



Underground Career Development Program

Offered by

ElectriCities of North Carolina, Inc.
1427 Meadow Wood Boulevard
Raleigh, North Carolina 27604

Underground Career Development Program Subcommittee

This program has been developed and implemented by representation from North Carolina members.

The following are the subcommittee members who gave their time and commitment to research and deliver the best possible training product available:

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About ElectriCities

ElectriCities is a membership organization including public power communities in North Carolina, South Carolina and Virginia. ElectriCities also provides management services to the state's two municipal power agencies - North Carolina Municipal Power Agency Number 1 and North Carolina Eastern Municipal Power Agency.

Our Vision

NC Public Power – A competitive, innovative, respected utility industry leader providing value through collective actions.

Definition of Excellence

Excellence is the demonstration of a professional attitude and commitment to providing accurate, timely services or products that exceed the customers' needs.

Our Purpose

ElectriCities - delivering value to public power communities through collective strength, wisdom and action while promoting a more successful future for our citizens.

Underground Career Development Program
Resource Manual
Revised June 2019

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UCDP
Section I
Introduction

Purpose

The Underground Career Development Program is a voluntary training program available to ElectriCities members and approved by the North Carolina Department of Community College. It exceeds the training mandates as outlined in the Federal Register 1910.269 Subpart R and 1926.95 Subpart V of the OSHA regulations guide.

The program provides a way for municipal powerline technicians to increase their skills and knowledge. If properly administered, a technician's work performance can become proficient regardless of his experience level. Each employee is required to be trained and proficient at his assigned task.

Linemen enrolled in this program will learn to install, repair and maintain electric systems. They will gain an understanding of electricity and, in the more advanced levels, gain supervisory experience and knowledge of complex electric operations.

The resource guide provides procedures that must be followed in order to complete the Underground Career Development Program. Included in this guide are the four recommended levels of training, registration procedures, how to order program materials, recording procedures, an index of modules, and examination procedures.

Support

The ElectriCities Safety & Training staff is available to help you in making this program a success.

Training Resources

Module Components

The modules in the Underground Career Development Program are Online-based training tools. A module includes the following components:

Online

The instructional online module contains segments that match up to the printable student manual. This time proven method of learning, seeing, hearing, reading, and doing—assures a higher level of participation and comprehension.

Student Manual

Each student has the option to print a copy of each manual from the website before viewing the module to assure they have all the tools to complete each level. The city/town also has the option to purchase books at the onset of each level.

The student manual contains a quiz for each segment to help ensure the student's training progress. Questions from each quiz may be included in the final examination given online at the conclusion of each module. A score of 80% is required to complete individual modules.

See Section III, Module Resources, for more information regarding module descriptions.

The manual lists segments in the requirement section which includes a supervisor sign off for tasks. The scale begins at “Very Good”, “Acceptable”, “Needs Improvement” to “Not able to Complete”.

FPR sheets need to be completed online by student and program coordinator.

Performance notes may be added on the back of the page. Copies of this field performance requirement page should be kept on file by the supervisor.

Task Requirements

Hands-On Training

Because the reading and viewing of the online module does not guarantee performance capabilities, the program requires hands-on training. Required skills and associated hours of training must be documented and included in each powerline technician training record. These forms must be kept current to ensure accurate record keeping.

Related Training

Documentation of related training will be done by ElectriCities Senior Safety & Training Technician at the completion of each ElectriCities school. Each student must attend at least four ElectriCities schools to complete the apprenticeship program or a hands-on test will be administered by ElectriCities staff. A total of 8,000 hours of hands-on training must be documented by completion of the course. On the job training hours can be found online once the student logs into the website. These hours should be logged daily by the student and checked by the program coordinator.

See Section IV, Task Requirements, for more information regarding hands-on and related classroom training.

Instructors and Other Local Participants

Municipal Coordinator

Each municipality involved in the Underground Career Development Program will appoint one employee to coordinate the training for the utility. This individual is responsible for scheduling and coordinating all instructional time for the training program, registering students, requesting testing, and assisting the student in maintaining records.

The student will receive their test score immediately upon completion of the end of level test. Because it is possible for a student to receive a passing grade yet still not demonstrate proficiency in a particular subject area, the municipality's training coordinator must also offer additional instruction and guidance in areas that need improvement.

To be in compliance with OSHA 1910.269, each municipality must keep current records of each student enrolled in the program (see section IV for more information on recording procedures). Record keeping forms, provided with this manual, and online assist in tracking the progress of each student. Promotion can be used as an incentive to participate in the program. In an effort to maintain the accuracy of each participating municipality's records, this documentation must be accessible for review by the Electricities program director. Testing and certification are specifically covered in the Program Procedures Section.

Instructors

If the municipality should choose to appoint an instructor for the online course, these instructors shall be those individuals who demonstrate the highest level of expertise in that area's subject matter. Because certified journeyman linemen have previously demonstrated expertise in all required areas, it is recommended that these individuals be utilized as instructors.

Involve the more experienced linemen in class demonstrations when addressing subject matters they have already mastered. This will reduce boredom, vary the program, involve the entire class, and utilize the expertise of others in the field.

When classes are instructor in house by the city/town, at least one member from that location must have attended and completed Train the Trainer School.

ElectriCities Program Director

The ElectriCities Program Director is a representative of ElectriCities who has been selected to coordinate and oversee the Underground Career Development Program. This individual is responsible for seeing that all records are forwarded to ElectriCities and are accurate.

