		Demonstrate the ability to operate a four-way gas monitor	Demonstrate the ability to follow the job safety analysis (JSA) 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 follow ventilation procedures	Demonstrate the ability to follow safety watch procedures
		Demonstrate the ability to utilize self-contained breathing apparatus (SCBA)	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 job completion checklist (JCC)	Demonstrate the ability to participate in the safety / environmental incident investigation process	Demonstrate the ability to identify sources / types of electric power injuries	Demonstrate the ability to recognize and mitigate electric power hazards
		Demonstrate the ability to recognize ground points, cables, and grids				
9.0	Visual Inspection Knowledge	Explain the primary reason for performing a visual inspection	Explain the importance of using electric power records during the visual inspection	Explain how to utilize abbreviations and symbols as found on records during the visual inspection	Describe visual signs that might indicate the presence of buried facilities	Explain how to recognize areas of previous ground disturbance

Electric Power

Explain how to recognize trench or excavation scars	Explain how to recognize potential hazards	Describe warning signs used for electric power 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 electric power 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 electric power 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 electric power records
Explain how to recognize property lines as found on electric power records	Explain how to recognize distances between cables and boundaries and property lines as found on electric power records	Explain how to recognize easements as found on electric power records	Explain how to recognize a right of way as found on electric power records	Explain how to recognize buried facilities in a public right of way as found on electric power records
Explain how to identify crossings (foreign, road, etc.) as found on electric power records	Explain how to identify the approximate alignment of lines as found on electric power records	Explain how to recognize electric power systems as found on electric power records	Explain how to recognize electric power grids as found on electric power records	Explain how to recognize electric power voltage as found on electric power records
Explain how to recognize electric power current as found on electric power records	Explain how to recognize connections to transmission grids as found on electric power records	Explain how to recognize 3-phase power as found on electric power records	Explain how to recognize 2-phase power as found on electric power records	Explain how to recognize single-phase power as found on electric power records
Explain how to recognize transmission power as found on electric power records	Explain how to recognize feeder power lines as found on electric power records	Explain how to recognize distribution power lines as found on electric power records	Explain how to recognize residential power lines as found on electric power records	Explain how to recognize repurposed legacy infrastructure as found on electric power records
Explain how to recognize abandoned or discontinued legacy infrastructure as found on electric power records	Explain how to recognize electric power equipment as found on electric power records	Explain how to recognize conductive facilities as found on electric power records	Explain how to recognize non-conductive facilities as found on electric power records	Explain how to recognize fibre-optic cables as found on electric power records
Explain how to recognize tracer wire applications	Explain how to identify different functions of electric power cables as found on electric power records	Explain how to identify various electric power infrastructure configurations as found on electric power records	Explain how to identify construction practices for electric power facilities as found on electric power records	Know the status of lines as found on electric power records
Explain how to identify a change in system voltage as found on electric power records	Explain how to identify a change in current capacity as found on electric power records	Explain how to identify a change in phase as found on electric power records	Explain how to recognize a substation as found on electric power records	Explain how to recognize electric power transformers as found on electric power records
Explain how to recognize electric power cable switchgear as found on electric power records	Explain how to recognize electric power load break centers as found on electric power records	Explain how to recognize electric power enhancement devices (e.g., capacitors) as found on electric power records	Explain how to recognize electric power splitters as found on electric power records	Explain how to recognize electric power taps as found on electric power records

