

AIR FORCE QUALIFICATION TRAINING PACKAGE (AFQTP)



FOR
ELECTRICAL SYSTEMS
(3E0X1)

MODULE 11

AFSC SPECIFIC SAFETY STANDARDS

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Career Field Education and Training Plan (CFETP) references from 1 Jul 02 version.

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Notice. This AFQTP is NOT intended to replace the applicable technical references nor is it intended to replace hands-on training. It is to be used in conjunction with these for training purposes only.

AIR FORCE QUALIFICATION TRAINING PACKAGES
FOR
ELECTRICAL SYSTEMS
(3E0X1)

INTRODUCTION

Before starting this AFQTP, refer to and read the [“AFQTP Trainer/Trainee Guide”](#).

AFQTPs are mandatory and must be completed to fulfill task knowledge requirements on core and diamond tasks for upgrade training. **It is important for the trainer and trainee to understand** that an AFQTP **does not** replace hands-on training, nor will completion of an AFQTP meet the requirement for core task certification. AFQTPs will be used in conjunction with applicable technical references and hands-on training.

AFQTPs and Certification and Testing (CerTest) must be used as minimum upgrade requirements for Diamond tasks.

MANDATORY minimum upgrade requirements:

Core task:

AFQTP completion
Hands-on certification

Diamond task:

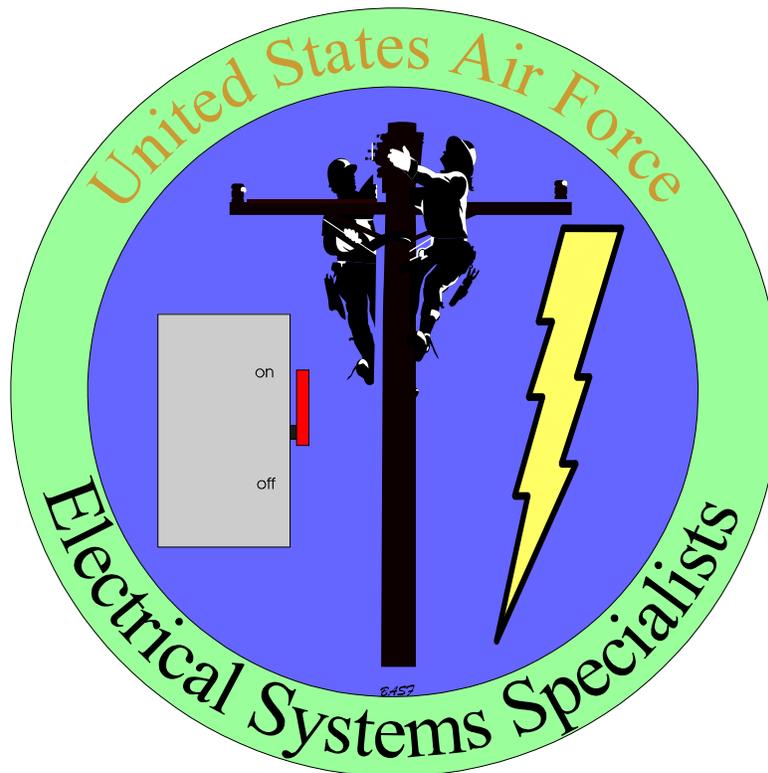
AFQTP completion
CerTest completion (80% minimum to pass)

Note: Trainees will receive hands-on certification training on diamond tasks when equipment becomes available either at home station or at a TDY location.

Put this package to use. Subject matter experts, under the direction and guidance of HQ AFCESA/CEOF, revised this AFQTP. If you have any recommendations for improving this document, please contact the Career Field Manager at the address below.

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ELECTRICAL FACILITIES SAFE CLEARANCE FORMS

USE AF FORM 269

MODULE 11

AFQTP UNIT 1

WHEN SWITCHING (11.1.3.1.)

WHEN BLOCKING AND TAGGING (11.1.3.2.)