Program Director Responsibilities

- Oversee the Career Development Program
- Must be an Active Member of the Career Development Program Working Group
- Oversee the Training Coordinator
- Monitor the Application of the Career Development Program
- Monitor, questions, updates, and maintain communication of Working Group
- Maintain the approval process associated with the Career Development Program

ElectriCities Program Trainers

- Inform updates to Program Coordinators
- Provide adequate training associated with the Career Development Program
- Monitor Field Performance Requirement Sheets

Program Coordinator Responsibilities

- Schedule adequate training facility
- Ensure required training documents are up-to-date and filled out
- Ensure employees are prepared for training
- Provide access to training tools and materials as needed
- Schedule class time for students at your municipality
- Program coordinators should ensure that FPR sheets are signed by student's direct supervisor. If municipality does not have qualified employee to sign ElectriCities staff will administer a hands-on test.

Program Forms

Samples of all the forms used in this manual appear in the appendix. Original forms are included in this guide and may be copied for use in the program. If you need to order more forms or copies of records, contact the ElectriCities Safety and Training Technician. *Only forms provided in this manual will be accepted. These forms must be completed as required, signed by regional management and filed with ElectriCities program director 30 days prior to testing.*

For purposes of this manual, each applicant enrolled in the Underground Career Development Program is referenced as “student”.

Copyright Laws. Each municipality must abide by federal copyright laws. It is against the law to reproduce, in whole or in part, any portion of the DVD or training materials.

UCDP
Section II
Module Resources

Establishing Expertise

Training Levels

The levels of training for powerline technicians are as follows:

1. Underground Technician I
2. Underground Technician II
3. Underground Technician III
4. Underground Journeyman (Level IV)

Following the successful completion of each level of the program, students receive a certificate of completion from ElectriCities. No certificate will be issued by ElectriCities for Journeyman level until all requirements of schools attended or hands-on testing has been satisfied.

Registration/Enrollment

As of July 1, 2019, registration cost is \$599.00 per student for Members and for Associate members \$899.00. All students must be registered through ElectriCities before being considered eligible to participate in the Underground Career Development Program (see Appendix A, Registration Form). A separate registration form is required for each level of the training program; however, more than one student may be registered per level using a single registration form. Completed forms must be signed by the municipality's training coordinator and returned to ElectriCities, 1427 Meadow Wood Blvd., Raleigh, NC 27604. See the registration form for billing details or contact the ElectriCities Program Director or the ElectriCities Safety & Training Technician.

Testing Procedures

Each module is divided into various subtopics called segments. After each segment, the student manual provides a quiz to verify the student's comprehension of the subject matter. A comprehensive online quiz is a mandatory requirement for completion of each module. Each student must pass the module quiz with a minimum score of 80% to complete the module. This practice will ensure understanding of the subject material and will greatly enhance the student's probability of passing the final exam.

Pretesting Requirements

The municipality's program coordinator must notify the ElectriCities Program Director at least 30 days prior to the desired date. **All necessary forms must be filed and approved by the ElectriCities Program Director 30 days prior to testing.**

Program Coordinator shall ensure that students have completed all modules and FPR sheets are signed by student's direct supervisor. These forms must be provided to the ElectriCities Program Director before testing. Conversely, students could complete the tasks requirements and still have additional modules to view prior to qualifying for the final test. Testing cannot take place until the student has successfully completed all pretesting requirements, completion of modules, and demonstrated proficiency in all assigned hands-on tasks (Field Performance Requirement Sheets).

Note: All program forms must be approved and filed with the ElectriCities Program Director 30 days prior to testing:

- Module Completion Forms (online)
- FPR Sheets (online)

For the student that completes only the classroom portion and not able to complete all other requirements, a classroom only certificate will be given (Appendix J2). This certificate may be upgraded to a certificate of completion if the student completes all requirements at a later date (Appendix J1).

The following procedures ensure integrity during testing for each level:

1. All program forms are received and filed by the ElectriCities Program Director 30 days prior to testing.
2. Online tests are administered to students by an ElectriCities Safety and Training staff member.
3. An ElectriCities staff member is present during the entire test.
4. The test results will be immediately available to the student upon completion of the test. ElectriCities staff can review the questions missed with the student.
5. Students may ask test administrator for clarification on test questions when needed.

Online Test

The time required to complete testing for each phase is **two hours**. Several tests have been compiled, each containing 100 questions. A minimum score of 70 percent correct answers is required to receive a passing grade.

Place Out Procedure

In the event a student for the Underground Career Development Program can document the required experience for the level in question, the student may be eligible to "Place Out" of the level and advance to the next level. Eligibility requirements include completion of modules in that level as well as FPR sheets completed by direct supervisor. Once the eligibility requirements have been met and all forms submitted, an ElectriCities staff member will administer the test. A Place Out Test Request Form (see Appendix M) and Verification of Previous Field Experience (see Appendix L) must be completed with the appropriate supervision verifying the student's experience and signed by the municipality's training coordinator and then forwarded to ElectriCities prior to any testing.

The minimum distribution electric system line work experience requirements for each level are as follows:

Powerline Technician I – Two years of line work experience or completion of an accredited underground school.

Powerline Technician II – Four years of line work experience.

Powerline Technician III – Six years of line work experience with the demonstrated ability to work without close supervision.