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Explain how to recognize electric power cable splice points as found on electric power records	Explain how to recognize electric power connection points as found on electric power records	Explain how to recognize underground cable as found on electric power records	Explain how to recognize possible trenchless cable installation sites as found on electric power records	Explain how to recognize a multi-party trench as found on electric power records
Explain how to recognize possible bell hole sites as found on electric power records	Explain how to recognize pedestals and cabinets as found on electric power records	Explain how to recognize multi-access housings (MAH) as found on electric power records	Explain how to recognize three-party pedestals as found on electric power records	Explain how to recognize two-party pedestals as found on electric power records
Explain how to recognize pole-mounted equipment as found on electric power records	Explain how to recognize a pole drop on as found electric power records	Explain how to recognize surface-mounted equipment as found on electric power records	Explain how to recognize hand holes, manholes, and vaults as found on electric power records	Explain how to recognize underground (hand hole, manhole, vault) installed equipment as found on electric power records
Explain how to recognize conduit as found on electric power records	Explain how to recognize duct banks as found on electric power records	Explain how to recognize a service drop as found on electric power records	Explain how to recognize a customer meter (demarcation point) as found on electric power records	Explain how to recognize an MDU (multi-dwelling unit) electric power service as found on electric power records
Explain how to recognize a primary electric power service as found on electric power records	Explain how to recognize a secondary (private) electric power service as found on electric power records	Explain how to recognize future cable as found on electric power records	Explain how to recognize dead-end cable as found on electric power records	Explain how to recognize electric power ancillary facilities (e.g., telemetry communications) as found on electric power records
Explain how to recognize bonding points as found on electric power records	Explain how to recognize ground rods as found on electric power records	Explain how to recognize ground grids as found on electric power records	Explain how to recognize unregistered electric power facilities	Explain how to recognize privately-owned/operated electric power systems
Explain how to recognize signal application access points as found on electric power records	Explain how to identify the origin/destination points of lines as found on electric power records	Explain how to recognize infrastructure and features as found on survey plans	Explain how to recognize infrastructure and features as found on third party database records	Explain how to recognize infrastructure and features as found on as-builts drawings
Explain how to recognize infrastructure and features as found on provincial regulatory boards / agencies / commission plans	Explain how to recognize infrastructure and features as found on land titles records	Explain how to recognize 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
Explain how to recognize infrastructure and features as found on GIS maps	Explain how to recognize infrastructure and features as found on aerial / satellite photographs	Explain how to recognize infrastructure and features as found on site photographs	Explain how to recognize infrastructure and features as found on internet-accessed mapping and photographs	Describe how to perform visual inspections with facility / field personnel
Describe how to perform visual inspections with the ground disturber	Explain how to recognize infrastructure and features as found on one call system information	Explain how to recognize infrastructure and features as found on municipal / county maps	Explain how to recognize infrastructure and features as found on engineer plot plans	Explain how to recognize infrastructure and features as found on locator company drawings

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		Explain how to recognize infrastructure and features found on previous stake-out reports	Explain how to recognize infrastructure and features recorded in a ground disturbance package	Explain how to recognize infrastructure as required by a current facility location request	Describe the importance of documenting the visual inspection in a job completion checklist	Explain how to recognize infrastructure and features found on previous crossing report
		Explain how to recognize obstacles to locating accuracy	Explain how to recognize changes in facilities	Explain how to recognize extreme environments	Explain how to recognize disruptive noises	Explain how to recognize inaccurate records
		Explain how to recognize sources of unwanted coupling	Explain how to anticipate a possible location of a sharp drop in signal	Explain how to anticipate a possible location of a complete loss of signal	Explain how to anticipate a possible problem with tracer wire	Explain how to anticipate a possible location of changes in depth
		Explain how to anticipate the possible location of buried cable splices	Explain how to anticipate possible areas of common-bonded facilities	Explain how to anticipate possible short facilities	Explain how to anticipate possible non-grounded facilities	Explain how to anticipate possible areas of facilities that are closer than normal
		Explain how to anticipate possible areas where facilities are congested	Explain facility access obstacles and how to overcome them	Explain 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 utilize electric power records during the visual inspection	Demonstrate ability to recognize visual signs that indicate the presence of buried facilities	Demonstrate ability to match records with site facilities	Demonstrate ability to recognize types, materials and sizes of buried electric power facilities	Demonstrate the ability to recognize visual signs that might 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 warning signs used for electric power facilities	Demonstrate the ability to recognize information found on warning signs
		Demonstrate the ability to recognize information found on safety labels signs	Demonstrate the ability to recognize information found on identification labels and tags	Demonstrate the ability to recognize signal application points as found on electric power records	Demonstrate the ability to recognize property lines as found on electric power records	Demonstrate the ability to recognize distances between cables and boundaries and property lines as found on electric power records
		Demonstrate the ability to recognize easements as found on electric power records	Demonstrate the ability to recognize a right of way as found on electric power records	Demonstrate the ability to recognize buried facilities in a public right of way as found on electric power records	Demonstrate the ability to recognize crossings (foreign, road, etc.) as found on electric power records	Demonstrate the ability to recognize the approximate alignment of lines as found on electric power records
		Demonstrate the ability to recognize electric power systems as found on electric power records	Demonstrate the ability to recognize electric power grids as found on electric power records	Demonstrate the ability to recognize electric power voltage as found on electric power records	Demonstrate the ability to recognize electric power current as found on electric power records	Demonstrate the ability to recognize connections to transmission grids as found on electric power records
		Demonstrate the ability to recognize 3-phase power as found on electric power records	Demonstrate the ability to recognize 2-phase power as found on electric power records	Demonstrate the ability to recognize single-phase power as found on electric power records	Demonstrate the ability to recognize transmission power as found on electric power records	Demonstrate the ability to recognize feeder power lines as found on electric power records