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**USE AF FORM 269 WHEN PERFORMING SWITCHING AND BLOCKING AND
TAGGING**

Task Training Guide

STS Reference Number/Title:	11.1.3.1., Use AF Form 269 when switching. 11.1.3.2., Use AF Form 269 when blocking and tagging. ()
Training References:	<ol style="list-style-type: none"> 1. Career Development Course (CDC) Electrical Systems 3E051A Vol. 1, Unit 4-1, <i>AF Occupational Safety and Health Program</i>. 2. Air Force Instructions (AFI) 32-1064, <i>Electrical Safety Practices</i>. 3. Air Force Manual (AFMAN) 32-1185, <i>Electrical Worker Safety</i>.
Prerequisites:	<ol style="list-style-type: none"> 1. Possess as a minimum a 3E051 AFSC. 2. Review the following references: <ol style="list-style-type: none"> 2.1. CDC Electrical Systems 3E051A, Vol. 1, Unit 4-1. 2.2. AFI 32-1064. 2.3. AFMAN 32-1185.
Equipment/Tools Required:	AF Form 269, Electrical Facilities Safe Clearance.
Learning Objective:	Use AF Form 269 correctly.
Samples of Behavior:	<ol style="list-style-type: none"> 1. Understand how to use AF Form 269, Electrical Facilities Safe Clearance, and follow the procedures exactly. 2. Know safety requirements associated with using AF form 269, Electrical Facilities Safe Clearance.
Notes:	
Any safety violation is an automatic failure.	

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USE AF FORM 269 WHEN PERFORMING SWITCHING AND BLOCKING AND TAGGING

1. Background: Other than taking voltage and current measurements, whenever a distribution system must be worked on, it must be done under an Electrical Facilities Safe Clearance (AF Form 269). The primary use for the AF Form 269 is switching of primary distribution lines. The safe clearance establishes a set of procedures that must be followed to turn the power off as well as to restore power after work is completed. The Base Civil Engineering Operations Flight Chief is responsible for safe clearance procedures. Following these procedures will let you work on lines and equipment in a safe manner. The AF Form 269 is used to record all switching, blocking, tagging, and grounding actions. It is very important that everyone understands how to read the form and follow the procedures exactly

2. The following information will be annotated on the AF Form 269 prior to performing switching:

2.1. Block 1: Record number.

2.1.1. A consecutive number, taken from the records maintained by the Electrical Safe Clearance Manager or Chief of Operations. It is used to keep track of the exact number and sequence of clearances issued. (See Figure 1)

2.2. Block 2: Other clearance numbers.

2.2.1. Enter the next consecutive clearance number here if more than one safe clearance is to be issued on the same line or equipment. More than one clearance may be issued depending on the size of the job and the distance between the crews. In such cases, the electrical supervisor must coordinate on all safe clearances issued. (See Figure 1)

2.3. Block 3: Issued by.

2.3.1. The Electrical Safe Clearance Manager must issue a safe clearance. Only one person can issue a clearance for a job. This eliminates confusion and possible hazardous conditions resulting from uncoordinated switching. (See Figure 1)

2.4. Block 4: Time Clearance was issued. (See Figure 1)

2.5. Block 5: Date Clearance was issued. (See Figure 1)

2.6. Block 6: Name of employee receiving clearance.

2.6.1. Only one authorized person can receive the safe clearance. He or She is responsible for accomplishing the safe clearance procedures. (See Figure 1)

2.7. Block 7: Line/equipment involved.

2.7.1. To let everyone know exactly which lines or equipment is affected, enter a brief but concise description of the lines or equipment on which the work is to be done. (See Figure 1)

2.8. Block 8: Details of blocking and tagging.

2.8.1. This block contains the exact directions for all switching, blocking, tagging and grounding to be accomplished in the proper sequence. These steps must be followed exactly in sequence. This includes all switching, blocking, tagging, and grounding operations. The person who receives the clearance controls the padlocks used for blocking. (See Figure 1)

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2.9. Block 9: Time applied.

2.9.1. Each time a detail action of switching, tagging, blocking, or grounding is done, the person who received the safe clearance must write the actual time opposite the detail and progress downward. This keeps track of the detail completed and the time accomplished. (See Figure 1)

2.10. Block 10: Released by.

2.10.1. After work has been completed, the Electrical Supervisor releases the safe clearance to the Safe Clearance Manager. It is the Electrical Supervisor's responsibility to make sure that all personnel and temporary grounds are clear and all lines and equipment are ready for service. The signature of the Electrical Supervisor in the "Released By" block is certification that this has been done. (See Figure 1)