Journeyman Underground – Eight years of line work experience, one of which must have been in a supervisory capacity, such as a crew leader, etc. or a lead lineman who has conducted hands-on shoulder training of an apprentice lineman.

Place out tests cost \$599.00 per level, per student. All necessary requirements must be met according to the Underground Career Development Program guidelines.

When an employee is eligible to take a “place out” test, the following shall be completed:

Verification of previous field experience/employment form (Appendix L). Place out test request form (Appendix N). Completion of all modules and FPR Sheets signed by direct supervisor.

If a student has demonstrated satisfactory completion of the prerequisites outlined above, the student can be tested beginning with the Powerline Technician I examination. The minimum passing grade for all examinations in the Underground Career Development Program is 70 percent correct. Following successful completion of each exam, the students may qualify to proceed to the next level. Each student will be given only **one** opportunity to place out of any level. Students must enter the Underground Career Development Program at the level they unsuccessfully fail to complete.

The participating student, once enrolled for Level I Place Out Test, will have thirty (30) days upon successful completion to schedule each test. Example: if you have the time and experience to place out in all four levels, the following would apply: thirty days for Level I, thirty days for Level II, thirty days for Level III, thirty days for Journeyman, consecutively. For example: if you begin your Level I Place Out Test on September 1, 2009 you would have until January 1, 2010 to complete all four levels. If you do not meet this time schedule, you will be enrolled in the level that you are currently working on.

Retesting Procedures

Should the student not pass the test on the first try, the municipality may retest the student no sooner than two months and no later than six months after initial testing.

After completing each module, all module completion forms must be re-submitted. The student's previous FPR Sheet training requirements are carried over when the student re-registers in the program. The student should retest within twelve to twenty-four months for the particular level.

If the student cannot successfully comply with these retesting procedures, the student is ineligible to continue in the program. The utility director may elect to reinstate the student only after the student has been out of the program for twelve months. The student may be signed up in the last level he did not complete satisfactorily and start from the beginning, completing all necessary requirements.

Hands-On Test

The Hands-On Test is required at the end of Level 4 if the student has not attended the required schools. (See page II-10 for required schools.) A municipality may elect to request a hands-on test as an additional resource. This test is in addition to the required written test. See Appendix O for registration form. Before requesting the Hands-On Test for a particular level, the student must first pass the required written test for the level requested.

See “Certification” section for additional information on Hands-On Testing.

NOTE: Electricities will not issue a certificate for the Journeyman level until all required schools or hands-on test requirements are completed as stated on page II-10.

NOTE: Hands-on testing shall not be conducted sooner than ten (10) working days after successful completion of a written test for a particular level.

NOTE: The first hands-on test is free to the municipalities. Additional tests are at a cost of \$549 per student.

Retesting Procedures for Hands-On Test

Should the student not pass the test on the first try, the municipality may retest the student no sooner than two months and no later than six months after initial testing. Should the student not pass the first test, the municipality may withdraw the student from the program or enroll the student to re-take that level a second time at a \$599.00.

Relocation

If a student enrolls in the program and then relocates to another municipality, the student will receive full credit for hours and modules completed. These records are forwarded to the ElectriCities Program Director. A student relocating to another municipality retains credit for past module completions and may continue in the LCDP if:

1. The Release of Student Information Authorization Form (Appendix K) is signed.
2. Re-registration occurs within two months of registration in the last class.

Certification

The ElectriCities Program Director and the North Carolina Department of Community Colleges (at completion of program) will issue certificates (refer to Appendix J for a copy of the ElectriCities Certificate of Completion) when the following steps have been completed:

Note: Each city/town is responsible for enrolling their employees with NC Department of Community Colleges.

Note: NC Department of Commerce Stipulations

1. Satisfactorily complete the assigned modules.
2. Pass the online examination with a score of 70 percent correct or higher.
3. Provide documentation with the proper signatures that states the student has satisfactorily performed the required hours of assigned general job hours, FPR Sheets and related classroom training sheets.
4. Have all completed powerline technician training records on file at ElectriCities. (list documentation required)
5. Complete the required Hands-On Test or ElectriCities schools.

NOTE: Only forms provided in this manual will be accepted.

A. The following criteria must be met before a Certificate of Completion for the program is awarded:

Four of the following schools must be completed by the student or a hands-on test will be given at the completion of Level four:

- Climbing School
- Basic Lineman School
- Basic Underground School
- Intermediate Lineman School
- Advanced Underground School
- Substation Operations School
- Transformer School
- Safety Seminar/OSHA Workshop

- Note:** An exception to attending the ElectriCities schools would be as follows: LCDP Working Group and an appointed Board of Test Administrators will test the student's ability to perform line work. This will be a hands-on test. The LCDP Working Group will appoint the Board of Test Administrators. A Test Administrator cannot participate from the same location that the student is being tested.
- B. If a student elects to place out and does not successfully complete one of the place out tests, he will then enter the program at that particular level.

Policy Dispute

- In the event of a policy dispute regarding the implementation of the program, a letter of appeal must be forwarded to the LCDP Coordinator requesting the dispute be resolved. Following consideration of the facts, the working group will rule on the dispute. The ruling of the working group is final.

UCDP
Section III
Module Resources

Module Resources

Selected modules have been assigned to each level of the program. Because each module is viewed once, it is important for the students to pay close attention in order to receive the maximum benefit before proceeding on to another module.

