



## The Association of Communications & Electronics Schools International Inc.

Competency Requirements For:

### **Certified Damage Prevention Specialist™ - C.D.P.S.**

Certified Damage Prevention Specialists are expected to demonstrate knowledge of utility locating principles and actual practices, as well as demonstrate “hands on” skills which are evidence of their mastery of techniques required to safely and completely locate and mark underground utilities/facilities according to Industry Best Practices, State/Provincial and Local Laws, Regulations, Codes and Industry Standards. Upon demonstrating this knowledge and “hands on” skills, a Certified Damage Prevention Specialist verifies his or her position as a professional underground Utility Locator as well as meets Industry Best Practices requirements for annual documented field testing and theory knowledge examinations. A Certified Damage Prevention Specialist is an efficient and profitable part of the Utility Location, Excavation, Construction, Maintenance and Critical Infrastructure Protection Industries.

Certified Damage Prevention Specialists must be knowledgeable and have sufficient “hands on” skills in the following technical and related areas:

### **1. Basic Electricity & Electronics Principles/Theory of Locating**

- 1.1 Demonstrate a thorough knowledge of Ohm's Law, electric/electronic/electromagnetic circuits and transmitted and received frequency applications as they relate to underground electromagnetic location techniques and procedures.
- 1.2 Demonstrate a thorough knowledge of conductors, insulators, signal paths and transmitted signal interference as they relate to underground electromagnetic location techniques and procedures.
- 1.3 Demonstrate the ability to correctly and safely construct a locatable electromagnetic circuit as it is used in underground electromagnetic location techniques and procedures.

### **2. Facility System Design**

- 2.1 Describe the three basic parts of a Facility/Utility System.
- 2.2 Explain/define the various methods of underground utility design.
- 2.3 Explain/define the various Excavation Methods and Processes.

### **3. Facility System Print Reading & Identification of Print Symbols**

- 3.1. Identify common Basic Plant Facility Print Symbols.
- 3.2 Identify prints, plats, records, engineering job orders, diagrams, and maps.
- 4.2 Identify the sources and the steps necessary to retrieve all applicable prints related to a locate request or ticket.
- 3.3 Describe what information is contained on owner/operator supplied available facility records.
- 3.4 Describe the procedure for updating records that are in error or to add new facilities.

- 3.5 Explain the importance and function of plat designation and notices of existing underground facility easements and proposed development plans on facility owners/operators.
- 3.6 Explain the planning phase of excavation projects.
- 3.7 Demonstrate the ability to read street maps, access and reference land survey forms and access land survey systems within a specific geographical area of responsibility.
- 3.8 Demonstrate the ability to read and understand customer-specific facility symbol identification and owner maps and drawings within a requested geographical area.
- 3.9 Accurately describe Federal, State, Provincial and Local Laws, Regulations, Codes, Standards and Industry Best Practices in support of accurately locating and marking facilities for excavation or projects which require underground facilities be located and marked prior to excavation or project commencement.

#### **4. Facility System Equipment, Technologies & Processes**

- 4.1 Accurately describe the permanent structures used to house utility equipment and provide access to facilities underground.
- 4.2 Define and/or identify all Electric Power system equipment, technologies & processes.
- 4.3 Define and/or identify all Natural Gas system equipment, technologies & processes.
- 4.4 Define and/or identify all Telephone system equipment, technologies & processes.
- 4.5 Define and/or identify all Cable (CATV) system equipment, technologies & processes.
- 4.6 Define and/or identify all Potable water system equipment, technologies & processes.
- 4.7 Define and/or identify all Reclaimed water, irrigation and slurry line system equipment, technologies & processes.
- 4.8 Define and/or identify all Sewer and drain line system equipment, technologies & processes.
- 4.9 Define and/or identify all other underground structures, system equipment, technologies & processes not previously listed.