2.11. Block 11: Accepted by.

2.11.1. The signature of the Safe Clearance Manager certifies acceptance. This is a double check to make sure that all personnel are clear of the lines and ground sets have been removed. (See Figure 1)

2.12. Block 12: Time Released to Safe Clearance Manager. (See Figure 1)**2.13. Block 13: Date Released to Safe Clearance Manager.** (See Figure 1)**2.14. Block 14: Time removed.**

2.14.1. Performing the switching operations in the reverse order is the responsibility of the electrical supervisor. Starting with the last detail and progressing upward on the AF Form 269, do each detail in reverse and annotate the actual time until the system is back to normal. Following the 269 in exact reverse order ensures that no steps are overlooked and power is completely restored. (See Figure 1)

SAFETY:

YOU MUST STRICTLY ADHERE TO THESE PROCEDURES. YOUR LIFE OR YOUR BUDDY'S LIFE MAY DEPEND ON IT!

3. To perform this task, follow these steps:**Step 1: Insure AF Form 269 is filled out with appropriate information.**

- 1.1. **Block 1:** Record number – obtained from the records maintained by the Electrical Safe Clearance Manager or Ops Chief.
- 1.2. **Block 2:** Other clearance numbers if multiple clearances needed.
- 1.3. **Block 3:** Electrical Safe Clearance Manager coordination.
- 1.4. **Block 4:** Time Clearance was issued.
- 1.5. **Block 5:** Date Clearance was issued.
- 1.6. **Block 6:** Name of employee receiving clearance.
- 1.7. **Block 7:** Brief description of lines or equipment involved.
- 1.8. **Block 8:** Exact directions and sequence for all switching, blocking, tagging and grounding to be accomplished.

Step 2: Perform each detail as prescribed on AF Form 269

- 2.1. Exactly as described.
- 2.2. Following proper sequence (from top to bottom).

Step 3: Annotate the time each detailed action was accomplished in the “Time Applied” column as tasks are performed.**Step 4: Return AF Form 269 to Electrical Supervisor after work has been accomplished.**

- 4.1. Electrical supervisor signs the “Released By”, “Time Released” and “Date Released” blocks.
- 4.2. Safe Clearance Manager signs the “Accepted By” block.

Step 5: To re-energize, Perform details of blocking and tagging in exact reverse order (bottom to top).**Step 6: Annotate the time each detail was removed in the “Time Removed” column as tasks are performed.****Step 7: Return AF Form 269 to Safe Clearance Manager.**

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**REVIEW QUESTIONS
FOR
USE AF FORM 269 WHEN PERFORMING SWITCHING AND BLOCKING AND
TAGGING**

QUESTION	ANSWER
1. Who would you receive the AF Form 269 Record Number from?	<ul style="list-style-type: none"> a. Electrical Supervisor. b. Craftsman. c. Safe Clearance Manager. d. Base Civil Engineering Operations Chief. e. a or c. f. c or d. g. a or d.
2. What is the primary use for AF Form 269?	<ul style="list-style-type: none"> a. Taking meter readings. b. Installing a single-phase motor. c. For switching primary distribution lines. d. For installing a new duct bank.
3. Who signs the "Released By" block?	<ul style="list-style-type: none"> a. Base Civil Engineering Operations Chief. b. Electrical Supervisor. c. Superintendent. d. Craftsman.
4. Who performs the actual switching?	<ul style="list-style-type: none"> a. Work Leader. b. Electrical Foreman. c. Person receiving clearance. d. Chief of Operations.
5. To re-energize, perform details of blocking and tagging in reverse order.	<ul style="list-style-type: none"> a. True. b. False.
6. The AF Form 269 is a general outline used to accomplish high voltage switching.	<ul style="list-style-type: none"> a. True. b. False.
7. What time(s) are written on AF Form 269?	<ul style="list-style-type: none"> a. Time applied. b. Time removed. c. Time issued. d. a & b. e. a & c. f. a, b, & c.

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USE AF FORM 269 WHEN PERFORMING SWITCHING AND BLOCKING AND TAGGING

PERFORMANCE CHECKLIST

INSTRUCTIONS:

The trainee must satisfactorily perform all parts of the task without assistance. Evaluate the trainee's performance using this checklist.