In order to receive a module, a Module Request Form (Appendix B) must be filled out by the municipality's training coordinator and submitted to the ElectriCities Safety & Training Technician. The module identification numbers, listed in this section, are used when ordering a specific module.

The municipality's training coordinator must fill out the Module Certificate of Completion Form when a student has completed a module. The identification number of the module completed must appear on the Module Certificate of Completion Form. This form must also have the proper signatures and is returned to the ElectriCities Safety & Training Technician.

Module titles and their identification numbers are on the following pages.

Module Listings

Underground Technician I (Level 1)

| | Module ID# |
|--|-------------------|
| 1. Safe Bucket Truck Operations..... | M100 |
| 2. Climbing Wooden Poles | M105 |
| 3. Using Tools | M110 |
| 4. Hydraulic Derricks | M115 |
| 5. Basic Electricity Theory..... | M120 |
| 6. Alternating Current Fundamentals | M125 |
| 7. Safety in Meter Work | M135 |
| 8. Introduction to Transmission and Distribution Systems..... | M150 |
| 9. Using Line Test Equipment..... | M155 |
| 10. Rigging 1 | M170 |
| 11. Cable Splicing 1 | M250 |
| 12. Overhead Troubleshooting 1 | M200 |
| 13. Safety in Overhead Line Maintenance..... | M265 |
| 14. American Public Power Association (APPA) Safety Manual | |

Module Listings

Underground Technician II (Level 2)

| | Module ID# |
|--|-------------------|
| 1. Distribution..... | M215 |
| 2. Electrical Safety | M140 |
| 3. Multimeter Operation and Use | M400 |
| 4. URD Troubleshooting | M360 |
| 5. Safety in Transmission and Distribution Maintenance | M145 |
| 6. Service Installation | M160 |
| 7. Transformer Connections..... | M345 |
| 10. Troubleshooting Overhead Lines..... | M500 |
| 11. Underground Cable Installation | M335 |
| 12. Underground Residential Distribution Systems | M505 |
| 13. Cable Splicing 2..... | M510 |
| 14. Safety in Underground Line Maintenance..... | M370 |
| 15. American Public Power Association (APPA) Safety Manual | |

Module Listings

Underground Technician III (Level 3)

| | Module ID# |
|--|-------------------|
| 1. Locating Secondary Faults..... | M245 |
| 2. Overhead Troubleshooting 2 Emergency Conditions..... | M205 |
| 3. Pad Mounted Transformers & Switchgear | M420 |
| 4. Care and Testing of Tools and Equipment | M130 |
| 5. Circuit Breakers 1 | M465 |
| 6. Introduction to Metering..... | M300 |
| 7. Distribution Line Repair (Gloves) | M355 |
| 8. Rigging 2..... | M210 |
| 9. Safety in Substation & Switchyards..... | M230 |
| 10. Cable Terminations..... | M515 |
| 11. Voltage Regulators 1 | M435 |
| 12. Transformer Troubleshooting | M350 |
| 13. American Public Power Association (APPA) Safety Manual | |

Module Listings

Journeyman (Level 4)

| | Module ID# |
|--|-------------------|
| 1. Locating Primary Faults | M365 |
| 2. Control Equipment | M455 |
| 3. Relays 1 | M450 |
| 4. Power Quality | M415 |
| 5. System Monitoring and Protection | M320 |
| 6. Substation & Switchyards..... | M235 |
| 7. Voltage Regulator 2 | M440 |
| 8. Relays 2..... | M520 |
| 9. High Voltage Terminations | M525 |
| 10. Capacitors and Reactors | M460 |
| 11. American Public Power Association (APPA) Safety Manual | |

UCDP
Section IV
Task Requirements

Hourly Recording Procedures

The cornerstone of this program is the successful completion and documentation of the FPR sheet. Keeping track of job hours and the maintenance of records over time is required by the North Carolina Department of Community Colleges apprenticeship program. Each program student and their immediate supervisor are responsible for the maintenance of these records.

A Underground Technician must complete the assigned criteria for field performance requirements and related training for the level the student is training in before being qualified to receive a certificate of completion and proceeding to the next level. This criteria shall be documented on the forms provided in this manual as listed below.

For the program there is a General Job Hours form (**Appendix D, E, F, G, H, M**) to keep track of hours and tasks.

These hourly forms and FPR sheets must be signed by the student and their immediate supervisor. No signature or form is valid, however, without the witness signatures of the utility director and the ElectriCities Program Director.

No certificate will be issued without the proper records and the authorized signatures. Only approved forms provided in this manual will be accepted.

In the event that the student reports directly to the city manager or clerk, both the student and manager's signatures are required. Anyone authorized to substitute to sign off on the hourly forms must have the Designation of Authorized Signatures Form (Appendix I) filled out. The student's signature alone is not acceptable.

Descriptions of task requirements for each level are on the following pages.

NOTE: Municipalities shall not grant or give credit hours to an employee, regardless of experience, unless “placing out” of a particular level. Documentation begins upon entry into the program.

NOTE: Hourly forms are to be filled out on a daily basis. Testing will not be conducted until the “Hourly Forms” have been sent to ElectriCities for review.