#### **5. Facility Location Equipment Technologies**

- 5.1 Explain the advantages and disadvantages of locating buried cables and pipes using Ground Penetrating Radar (GPR), Acoustic Location, Infra-Red Imaging, Facility Prints, Electromagnetic Location, Geographic Information System (GIS), Global Positioning System (GPS), and Orthographic and Satellite Images.
- 5.2 Demonstrate a thorough knowledge of all available location equipment technologies.

#### **6. Construction Standards & Practices: Facilities**

- 6.1 Demonstrate a thorough knowledge of construction standards & common practices in excavation methods.
- 6.2 Identify and describe the "tolerance zone" as it relates to facility location and marking practices.
- 6.3 Explain the excavator's responsibilities in exercising due care and special care when working within the tolerance zone.
- 6.4 Explain the terms "Supply Line Separation", "Subsurface Utility Engineering" (SUE), "Positive Response", "No Conflict" and "Failure to Respond".

#### **7. Equipment Training and Techniques: Location Equipment**

- 7.1 Demonstrate the ability to properly check the operational functioning of locating equipment to include: the proper use of manufacturer's instructions, cleaning, storage, maintenance, performing a proper function test, performing a continuity test on the transmitter, testing the receiver for response in both peak and null modes, testing for battery life, calibration requirements, diagnostic tests, antenna function tests and comparing operational tests to a known facility's actual location and depth to ensure accuracy under actual or simulated site conditions.
- 7.2 Demonstrate the proper set up and use of an Electromagnetic Transmitter during actual or simulated site conditions.
- 7.3 Demonstrate the proper set up and use of an Electromagnetic Receiver during actual or simulated site conditions.

- 7.4 Demonstrate the proper set up of all Electromagnetic Equipment for conductive locating circuits during actual or simulated site conditions to include: adjusting the frequency, sensitivity and gain; performing a function test as per manufacturer's instructions; selecting the appropriate antenna (peak or null) for the type of response mode being applied; battery tests; optimal power outputs; and proper storage, maintenance and cleaning under actual or simulated site conditions.
- 7.5 Demonstrate the ability to "adjust as necessary" to ensure a proper signal is applied and received.
- 7.6 Demonstrate the proper set up and conductor grounding requirements for the use of an Induction Clamp (or Coupler) for locating circuits in actual or simulated site conditions.
- 7.7 Demonstrate the proper set up for the use of inductive locating techniques for locating facilities under actual or simulated site conditions.
- 7.8 Demonstrate the proper distance requirements for EM Receiver placement to resist air coupling when using inductive locating techniques under actual or simulated site conditions.
- 7.9 Demonstrate each of the following EM Locating techniques during actual or simulated site conditions: Circle Sweep; Tracing; and Blind Sweep to designate the position of underground facilities.

## **8. Multi-Plant Facilities Recognition: Visual Observation Skills, Site Familiarization/Site Characteristics**

- 8.1 Explain the importance of above ground visual observations.
- 8.2 Describe the Industry Best Practices "Site Familiarization" or "Site Characteristics".

## **9. Locate Procedures: One-Call Centers**

- 9.1 Explain the process and routing of a Locate Request "Ticket" through a One-Call Center.
- 9.2 Describe the advantages of establishing a One-Call Center.

## **10. Locate Procedures: All States**

- 10.1 Explain the Federal, State, Provincial, and Local Laws, Regulations and Codes (for individual States without a One-Call Center).
- 10.2 Explain how the Federal, State, Provincial, and Local Laws, Regulations and Codes (for individual States without a One-Call Center) ensure a timely response is given for a Locate Request.

## **11. Industry Best Practices Guidelines**

- 11.1 Describe the purpose and contents of the Common Ground Alliance Industry Best Practices Version 3.0.
- 11.2 Demonstrate using current Industry Standard Color Codes and Marking Procedures the correct method to mark underground facilities during a simulated or actual Locate Request.

## **12. Industry Standards: Color Code**

- 12.1 List each color of the APWA Uniform Color Code (ANSI Z535.1) and its designated represented use.