DID THE TRAINEE....?	YES	NO
1. Review AF Form 269 with Electrical Foreman		
2. Follow the AF Form 269 when switching		
3. Annotate "Time Applied" after each task detailed		
4. Ensure proper signatures were obtained after work was accomplished		
5. Reverse tasks to re-energize circuit		
6. Annotate "Time Removed"		

FEEDBACK: Trainer should provide both positive and/or negative feedback to the trainee immediately after the task is performed. This will ensure the issue is still fresh in the mind of both the trainee and trainer.

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ELECTRICAL FACILITIES SAFE CLEARANCE FORMS

MODULE 11

AFQTP UNIT 1

PLAN SAFE CLEARANCE (11.1.4.)

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PLAN SAFE CLEARANCE
Task Training Guide

STS Reference Number/Title:	11.1.4., Plan safe clearance.
Training References:	<ol style="list-style-type: none"> 1. Career Development Course (CDC) Electrical Systems 3E051A Vol. 1, Unit 1, Section 1-7: <i>Planning Work Requirements</i> and Unit 4-1: <i>AF Occupational Safety and Health Program</i>. 2. Air Force Instructions (AFI) 32-1064, <i>Electrical Safety Practices</i>. 3. Air Force Manual (AFMAN) 32-1185, <i>Electrical Worker Safety</i>.
Prerequisites:	<ol style="list-style-type: none"> 1. Possess as a minimum a 3E051 AFSC. 2. Review the following references: <ol style="list-style-type: none"> 2.1. CDC Electrical Systems 3E051A, Vol. 1, Section 1-7 and Unit 4-1. 2.2. AFI 32-1064. 2.3. AFMAN 32-1185.
Equipment/Tools Required:	<ol style="list-style-type: none"> 1. AF Form 269, Electrical Facilities Safe Clearance. 2. AF Form 979, Danger Tag. 3. AF Form 980, Caution Tag. 4. Electrical Distribution Maps.
Learning Objective:	<ol style="list-style-type: none"> 1. Plan and implement an AF Form 269 Electrical Facilities Safe Clearance. 2. Appropriately complete and apply an AF Form 979. 3. Appropriately complete and apply an AF Form 980.
Samples of Behavior:	<ol style="list-style-type: none"> 1. Following approved procedures; plan a power outage using an AF Form 269. 2. Follow the steps while using an AF Form 979. 3. Follow the steps while using an AF Form 980. 4. Know safety requirements associated with planning and completing proper forms for a power outage.
Notes:	Any safety violation is an automatic failure.

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PLAN SAFE CLEARANCE

1. Background: Other than taking voltage and current measurements, whenever a distribution system must be worked on, it must be done under an Electrical Facilities Safe Clearance (AF Form 269). The safe clearance establishes a set of procedures that must be followed to turn the power off. The Base Civil Engineering Operations Chief is responsible for safe clearance procedures. Following these procedures will let you work on lines and equipment in a safe manner. The AF Form 269 is used to record all blocking and tagging actions done on primary electrical circuits on Air Force installations. This form is not used to document work on secondary lines or equipment. All logs, administrative records, and safe clearance forms must be retained for 1 year after release.

SAFETY:

YOU MUST STRICTLY ADHERE TO THESE PROCEDURES. YOUR LIFE OR YOUR BUDDY'S LIFE MAY DEPEND ON IT!

2. To perform this task, follow these steps:

Step 1: Identify the affected area.

- 1.1. There are many reasons why you may need to isolate a portion of your distribution system.
- 1.2. You may be preparing to install larger transformers for a system upgrade, or a car might have crashed into a pole forcing you replace that pole.
- 1.3. Although the purposes may differ the steps you take to isolate the circuit are the same.

Step 2: Visual Inspection of System.

- 2.1. Physically go out and inspect the area where you will be working.
- 2.2. Take note of any switches in the distribution system or any points of possible back feed, such as laterals and buildings with back-up generators.

Step 3: Base Distribution Map.

- 3.1. Use your base distribution maps to aid in determining which switches must be opened or closed to allow the majority of the customers to continue enjoying uninterrupted power while you isolate the work site.