**General Job Hours
Group A**

| Task Requirements |
|---|
| Identify equipment, line material, and the proper / safe use of tools and equipment I.D. height / class of poles, assist in loading / unloading poles. Hand and machine dig holes, backfill, identify install and remove various anchors / guy wires and attachments. Install pole grounds and ground rods accordingly. |
| Demonstrate proper use of company radio / telephone under normal conditions, perform operational checks on line truck and related equipment, operate bucket truck up / down using ground controls. |
| Climb wooden poles, physically examine and air test personal rubber gloves, rig block & tackle to install transformer by hand. Identify rope, tie knots, demonstrate use. |
| Direct traffic using proper signals / signs, PPE. Install work zone traffic control. |
| First Aid / CPR (demonstrate skills) and proper use of radio / telephone in emergency conditions. |
| Assist troubleshooting, installing, and removing overhead and pad mounted transformers, bushings, switches, wire used for make up and connectors. Demonstrate safe work practice. (de-energized) |
| Assist in street / area light installation and removal. |
| Assist in URD construction & maintenance. Demonstrate safe work practice. |
| Assist in pole framing and setting loading and unloading poles, stringing and installing wire / cable. Demonstrate safe work practice. |
| Demonstrate and use Volt-Ohm and phase meter and identify and read watt-hour and demand meters. |
| Related work as required. |

**General Job Hours
Group B**

| Task Requirements |
|---|
| Troubleshoot overhead lines in outage situation, splice & connect de-energized overhead conductors. De-energize lines and equipment – (lock out / tag out). |
| Inspect, frame, and install poles. Climb wooden poles. |
| Install underground and overhead service. |
| Install and remove transformers, include 3 phase transformers, banks, pad mounted and URD transformers. |
| Troubleshoot, install, prep and splice URD primary cable. De-energize lines and locate URD Secondary Faults equipment – (lock out / tag out). |
| Demonstrate proper cover up on primary's and secondary's, work energized conductors 600 volts and below. |
| Street and aerial light installation. |
| CPR / First Aid. |
| Perform pole top, bucket and vault rescue. |
| Participate in safety meetings, develop and conduct two meetings that pertain to electrical safety. Review and study APPA Safety Manual, study and review NESC clearance / grounding. Review and study underground & overhead circuits (blueprints) of municipal electrical system. Review and study underground & overhead circuits (blueprints) of municipal electrical system. |
| Install cutouts and reclosers. |
| Proper rigging to install / change out transformers and replace cross arms. |
| Related work as required. |

**General Job Hours
Group C**

| Task Requirements |
|--|
| Install personal protective grounds on any given location on a distribution system as well as in substations. |
| Install / remove single phase and 3 phase transformers / banks, and assist in sizing and design of current and potential transformers. |
| Locate and repair damaged URD cable, primary / secondary. |
| Install / replace damaged hardware on overhead system. |
| Troubleshoot overhead lines during system outages. |
| Inspect, install / remove, frame poles, install / remove down guys, guards & anchors. |
| Climb and perform work on wooden poles. |
| Work from bucket truck. |
| Work on energized conductors over 600 volts. |
| Install overhead conductors. |
| Assist in switching operations and substation maintenance. |
| Install services. |
| Practice first aid – CPR. |
| Hold job briefing (tailgate discussion). |
| Related work as required. |

**General Job Hours
Group D**

| Task Requirements |
|--|
| Calculate fuse size, transformer size for system / customer needs. This may require working with Engineering Dept. |
| Write and execute switching orders / assignments. |
| Participate in two ElectriCities / NCAMES schools. |
| Train less experienced personnel on LCDP tasks, hands-on shoulder training and troubleshooting overhead and underground systems. Participate in related class instruction. |
| Install / remove and frame poles; anchors and down guys. |
| Install / remove transformer, (1 phase, 3 phase, and banks) Install / remove capacitors, Ct. and Pts. |
| Install overhead and underground conductors. |
| De-energize lines and equipment (lock out / tag-out). |
| Practice and participate in training for pole top, bucket truck and vault rescue procedures and techniques. |
| Infrared monitoring and multimeter use. |
| Practice first aid / CPR. |
| Conduct effective safety meetings. |
| Related work as required. |

**UCDP
Section V
Appendices**

Appendix A - Program Registration Form

| | |
|---|-----|
| List names of students registering for this program and indicate training level. Please Use Proper Name – No Nicknames | |
| 1. | 7. |
| 2. | 8. |
| 3. | 9. |
| 4. | 10. |
| 5. | 11. |
| 6. | 12. |
| Level I <input type="checkbox"/> Level II <input type="checkbox"/> Level III <input type="checkbox"/> Journeyman <input type="checkbox"/> | |

Name of municipality _____

Name of training coordinator _____

Telephone number (_____) _____

Registration Fee:

Registration fee is \$599.00 for each student. Fee includes cost for student manuals, instructor's guide, DVDs, and shipping costs.

A check made out to ElectriCities of North Carolina, Inc. is enclosed.

Please bill.

Training Coordinator Acknowledgment:

To the best of my knowledge the above information is accurate, and I agree to abide by the conditions of the Underground Career Development Program.

Signature: _____ Date _____

Municipal Training Coordinator

Mailing Instructions:

Return this form and payment to:
 ElectriCities of North Carolina, Inc.
 Safety and Training Technician
 1427 Meadow Wood Blvd.
 Raleigh, NC 27604

Appendix B - Module Request Form

Name of municipality _____

Name of training coordinator _____

Telephone number _____

| List Module Title and I.D. number requested, and check appropriate training | | | |
|---|--|---|--|
| | | | |
| | | | |
| | | | |
| Level I <input type="checkbox"/> | Level II <input type="checkbox"/> | Level III <input type="checkbox"/> | Journeyman <input type="checkbox"/> |

Mail module along with Certification of Module Completion Form within three weeks from date module is received.