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Demonstrate the ability to recognize distribution power lines as found on electric power records	Demonstrate the ability to recognize residential power lines as found on electric power records	Demonstrate the ability to recognize repurposed legacy infrastructure as found on electric power records	Demonstrate the ability to recognize abandoned or discontinued legacy infrastructure as found on electric power records	Demonstrate the ability to recognize electric power equipment as found on electric power records
Demonstrate the ability to recognize conductive facilities as found on electric power records	Demonstrate the ability to recognize non-conductive facilities as found on electric power records	Demonstrate the ability to recognize fibre-optic cables as found on electric power records	Demonstrate the ability to recognize tracer wire applications	Demonstrate the ability to identify different functions of electric power cables as found on electric power records
Demonstrate the ability to identify various electric power infrastructure configurations as found on electric power records	Demonstrate the ability to identify construction practices for electric power facilities as found on electric power records	Demonstrate the ability to recognize the status of lines as found on electric power records	Demonstrate the ability to identify a change in system voltage as found on electric power records	Demonstrate the ability to identify a change in current capacity as found on electric power records
Demonstrate the ability to identify a change in phase as found on electric power records	Demonstrate the ability to recognize a substation as found on electric power records	Demonstrate the ability to recognize electric power transformers as found on electric power records	Demonstrate the ability to recognize electric power cable switchgear as found on electric power records	Demonstrate the ability to recognize electric power load break centers as found on electric power records
Demonstrate the ability to recognize electric power enhancement devices (e.g., capacitors) as found on electric power records	Demonstrate the ability to recognize electric power splitters as found on electric power records	Demonstrate the ability to recognize electric power taps as found on electric power records	Demonstrate the ability to recognize electric power cable splice points as found on electric power records	Demonstrate the ability to recognize electric power connection points as found on electric power records
Demonstrate the ability to recognize underground cable as found on electric power records	Demonstrate the ability to recognize possible trenchless cable installation sites as found on electric power records	Demonstrate the ability to recognize a multi-party trench as found on electric power records	Demonstrate the ability to recognize possible bell hole sites as found on electric power records	Demonstrate the ability to recognize pedestals and cabinets as found on electric power records
Demonstrate the ability to recognize multi-access housings (MAH) as found on electric power records	Demonstrate the ability to recognize three-party pedestals as found on electric power records	Demonstrate the ability to recognize two-party pedestals as found on electric power records	Demonstrate the ability to recognize pole-mounted equipment as found on electric power records	Demonstrate the ability to recognize a pole drop on as found electric power records
Demonstrate the ability to recognize surface-mounted equipment as found on electric power records	Demonstrate the ability to recognize hand holes, manholes, and vaults as found on electric power records	Demonstrate the ability to recognize underground (hand hole, manhole, vault) installed equipment as found on electric power records	Demonstrate the ability to recognize conduit as found on electric power records	Demonstrate the ability to recognize duct banks as found on electric power records
Demonstrate the ability to recognize a service drop as found on electric power records	Demonstrate the ability to recognize a customer meter (demarcation point) as found on electric power records	Demonstrate the ability to recognize an MDU (multi-dwelling unit) electric power service as found on electric power records	Demonstrate the ability to recognize a primary electric power service as found on electric power records	Demonstrate the ability to recognize a secondary (private) electric power service as found on electric power records
Demonstrate the ability to recognize future cable as found on electric power records	Demonstrate the ability to recognize dead-end cable as found on electric power records	Demonstrate the ability to recognize electric power ancillary facilities (e.g., telemetry communications) as found on electric power records	Demonstrate the ability to recognize bonding points as found on electric power records	Demonstrate the ability to recognize ground rods as found on electric power records