Step 4: Fill Out the AF Form 269. (See Figure 1)

- 4.1. **Record Number.** A consecutive number, taken from the records maintained by the Electrical Safe Clearance Manager or the Chief of Operations.
- 4.2. **Other Clearance Numbers.** Enter the next consecutive clearance number here if more than one safe clearance is to be issued on the same line or equipment.
- 4.3. **Issued By.** The Safe Clearance Manager or a designated supervisor must issue a safe clearance. He or she must also make any necessary arrangements for interruption of service and must notify the off-base utility if the operation will affect its system.
- 4.4. **Name of Employee Receiving Clearance.** The supervisor responsible for exterior electrical systems will receive the safe clearance. In the absence of the supervisor, the safe clearance is to be issued only to authorized personnel, maintained on a list by the Infrastructure Element Supervisor. More than one safe clearance may be issued when more than one crew is used, in such cases; the Electrical Supervisor must coordinate on all safe clearances issued.

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4.5. Line / Equipment Involved. Enter a brief but concise description of the lines or equipment on which the work is to be done. The safe clearance is issued **after** this information is entered.

4.6. Details of Blocking and Tagging. List all blocking and tagging details. All details of the procedures must be recorded in this section in their proper sequence, reading down the form. This must include all switching, blocking, tagging, and grounding operations. The person who receives the clearance controls the padlock.

NOTE:

A visible line break must be present at all points of possible feed before work can be done under a safe clearance. If a visible line break is not practical when working on an underground system, an oil disconnect switch or subway switch may be used as long as it is blocked mechanically, locked, and the appropriate tag attached. On underground switches, open the switch first and then place elbows (if present) on the parking bushings to ensure an open circuit.

4.7. Time Applied. Each time a detail action of switching, tagging, blocking, or grounding is done, the person who received the safe clearance must write the actual time opposite the detail and progress downward.

4.8. Released By. After work has been completed, release the safe clearance to the safe clearance manager. You must ensure that all personnel and temporary grounds are clear and all lines and equipment are ready for service. Your signature in the "Released By" block is certification that this has been done.

4.9. Accepted By. The Safe Clearance Manager is responsible for the release of all safe clearances. If more than one safe clearance has been issued, he or she must make sure that all clearances have been accepted and released before the tags and locks are removed. The signature of the Safe Clearance Manager certifies acceptance.

4.10. Time Released to Safe Clearance Manager.

4.11. Date Released to Safe Clearance Manager.

4.12. Time Removed. Performing switching operations in the reverse order is the responsibility of the electrical supervisor. Starting with the last detail and progressing upward on the AF Form 269, do each detail in reverse order and annotate the actual time each detail is removed until the system is back to normal.

Step 5: Fill out the AF Form 979.

5.1. Transcribe appropriate information from AF Form 269 to AF Form 979 and install the tag and padlock.

5.2. This tag signifies an abnormal condition exists.

Step 6: Fill out the AF Form 980.

6.1. Transcribe appropriate information from AF Form 269 on to AF Form 980 and install the tag and padlock.

6.2. This tag signifies danger to personnel and /or equipment.

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**REVIEW QUESTIONS
FOR
PLAN SAFE CLEARANCE**

QUESTION	ANSWER
1. What is the first step in planning an outage?	a. Determine area affected. b. Isolate the system. c. Install ground set. d. Physically survey the area.
2. Who may issue a safe clearance?	a. Designated Supervisor. b. Electrical Superintendent. c. Safe Clearance Manager. d. a or c.
3. Who is responsible for the release of all safe clearances?	a. Electrical Superintendent. b. Chief of Operations. c. Shop Foreman. d. Safe clearance manager. e. a or b.
4. When is a visible line break not required before work can be done under a safe clearance?	a. When working on an overhead system controlled by a circuit breaker. b. When working on an overhead system which has an air-break switch that can be locked open. c. A visible line break is always required. d. When working on an underground system which has an oil disconnect switch or subway switch that can be locked open.
5. What time is written on an AF Form 269?	a. Time Removed. b. Time Released. c. Time Applied. d. All the above.
6. The responsibility of reversing the switching procedures belongs to the Chief of Operations.	a. True. b. False.