Waiver:

I request the modules above and agree to adhere to the above. Further, I understand the conditions for the Underground Career Development Program and agree to abide by them.

Signature: _____ Date _____

Municipal Training Coordinator

Mailing Instructions:

Return form to: ElectriCities of North Carolina, Inc.
 Safety and Training Technician
 1427 Meadow Wood Blvd.
 Raleigh, NC 27604

Appendix C1 Module Completion Certification Form

| Module ID Number | Module Title | Date Class Held | Overall Grade Pass or Fail | Hours |
|------------------|--|-----------------|----------------------------|-------|
| M150 | Introduction to Transmission and Distribution | | | 8 |
| M120 | Basic Electricity | | | 8 |
| M125 | Alternating Current Fundamentals | | | 8 |
| M110 | Using Tools | | | 8 |
| M100 | Safe Bucket Truck Operations | | | 10 |
| M115 | Hydraulic Derricks | | | 8 |
| M135 | Safety in Meter Work | | | 8 |
| M105 | Climbing Wooden Poles | | | 8 |
| M265 | Safety in Overhead Line Maintenance | | | 10 |
| M155 | Using Line Test Equipment 1 | | | 4 |
| M200 | Overhead Troubleshooting 1 | | | 10 |
| M170 | Rigging 1 | | | 8 |
| M250 | Cable Splicing 1 | | | 8 |
| | APPA Safety Manual (Definitions and General Rules) | | | |

106

Certification:

Students Proper Name (no nicknames): _____

I certify that the above information is correct to the best of my knowledge.

Date Completed: _____

Municipal Training Coordinator: _____

Name of Municipality: _____

Mailing Instructions:

Return form and DVD to:

ElectriCities of North Carolina, Inc.
 Safety and Training Technician
 1427 Meadow Wood Blvd.
 Raleigh, NC 27604

**A module consists of a DVD, student manual, and an instructor's guide*

Appendix C2 Module Completion Certification Form

| Module ID Number | Module Title | Date Class Held | Overall Grade Pass or Fail | Hours |
|------------------|---|-----------------|----------------------------|-------|
| M215 | Distribution | | | 8 |
| M140 | Electrical Safety | | | 8 |
| M400 | Multimeter Operations and Use | | | 8 |
| M360 | Underground Residential System Troubleshooting | | | 10 |
| M145 | Safety in Transmission and Distribution Maintenance | | | 8 |
| M160 | Service Installation | | | 5 |
| M345 | Transformer Connections | | | 10 |
| M500 | Troubleshooting Overhead Lines | | | 10 |
| M335 | Underground Cable Installation | | | 8 |
| M505 | Underground Residential Distribution Systems | | | 10 |
| M510 | Cable Splicing 2 | | | 8 |
| M370 | Safety in Underground Line Maintenance | | | 10 |
| | APPA Safety Manuals (Health and Environmental Control and Chemical and Physical Hazard Control) | | | |

Certification:

103

Students Proper Name (no nicknames): _____

I certify that the above information is correct to the best of my knowledge.

Date Completed: _____

Municipal Training Coordinator: _____

Name of Municipality: _____

Mailing Instructions:

Return form and DVD to:

ElectriCities of North Carolina, Inc.
 Safety and Training Technician
 1427 Meadow Wood Blvd.
 Raleigh, NC 27604

**A module consists of a DVD, student manual, and an instructor's guide*

Appendix C3 Module Completion Certification Form

| Module ID Number | Module Title | Date Class Held | Overall Grade Pass or Fail | Hours |
|------------------|--|-----------------|----------------------------|-------|
| M245 | Locating Secondary Faults | | | 8 |
| M205 | Overhead Troubleshooting 2 (Emergency Conditions) | | | 10 |
| M420 | Pad Mount Transformer and Switch Gear | | | 10 |
| M130 | Care and testing of Tools and Equipment | | | 8 |
| M465 | Circuit Breakers 1 | | | 10 |
| M300 | Introduction to Metering | | | 8 |
| M355 | Distribution Line Repair (Gloves) | | | 10 |
| M210 | Rigging 2 | | | 8 |
| M230 | Safety in Substations and Switchyards | | | 8 |
| M515 | Cable Terminations | | | 8 |
| M435 | Voltage Regulator 1 | | | 10 |
| M350 | Transformer Troubleshooting | | | 8 |
| | APPA Safety Manuals (PPE and Electrical Utility Operations 501 – 506.10) | | | |

Certification:

106

Students Proper Name (no nicknames): _____

I certify that the above information is correct to the best of my knowledge.