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		Demonstrate the ability to recognize ground grids as found on electric power records	Demonstrate the ability to recognize unregistered electric power facilities	Demonstrate the ability to recognize privately-owned/operated electric power systems	Demonstrate the ability to recognize signal application access points as found on electric power records	Demonstrate the ability to identify the origin/destination points of lines as found on electric power records
		Demonstrate the ability to recognize infrastructure and features as found on survey plans	Demonstrate the ability to recognize infrastructure and features as found on third party database records	Demonstrate the ability to recognize infrastructure and features as found on as-builts drawings	Demonstrate the ability to recognize infrastructure and features as found on provincial regulatory boards / agencies / commission plans	Demonstrate the ability to recognize infrastructure and features as found on land titles records
		Demonstrate the ability to recognize infrastructure and features as found on topographical maps	Demonstrate the ability to utilize landowner information during the visual inspection	Demonstrate the ability to recognize infrastructure and features as found on GIS maps	Demonstrate the ability to recognize infrastructure and features as found on aerial / satellite photographs	Demonstrate the ability to recognize infrastructure and features as found on site photographs
		Demonstrate the ability to recognize infrastructure and features as found on internet-accessed mapping and photographs	Demonstrate the ability to perform visual inspections with facility / field personnel	Demonstrate the ability to perform visual inspections with the ground disturber	Demonstrate the ability to recognize infrastructure and features as found on one call system information	Demonstrate the ability to recognize infrastructure and features as found on municipal / county maps
		Demonstrate the ability to recognize infrastructure and features as found on engineer plot plans	Demonstrate the ability to recognize infrastructure and features as found on locator company drawings	Demonstrate the ability to recognize infrastructure and features found on previous stake-out reports	Demonstrate the ability to recognize infrastructure and features recorded in a ground disturbance package	Demonstrate the ability to recognize infrastructure as required by a current facility location request
		Demonstrate the ability to document the visual inspection in a job completion checklist	Demonstrate the ability to recognize infrastructure and features found on previous crossing report	Demonstrate the ability to recognize obstacles to locating accuracy	Demonstrate the ability to recognize changes in facilities	Demonstrate the ability to recognize extreme environments
		Demonstrate the ability to recognize disruptive noises	Demonstrate the ability to recognize inaccurate records	Demonstrate the ability to recognize sources of unwanted coupling	Demonstrate the ability to anticipate a possible location of a sharp drop in signal	Demonstrate the ability to anticipate a possible location of a complete loss of signal
		Demonstrate the ability to anticipate a possible problem with tracer wire	Demonstrate the ability to anticipate a possible location of changes in depth	Demonstrate the ability to anticipate the possible location of buried cable splices	Demonstrate the ability to anticipate possible areas of common-bonded facilities	Demonstrate the ability to anticipate possible short facilities
		Demonstrate the ability to anticipate possible non-grounded facilities	Demonstrate the ability to anticipate possible areas of facilities that are closer than normal	Demonstrate the ability to anticipate possible areas where facilities are congested	Demonstrate the ability to recognize facility access obstacles and how to overcome them	Demonstrate the ability to anticipate and determine 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				
11.0	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 Parallel Line Check Method

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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
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 cable	Describe the appropriate procedures for connection at an access point	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) electrical housing
Describe safe procedures for applying a direct hook-up to a (safe) electrical transformer	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) cathodic cable	Describe safe procedures for applying a direct hook-up to a (safe) control cable
Explain proper procedure for direct hook-up method for ground cables	Explain proper procedure for direct hook-up method for ground grids	Explain proper procedure for direct hook-up method for communication cables	Explain proper procedure for direct hook-up method for fibre optic cables	Explain proper procedure for direct hook-up method for two / three party pedestals
Describe the tools required to perform the direct hook-up method at a two / three party pedestal	Describe the tools required to perform the direct hook-up method at hand holes, manholes, and vaults	Explain proper procedure for direct hook-up method at hand holes, manholes, and vaults	Explain proper procedure for direct hook-up method at conduits	Explain proper procedure for direct hook-up method at transformers
Explain proper procedure for direct hook-up method at switch or load break centers	Explain proper procedure for direct hook-up method at service drops	Explain proper procedure for direct hook-up method at customer meters (demarcation point)	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 ground cable with an inductive clamp	Describe the safe procedures for applying a signal to a ground grid with an inductive clamp
Describe the safe procedures for applying a signal at transformers with an inductive clamp	Describe the safe procedures for applying a signal at switch or load break centers with an inductive clamp	Describe the safe procedures for applying a signal at service drops with an inductive clamp	Describe the safe procedures for applying a signal at customer meters (demarcation point) with an inductive clamp	Describe the criteria for selecting an effective general inductive signal application point