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PLAN SAFE CLEARANCE

PERFORMANCE CHECKLIST

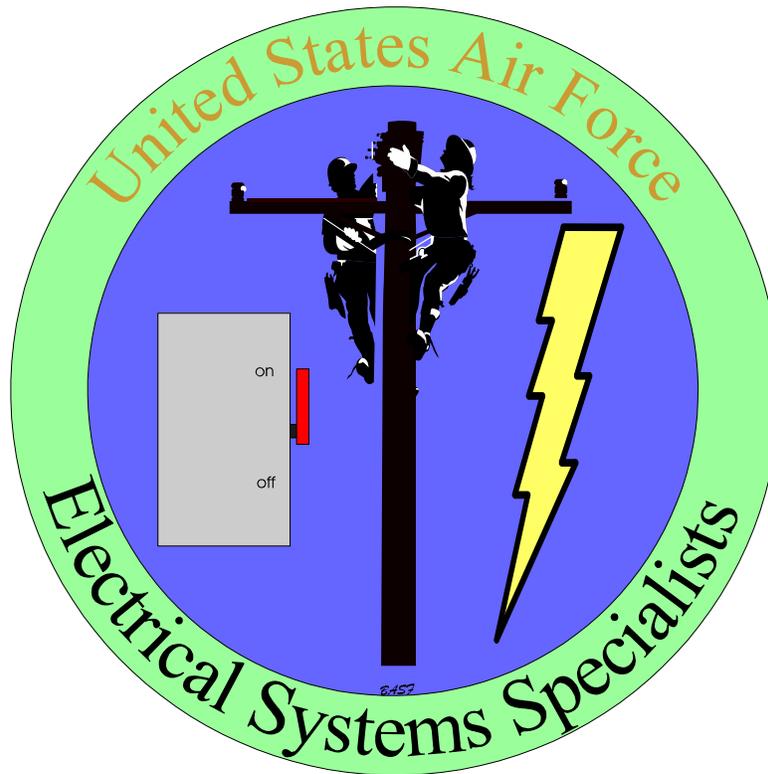
INSTRUCTIONS:

The trainee must satisfactorily perform all parts of the task without assistance. Evaluate the trainee's performance using this checklist.

DID THE TRAINEE....?	YES	NO
1. Correctly determine the area to be affected by the outage		
2. Properly identify all switches and circuit breakers that needed to be blocked and tagged		
3. Write a brief but concise description of the lines or equipment on which the work is to be done		
4. Correctly list details of all blocking and tagging		
5. Record correct times on the AF Form 269		
6. Record the correct information on AF Form 979		
7. Record the correct information on AF Form 980		

FEEDBACK: Trainer should provide both positive and/or negative feedback to the trainee immediately after the task is performed. This will ensure the issue is still fresh in the mind of both the trainee and trainer.

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CONDUCT SAFETY INSPECTIONS

MODULE 11

AFQTP UNIT 5

HOTLINE TOOLS (11.5.1.)

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CONDUCT SAFETY INSPECTION OF HOTLINE TOOLS
Task Training Guide

STS Reference Number/Title:	11.5.1., Conduct safety inspection of hotline tools.
Training References:	<ol style="list-style-type: none"> 1. Career Development Course (CDC) Electrical Systems 3E051B Vol. 1, Unit 2: <i>Rubber Goods, Hot-Line Tools, and Vehicles.</i> 2. Air Force Manual (AFMAN) 32-1185, <i>Electrical Worker Safety.</i> 3. Air Force Instructions (AFI) 32-1064, <i>Electrical Safety Practices.</i>
Prerequisites:	<ol style="list-style-type: none"> 1. Possess as a minimum a 3E031 AFSC. 2. Review the following references: <ol style="list-style-type: none"> 2.1. CDC Electrical Systems 3E051B Vol. 1, Unit 2. 2.2. AFI 32-1064. 2.3. AFMAN 32-1185.
Equipment/Tools Required:	Hotline tools.
Learning Objective:	Given equipment, conduct safety inspection of hotline tools.
Samples of Behavior:	Follow the required steps while inspecting hotline tools.
Notes:	Any safety violation is an automatic failure.