Date Completed: _____

Municipal Training Coordinator: _____

Name of Municipality: _____

Mailing Instructions:

Return form and DVD to:

ElectriCities of North Carolina, Inc.
 Safety and Training Technician
 1427 Meadow Wood Blvd.
 Raleigh, NC 27604

**A module consists of a DVD, student manual, and an instructor's guide*

Appendix C4 Module Completion Certification Form

| Module ID Number | Module Title | Date Class Held | Overall Grade Pass or Fail | Hours |
|------------------|---|-----------------|----------------------------|-------|
| M455 | Control Equipment | | | 10 |
| M450 | Relays 1 | | | 8 |
| M365 | Locating Primary Faults | | | 10 |
| M440 | Voltage Regulator 2 | | | 10 |
| M320 | System Monitoring and Protection | | | 8 |
| M235 | Substations and Switchyards | | | 8 |
| M460 | Capacitors and Reactors | | | 8 |
| M415 | Power Quality | | | 10 |
| M520 | Relays 2 | | | 8 |
| M525 | High Voltage Terminations | | | 10 |
| | APPA Safety Manual (Electrical Utility Operations 507 – 512.13) | | | |

90

Certification:

Students Proper Name (no nicknames): _____

I certify that the above information is correct to the best of my knowledge.

Date Completed: _____

Municipal Training Coordinator: _____

Name of Municipality: _____

Mailing Instructions:

Return form and DVD to:

ElectriCities of North Carolina, Inc.
 Safety and Training Technician
 1427 Meadow Wood Blvd.
 Raleigh, NC 27604

**A module consists of a DVD, student manual, and an instructor's guide*

Appendix D

Month:

| Days | Group A | Group B | Group C | Group D | Vac/Sick/OT/Hol |
|--|---------|---------|---------|---------|-----------------|
| 1 | | | | | |
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| 28 | | | | | |
| 29 | | | | | |
| 30 | | | | | |
| 31 | | | | | |
| Line Total | | | | | |
| Total Hours Worked (A, B, C, D) | | | | | |
| Previous Work Hours | | | | | |
| Total Hours Worked | | | | | |

Students Signature Date

Coordinator's signature Date

Supervisor's Signature Date

Director's Signature Date

Appendix E
General Job Hours
Group A

| Task Requirements |
|---|
| Identify equipment, line material, and the proper / safe use of tools and equipment I.D. height / class of poles, assist in loading / unloading poles. Hand and machine dig holes, backfill, identify install and remove various anchors / guy wires and attachments. Install pole grounds and ground rods accordingly. |
| Demonstrate proper use of company radio / telephone under normal conditions, perform operational checks on line truck and related equipment, operate bucket truck up / down using ground controls. |
| Climb wooden poles, physically examine and air test personal rubber gloves, rig block & tackle to install transformer by hand. Identify rope, tie knots, demonstrate use. |
| Direct traffic using proper signals / signs, PPE. Install work zone traffic control. |
| First Aid / CPR (demonstrate skills) and proper use of radio / telephone in emergency conditions. |
| Assist troubleshooting, installing, and removing overhead and pad mounted transformers, bushings, switches, wire used for make up and connectors. Demonstrate safe work practice. (de-energized). |
| Assist in street / area light installation and removal. |
| Assist in URD construction & maintenance. Demonstrate safe work practice. |
| Assist in pole framing and setting loading and unloading poles, stringing and installing wire / cable. Demonstrate safe work practice. |
| Demonstrate and use Volt-Ohm and phase meter and identify and read watt-hour and demand meters. |
| Related work as required. |

Appendix F
General Job Hours
Group B

| Task Requirements |
|---|
| Troubleshoot overhead lines in outage situation, splice & connect de-energized overhead conductors. De-energize lines and equipment – (lock out / tag out). |
| Inspect, frame, and install poles. Climb wooden poles. |
| Install underground and overhead service. |
| Install and remove transformers, include 3 phase transformers, banks, pad mounted and URD transformers. |
| Troubleshoot, install, prep and splice URD primary cable. De-energize lines and locate URD Secondary Faults equipment – (lock out / tag out). |
| Demonstrate proper cover up on primary's and secondary's, work energized conductors 600 volts and below. |
| Street and aerial light installation. |
| CPR / First Aid. |
| Perform pole top, bucket and vault rescue. |
| Participate in safety meetings, develop and conduct two meetings that pertain to electrical safety. Review and study APPA Safety Manual, study and review NESC clearance / grounding. Review and study underground & overhead circuits (blueprints) of Municipal electrical system. |
| Install cutouts and reclosers. |
| Proper Rigging to install / change out transformers and replace cross arms. |
| Related work as required. |

Appendix G
General Job Hours
Group C

| Task Requirements |
|--|
| Install personal protective grounds on any given location on a distribution system as well as in substations. |
| Install / remove single phase and 3 phase transformers / banks, and assist in sizing and design of current and potential transformers. |
| Locate and repair damaged URD cable, Primary / Secondary. |
| Install / replace damaged hardware on overhead system. |
| Troubleshoot overhead lines during system outages. |
| Inspect, install / remove, frame poles, install / remove down guys, guards & anchors. |
| Climb and perform work on wooden poles. |
| Work from bucket truck. |
| Work on energized conductors over 600 volts. |
| Install overhead conductors. |
| Assist in switching operations and substation maintenance. |
| Install services. |
| Practice First Aid – CPR. |
| Hold job briefing (tailgate discussion). |
| Related work as required. |