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		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 ground cable	Describe the criteria for selecting an effective inductive signal application point for a ground grid	Describe the criteria for selecting an effective inductive signal application point for electrical feeder cable
		Describe the criteria for selecting an effective inductive signal application point for electrical distribution cable	Describe the criteria for selecting an effective inductive signal application point for electrical service (drop) cable	Describe the criteria for selecting an effective inductive signal at a transformer	Describe the criteria for selecting an effective inductive signal at a switch or load break center	Describe the criteria for selecting an effective inductive signal at a service drop
		Describe the criteria for selecting an effective inductive signal application point for fibre-optic cable	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 electric power 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 metal manhole cover with a magnetic locator	Describe the procedures for locating a metal hand-hole cover 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		
12.0	Locating Methods Skills	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) Mode	Demonstrate the procedures for the Radio 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 remotely-applied EM signals	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 conditions that provide an optimal direct hook-up ground point	Demonstrate the conditions that provide a poor direct hook-up ground point	Demonstrate the procedures to improve a direct hook-up ground point	Demonstrate the effective use of a ground rod and ground plate

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Demonstrate the effective use of an extended or multi-point ground	Demonstrate safe procedures for applying a direct hook-up to a conductive cable	Demonstrate the appropriate procedures for connection at an access point	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) electrical housing
Demonstrate safe procedures for applying a direct hook-up to a (safe) electrical transformer	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) cathodic cable	Demonstrate safe procedures for applying a direct hook-up to a (safe) control cable
Demonstrate proper procedure for direct hook-up method for fibre optic cables	Demonstrate proper procedure for direct hook-up method for two / three party pedestals	Demonstrate the ability to select the tools required to perform the direct hook-up method at a two / three party pedestal	Demonstrate the ability to select the tools required to perform the direct hook-up method at hand holes, manholes, and vaults	Demonstrate proper procedure for direct hook-up method at hand holes, manholes, and vaults
Demonstrate proper procedure for direct hook-up method at conduits	Demonstrate proper procedure for direct hook-up method at transformers	Demonstrate proper procedure for direct hook-up method at a switch or load break center	Demonstrate proper procedure for direct hook-up method at service drops	Demonstrate proper procedure for direct hook-up method at customer meters (demarcation point)
Demonstrate proper procedure for direct hook-up method for ground cables	Demonstrate proper procedure for direct hook-up method for ground grids	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 at a transformer with an inductive clamp	Demonstrate the safe procedures for applying a signal at a switch or load break center with an inductive clamp	Demonstrate the safe procedures for applying a signal at service drops with an inductive clamp
Demonstrate the safe procedures for applying a signal at customer meters (demarcation point) with an inductive clamp	Demonstrate the safe procedures for applying a signal at a ground cable with an inductive clamp	Demonstrate the safe procedures for applying a signal at a ground grid 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
Demonstrate the ability to select an effective inductive signal application point for communication cable	Demonstrate the ability to select an effective inductive signal application point for ground cable	Demonstrate the ability to select an effective inductive signal application point for electrical feeder cable	Demonstrate the ability to select an effective inductive signal application point for electrical distribution cable	Demonstrate the ability to select an effective inductive signal application point for electrical service (drop) cable
Demonstrate the ability to select an effective inductive signal application point at a transformer	Demonstrate the ability to select an effective inductive signal application point at a switch or load break center	Demonstrate the ability to select an effective inductive signal application point at a service drop	Demonstrate the ability to select an effective inductive signal application point for fibre-optic cable	Demonstrate the procedures for tracing an EM signal