## **13. Daily Operations and Procedures**

- 13.1 Describe the procedures for scheduling and completing a locate request.
- 13.2 Explain the importance of organizing and checking the position of locating equipment in a vehicle before and after assigned locates.
- 13.3 Demonstrate the proper use of safety procedures, safety gear, safety cones and traffic alerts while performing a facility locate.
- 13.4 Describe the required post-locate cleanup requirements of a locator.
- 13.5 Explain the term "Emergency" when applied to utility locating.

## 14. Facility Owner/Excavator Relationships and Public Image

- 14.1 Explain the importance of providing a good public image of facility owners and excavators and how it relates to a professional utility locator.
- 14.2 Explain the relationships of facility owners and excavators with respect to safely locating and excavating around existing facilities.
- 14.3 List what an individual utility locator can do to maintain good excavator relationships and a good public image.

## 15. Locating Pipelines (US) To Comply With CFR 192.614(b)(5)

- 15.1 Explain the history of CFR 192.614(b)(5) to include: that CFR 192.614(b)(5) is a subpart of the US Department of Transportation (DOT) Pipeline Safety Rule which addresses specifically the locating of pipelines, that this rule establishes specific procedures to use when locating pipelines, that there are certain mandatory requirements contained within this rule which governs the actions of a utility locator and that this rule is to be followed in all cases where pipelines are located within the US.
- 15.2 List the steps to locating pipelines contained within CFR 192.614(b)(5) to include:
  - 1. performance of an equipment operation check; 2. verification of the scope of the locate request; 3. visual inspection of the locate area; 4. locate and mark facility(ies); and 5. recognize and react to Abnormal Operating Conditions.
- 15.3 Define "Abnormal Operating Conditions" contained in CFR 192.614(b)(5) to include recognition of: damaged pipe, damaged pipe coatings, excavation activities started prior to facility locating procedures (blasting, earth movement by excavators, trenching or other such excavation practices conducted prior to locating procedures), missing or broken tracer wires and/or the inability to locate the targeted pipeline.
- 15.4 Perform pursuant to CFR 192.614(b)(5) and prior to the utility locate:
  - 1. an equipment operational check in accordance with manufacturer's instructions; 2. verify the battery strength; 3. perform corrective actions for equipment out of specifications prior to the locate.
- 15.5 Verify the scope of the locate request pursuant to CFR 192.614(b)(5) and prior to the utility locate:
  - 1. determine the type of pipe required to be located; 2. verify conclusively the geographic location of the job site; and 3. verify the full extent of the locate request as it appears on the ticket.
- 15.6 Identify adjacent facilities, structures, or obstructions that may affect the successful completion of the locate request.
- 15.7 Compare prints, records and any written or observed information to conditions which exist prior to the locate and communicate these discrepancies to the proper authorities
- 15.8 Describe how additional locate requirements may be included in the locate ticket and identify where to look for additional locate instructions on the ticket or how additional requirements may be contained in various areas of the ticket.
- 15.9 Demonstrate the ability to select a type of locate to include:
  - 1. conductive; 2. inductive; and 3. measurement to locate utilities in accordance with CFR 192.614(b)(5).
- 15.10 Demonstrate the ability to locate utilities in accordance with manufacturer instructions.
- 15.11 Demonstrate the ability to initiate the proper corrective action to regain or acquire a signal if a signal is lost or too weak to provide an adequate signal.
- 15.12 Demonstrate the ability to complete a locate within the entire scope of the locate request.
- 15.13 Mark (paint, flag or stake) the location of the facility(ies) according to Industry Best Practices to include:
  - 1. mark changes in direction; and 2. place or provide marks so as to ensure the conclusiveness of the location of the facilities.
- 15.14 Demonstrate the ability to compare records to existing conditions after a facility is located and marked and identify and communicate those discrepancies via photos, sketches, drawings and written notations and descriptions to the proper authorities.
- 15.15 Demonstrate the ability (through actual or simulated conditions) to recognize Abnormal Operating Conditions while performing a locate.
- 15.16 Demonstrate what actions should be taken by the utility locator in reacting to Abnormal Operating Conditions (through actual or simulated conditions) including:
  - 1. describe the Abnormal Operating Condition correctly; 2. determining if remedial action is necessary; 3. determining which remedial action to take to correct the Abnormal Operating Condition; 4. initiating remedial action; 4. reporting Abnormal Operating Conditions; and 5. describing

various responses to Abnormal Operating Conditions dependant upon the nature of the Abnormal Operating Condition (damaged pipe, damage pipe coating, excavation activities begun prior to the locate, missing or broken tracing wire, and the inability to locate the pipeline).