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CONDUCT SAFETY INSPECTION OF HOTLINE TOOLS

1. Background: The purpose of hot-line tools is to minimize the number of power interruptions or outages by allowing a safe means of live line maintenance. The tools are used for maintenance, not for construction. Maintenance of energized, or "hot," high-voltage lines may appear hazardous, especially when you compare it with maintenance on de-energized or on low-voltage lines with rubber gloves and other rubber protective equipment. However, the work can be just as safe if linemen are always conscious of the fact that the lines are energized. If you remember this, you'll be cautious! When you work on live lines; there's no possibility of the line being hot when you thought it was dead, which is possible when you're working on *supposedly* dead lines. When you're working with energized lines, you know that each conductor is hot; each operation is planned and performed accordingly. Use only hot sticks with manufacturer's certification to withstand a minimum test of 100,000 volts AC per foot for five minutes on fiberglass and epoxy sticks. Hot-line tools are tested electrically upon receipt from the manufacturer and re-tested every six months. Hot-line tools stored for mobility are tested once a year. Also, the electrical supervisor inspects the tools visually in the field at least every 6 months to make sure they are maintained properly. Epoxiglass hot-line tools are safe, dependable, and made to take demanding use.

2. To perform this task, follow these steps:

Step 1: Visual inspection.

- 1.1.** Long exposure to moisture, dirt, or ultraviolet attack can affect the tool adversely. Hot-line tools must be inspected before each use. Inspect the tool visually for cracked or distorted end fittings, feathered rivets or ferrules that have moved visibly, hairline cracks or scars in the insulation, and blisters in poorly applied coatings that could trap moisture.
- 1.2.** Inspect the fiberglass surface of each tool for dirt, creosote, grease, paint, or any other foreign material before and after each use. If you find any of these contaminants fiberglass surface must be cleaned.

NOTE:

Although wooden hot-line tools are still approved for use, efforts should be made to replace them with fiberglass tools.

Step 2: Clean fiberglass tools.

- 2.1.** Wipe the fiberglass with a clean rag.
- 2.2.** Clean the fiberglass surface with hot-stick pole cleaner.
 - 2.2.1. CAUTION:** Do not use this cleaner on painted surfaces.
 - 2.2.2.** This nonconductive cleaner will also remove surface wax on fiberglass.
 - 2.2.3.** If this step is successful in cleaning the hot-stick, you **must** do the next procedure.
- 2.3.** Wax the fiberglass surfaces with hot-stick wax.
- 2.4.** If hot-stick pole cleaner fails to clean the fiberglass surface (this should be infrequent), take the tool out of use, tag it, and refer it to the supervisor for further evaluation.
 - 2.4.1. CAUTION:** Don't write on the fiberglass surface.

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2.5. Don't use household or industrial soap detergents, abrasives, and clean (liquid or powdered form) to clean fiberglass tools under field conditions.

2.5.1. Cleaning agents leave conductive residue unless they're rinsed off with generous amounts of water (usually not available in the field).

2.5.2. Abrasive cleaners destroy the surface gloss on the stick.

2.5.3. All fiberglass tools subjected to such cleaning agents must be electrically tested to ensure complete removal of residue from soap-type cleaners.

NOTE:

Silicone cloths may enhance the electrical integrity of hot sticks and help protect the glossy fiberglass surface, but they're not approved for use because silicone may migrate and over a period of time which may hamper refinishing. Hot-stick wax has all of the advantages of silicone without the suspected adverse effects.

**REVIEW QUESTIONS
FOR
CONDUCT SAFETY INSPECTION OF HOTLINE TOOLS**

QUESTION	ANSWER
1. What is the purpose of using hot-line tools?	a. Minimize power outages. b. Line construction. c. Disconnect Power.
2. How often does the supervisor inspect hot-line tools visually?	a. Monthly. b. Quarterly. c. Semi-annually. d. Annually.
3. Silicone cloths should be used to maintain the finish on fiberglass hot-sticks.	a. True. b. False.
4. Hotline tools used for mobility are electrically tested at intervals not to exceed _____.	a. three months. b. six months. c. nine months. d. twelve months.
5. What is the minimum acceptance voltage for fiberglass sticks?	a. 75kv AC for 3 minutes. b. 100kv AC for 3 minutes. c. 75kv AC for 5 minutes. d. 100kv AC for 5 minutes.
6. You may use household detergent to clean hot-sticks under field conditions.	a. True. b. False.

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CONDUCT SAFETY INSPECTION OF HOTLINE TOOLS

PERFORMANCE CHECKLIST

INSTRUCTIONS:

The trainee must satisfactorily perform all parts of the task without assistance. Evaluate the trainee's performance using this checklist.