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		Demonstrate procedures for verifying a previously located facility	Demonstrate the ability to properly identify a target facility	Demonstrate the ability to verify locates of electric power 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 metal manhole cover with a magnetic locator	Demonstrate the procedures for locating a metal hand-hole cover 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				
13.0	Locator Marking Knowledge	Explain marking electric power cables using the APWA Uniform Color Code	Explain marking electric power ancillary infrastructure using the APWA Uniform Color Code	Explain the CGA guidelines for marking practices	Describe marking electric power cables using CGA common abbreviations	Describe marking electric power 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 buried splice marking
		Explain facilities installed in a vault marking	Explain structure markings (e.g., vaults)	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				
14.0	Locator Marking Skills	Demonstrate proper ground marking using the APWA Uniform Color Code	Demonstrate marking electric power ancillary infrastructure using the APWA Uniform Color Code	Demonstrate marking electric power infrastructure using CGA marking practices	Demonstrate marking electric power infrastructure using CGA common abbreviations	Demonstrate situations where other marking systems may be used
		Demonstrate marking electric power 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 buried splice marking	Demonstrate facilities installed in a vault marking	Demonstrate structure markings (e.g., vaults)	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 (stake-chaser) marking	Demonstrate proper marking in navigable waterways
		Demonstrate the ability to mark facilities under adverse ground and environment conditions	Demonstrate the ability to mark facilities with site specific markings			

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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 electrical system configuration	Explain the effects of electrical system configuration on the EM signal and locate accuracy	Explain the effects of joint system/network (telco, gas, electrical, etc.) installations on locate accuracy
		Explain procedures used to locate in adverse site conditions	Explain procedures to locate in high-traffic areas	Describe how electrical fields which bleed onto other conductors affects locate signals	Explain the effects of work site conditions on locate accuracy	Explain the capabilities of locate equipment to overcome problems
		Explain why various facilities and compositions of cables require their own locating techniques	Describe how inaccurate records can affect locate accuracy	Explain ancillary facilities	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 cable ends on the EM signal	Explain the effects of buried splices and tees on the EM signal	Explain the effects of cathodic protection on locate accuracy	Explain the effects of electrical cable type transitions on the EM signal
		Explain the effects of high-voltage interference on the EM signal	Explain the effects of rebar on locate accuracy	Explain the effects of slack loops on locate accuracy	Explain the effects of unknown laterals (buried tee splices) on locate accuracy	Describe the effects on facility identification by limited or restricted access to facilities
		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	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		
16.0	Problem Solving Skills	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 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 overcome the effects of electric power system configuration on the EM signal and locate accuracy	Demonstrate the ability to overcome the effects of electric power system configuration on the EM signal and locate accuracy	Demonstrate the ability to overcome the effects of joint system/network (telco, gas, electrical, etc.) installations on locate accuracy	Demonstrate the ability to overcome the effects of locating in adverse site conditions
		Demonstrate the ability to overcome the effects of locating in high-traffic areas	Demonstrate the ability to overcome the effects of electrical fields bleeding onto other conductors	Demonstrate the ability to 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 various locating techniques to locate different facilities and compositions of cables

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		Demonstrate the ability to overcome inaccurate records	Demonstrate the ability to anticipate and locate ancillary facilities	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 cable ends on the EM signal	Demonstrate the ability to identify and overcome the effects of buried splices and tees 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 electrical cable type transitions on the EM signal	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 rebar on locate accuracy	Demonstrate the ability to identify and overcome the effects of slack loops on locate accuracy	Demonstrate the ability to identify and overcome the effects of unknown laterals (buried splice tees) on locate accuracy	Demonstrate the ability to obtain access to facilities or overcome limited or restricted access	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 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			
17.0	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 applications of a locate drawing	Explain symbology for electric power facilities	Explain mapping terminology for locator drawings	Explain the key elements that must be labeled on a drawing
		Explain the importance of measurements from electric power facilities to other known facilities	Explain the importance of measurements from electric power 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 processes	Demonstrate the ability to identify and utilize client specific drawing requirements
		Demonstrate the ability to identify and utilize company specific drawing requirements	Demonstrate the ability to identify and utilize multiple applications of a locate drawing	Demonstrate the ability to identify and utilize symbology for electric power facilities	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 electric power facilities to other known facilities	Demonstrate the ability to identify and record measurements from electric power 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

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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