Appendix H
General Job Hours
Group D

| Task Requirements |
|--|
| Calculate fuse size, transformer size for system / customer needs. This may require working with Engineering Dept. |
| Write and execute switching orders / assignments. |
| Participate in two ElectriCities / NCAMES schools. |
| Train less experienced personnel on LCDP tasks, hands-on shoulder training and troubleshooting overhead and underground systems. Participate in related class instruction. |
| Install / remove and frame poles; anchors and down guys. |
| Install / remove transformer, (1 phase, 3 phase, and banks). Install / remove capacitors, Ct and Pt. |
| Install overhead and underground conductors. |
| De-energize lines and equipment (lock out tag-out). |
| Practice and participate in training for pole top, bucket truck and vault rescue procedures and techniques. |
| Infrared monitoring and multimeter use. |
| Practice first aid / CPR. |
| Conduct effective safety meetings. |
| Related work as required. |

Appendix I – Designation of Authorized Signatures Form

Name of Student: _____
(Please Use Proper Name – No Nicknames)

Municipality: _____

Student Name: _____

The above named student has been employed as a lineman for our Municipality:

from _____ **to** _____
(month) (day) (year) (month) (day) (year)

He also has been employed by other electric department employers for a total of _____ and _____.
(years) (months)

Hands-On Test Requested - Check Appropriate Box:

- Underground Technician I
- Underground Technician II
- Underground Technician III
- Underground Journeyman

The above student has met the minimum distribution electric system experience requirements as outlined in this manual. He has also passed the written test for the level requested.

Municipal Training Coordinator _____
(signature)

Municipal Supervisor _____
(signature)

Student _____
(signature)

Appendix J1 – Certificate of Level Completion



Appendix J2 – Certificate of Classroom Only Completion



Appendix K - Release of Student Information Authorization Form

Please forward to Electricities a copy of my written exam, FPR Sheets, hands-on exam, and a list of modules I have completed.

| | | | |
|--|--|---|--|
| Please Use Proper Name – No Nicknames | | | |
| Name | | | |
| Title | | | |
| Municipality | | | |
| Address | | | |
| City | State | Zip Code | |
| Level I <input type="checkbox"/> | Level II <input type="checkbox"/> | Level III <input type="checkbox"/> | Journeyman <input type="checkbox"/> |

Waiver:

I understand that I cannot hold Electricities responsible for information released to a prospective employer.

Confidentiality:

I understand that this authorization form is considered confidential and photocopying is not permitted.

Authorization: (See Note Below) **Please Use Proper Name – No Nicknames**

_____ Date _____
 Student

_____ Date _____
 Municipal Training Coordinator

_____ Date _____
 Electricities Manager, Safety & Training

Mailing Instructions:

Return form to:

Electricities of North Carolina, Inc.
 Safety and Training Technician
 1427 Meadow Wood Blvd.
 Raleigh, NC 27604

Appendix L - Verification of Previous Field Experience / Employment Form

TO: _____

FROM: _____

DATE: _____

SUBJECT: Verification of Previous Field Experience / Employment

I _____, am presently employed by
Please Use Proper Name – No Nicknames

City / Town of _____

Please verify my employment as a lineman for your company

from _____ **to** _____
(month) (day) (year) (month) (day) (year)

This form acknowledges the length of time employed, not the student's qualifications. Without appropriate signatures, this document is invalid.

Signatures:

Name

Title

Date

- A copy of this form must be made available to Electricities before the student can be given an opportunity to place out on the first level of the program.
- Amount of years in service cannot substitute this form.
- This form is to be completed when a student elects to take a "Place Out Test".

Appendix M – ElectriCities Schools Attended Form

144 Hours Required Per Level of Training

Month:

| Days | Activity Descriptions | Total Hours |
|--------------|--|-------------|
| | Training Hours Received from Module Completion Form Level 1 (106), Level 2 (103), Level 3 (106), Level 4 (90) | |
| 1 | | |
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| 30 | | |
| 31 | | |
| Total | | |

Students Signature Date

Coordinator's signature Date

Supervisor's Signature Date

Director's Signature Date

Appendix N – Place Out Test Request Form

Name of Student: _____

Please Use Proper Name – No Nicknames

Municipality: _____

The above named student has been employed as a lineman for our Municipality:

from _____ **to** _____
(month) (day) (year) (month) (day) (year)

for a total duration of _____ and _____.
(years) (months)

The student also has been employed by other employers for a total duration of:
_____ and _____.
(years) (months)

(See Appendix M - Verification of Previous Field Experience / Employment Form.)
Registration Fee: \$599.00 per level. Fee to be applied to the \$599.00 enrollment fee if the place out test is not successful.

Place Out Level Requested - Check Appropriate Box:

- Underground Technician I
- Underground Technician II
- Underground Technician III
- Underground Journeyman

The above student has met the minimum distribution electric system experience requirements as outlined in the Place Out Procedures on page II-4 of the Program Procedures Manual.

Municipal Coordinator Signature _____

Municipal Supervisor Signature _____

Municipal Utility Director Signature _____

Appendix O - Hands-On Test Request Form

Name of Student: _____

Please Use Proper Name – No Nicknames

Municipality: _____

The above named student has been employed as a lineman for our Municipality:

from _____ **to** _____
(month) (day) (year) (month) (day) (year)

The student also has been employed by other electric department employers for a total of _____ and _____.
(years) (months)

Hands-On Test Requested - Check Appropriate Box:

- Underground Technician I
- Underground Technician II
- Underground Technician III
- Underground Journeyman

The above student has met the minimum distribution electric system experience requirements as outlined in this manual and has also passed the written test for the level requested.

Municipal Training Coordinator _____
(signature)

Municipal Supervisor _____
(signature)

Student _____
(signature)

(Please Use Proper Name – No Nicknames)