## **16. Safety Procedures Per OSHA Regulations, Federal, State, Provincial and Local Laws**

- 16.1 Describe the Occupational Safety and Health Administration's (OSHA) role in providing employers and their employees with rules and regulations concerning worker safety.
- 16.2 Explain what safety precautions a utility locator must take in accordance with OSHA Regulations, Federal, State, Provincial and Laws when performing duties as a facilities locator.
- 16.3 Describe all Federal, State, Provincial and Local Regulatory Laws regarding safety procedures as they pertain to the specific geographic area of responsibility of the utility locator.
- 16.4 Demonstrate how to reference and access specific geographical area regulatory information pertinent to the performance of utility locating.
- 16.5 Demonstrate the ability to perform utility locating while observing and adhering to all applicable OSHA, Federal, State, Provincial and Local Regulatory Laws as they pertain to the specific geographical area of the utility locator.

## **17. Written Examinations and "Hands On" Skills Testing (Field Testing)**

- 17.1 Demonstrate a thorough knowledge and mastery of utility locating principles and practices by successfully completing all required "Hands On" Skills Testing (Field Testing) requirements.
- 17.2 Demonstrate a thorough knowledge and mastery of utility locating principles and practices by successfully passing a 50 question, closed book multiple-choice written exam by a score of 75% or better (12 wrong or less).

## **18. Field Training Requirements**

- 18.1 Demonstrate a thorough knowledge and mastery of utility locating principles and practices through field training while employed by and under the supervision of a professional utility locator trainer/training division.

## **19. Annual Re-testing**

- 19.1 Upon entry into employment as a Professional Utility (Facilities) Locator each individual must receive annual documented Re-testing to include: "Hands On" Skills Testing (Field Testing); and successfully passing a 50 question, closed book multiple-choice written exam by a score of 75% or better (12 wrong or less).

## **Suggested Study Materials**

Pulse® Development Program for Damage Prevention Specialists, Version 6.0u 06/06, © Copyright 2003-2006 Discovery Enterprises, Inc. (All rights reserved) or equivalent, CGA Best Practices Guidelines (current version), current Industry Standards, CFR 191.614(b)(5), S.U.E. (Subsurface Utility Engineering Planning Guide) and "Hands On" Field Testing conducted by an ACES Int'l Certification Administrator.

Prerequisites: A minimum of 240 hours documented employment in the field of facilities location.

Course Length: 5 hours Classroom, 4 hours "Hands On" Certification Field Testing and written examination administration which are intended to verify the required competence of a Certified Damage Prevention Specialist.

9 Total contact hours – 40% Field Testing and written examination

## **Certified Damage Prevention Specialist Exam Review Committee**

Chairman: Robert P. Nighswonger, (Program Manager) (President, Utility Training Academy)  
Eric Churchill, (Regional Manager, UTI Locating Services)  
Kelly Hardy, (Regional Manager, UtiliQuest LLC)  
Brandon Wright, (Vice President, Utility Integrity Solutions)  
John Christionson, (Independant Utility Consultant)  
Mike Presser, (Utility Engineering Services, Denver Co.)  
Allison Goodgame, (3M Dynatel)  
Christopher Koch, (Hance Utility Services, Inc)  
Shawn Kelly, (Contra Costa Water District)  
Steven R. Arnold, (Contra Costa Water District)  
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Emerald S. Cabamalan, (Sacramento Municipal Utility District)  
Edward Pelkey, (City of Fresno)