DID THE TRAINEE....?	YES	NO
1. Inspect the tool visually for cracked or distorted end fittings, feathered rivets or ferrules that have moved visibly, hairline cracks or scars in the insulation, and blisters in poorly applied coatings that could trap moisture		
2. Inspect the fiberglass surface of each tool for dirt, creosote, grease, paint, or any other foreign material before and after each use		
3. Clean the fiberglass surface of the tool with the correct cleaning agent		
4. Wipe down the fiberglass hot-stick with Hot-stick wax		

FEEDBACK: Trainer should provide both positive and/or negative feedback to the trainee immediately after the task is performed. This will ensure the issue is still fresh in the mind of both the trainee and trainer.

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CONDUCT SAFETY INSPECTIONS

MODULE 11

AFQTP UNIT 5

RUBBER PERSONAL PROTECTIVE EQUIPMENT (11.5.2.)

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**CONDUCT SAFETY INSPECTION OF RUBBER PERSONAL PROTECTIVE
EQUIPMENT**

Task Training Guide

STS Reference Number/Title:	11.5.2., Conduct safety inspection of rubber personal protective equipment.
Training References:	<ol style="list-style-type: none"> 1. Career Development Course (CDC) Electrical Systems 3E051B Vol. 1, Unit 2: <i>Rubber Goods, Hot-Line Tools, and Vehicles.</i> 2. Air Force Instructions (AFI) 32-1064, <i>Electrical Safety Practices.</i> 3. Air Force Manual (AFMAN) 32-1185, <i>Electrical Worker Safety.</i> 4. ANSI/ASTM F478, <i>In-Service Care Of Insulating Line Hose And Covers.</i> 5. ANSI/ASTM F496, <i>In-Service Care Of Insulating Blankets.</i> 6. ANSI/ASTM F479, <i>In-Service Care Of Insulating Gloves And Sleeves.</i>
Prerequisites:	<ol style="list-style-type: none"> 1. Possess as a minimum a 3E031 AFSC. 2. Review the following references: <ol style="list-style-type: none"> 2.1. CDC Electrical Systems 3E051B, Vol. 1, Unit 2. 2.2. AFI 32-1064. 2.3. AFMAN 32-1185. 2.4. ANSI/ASTM F478, 479, and 496.
Equipment/Tools Required:	<ol style="list-style-type: none"> 1. Rubber gloves. 2. Rubber sleeves. 3. Rubber blankets. 4. Line hoses. 5. Hoods.
Learning Objective:	Given equipment, conduct safety inspection of rubber protective equipment.
Samples of Behavior:	Follow the required steps while correctly inspecting rubber protective equipment for physical damage and chemical deterioration.
Notes:	
Any safety violation is an automatic failure.	

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CONDUCT SAFETY INSPECTION OF RUBBER PERSONAL PROTECTIVE EQUIPMENT

1. Background: Electrician's rubber protective equipment is for personal protection, and serious personal injury may result if it fails in use. The American National Standards Institute/American Society for Testing Materials (ANSI/ASTM) specifications for in service care of rubber protective equipment stress visual inspection in the field as an important requirement in protecting from electric shock.

1.1. Rubber protective equipment (gloves, sleeves, blankets, line hoses and hoods) made of Type I natural or polyisoprene synthetic rubber is subject to ozone and corona deterioration.

1.2. Salcore equipment made of Type II elastomeric compounds is not affected by this particular deterioration.

1.3. All rubber protective equipment is subject to chemical deterioration and possible loss of insulating properties after prolonged exposure to ozone, heat, sun, oil and grease, or general weathering. In addition to regular electrical tests and visual inspection for physical defects such as holes, tears, punctures and cuts, it should also be visually inspected at regular intervals for signs of possible chemical deterioration such as corona cutting, ozone or sun checking. Check for texture changes such as swelling, softening, hardening and becoming sticky or inelastic.

1.4. If contact has been made with any petroleum-base products (such as inhibitors, hydraulic fluids, and transformer oils), the gloves and sleeves must be wiped off with a rag as soon after the contact as possible. Failure to remove the petroleum-based product promptly will result in the rubber's swelling and ultimately deteriorating. The swelling will eventually disappear, but it may cause considerable reduction of mechanical strength. The resistance to snag, puncture, and tear may be greatly reduced and chemical deterioration may result.

1.5. Because of potential loss of electrical resistance reversion or other deterioration, equipment should be withdrawn from service the first indication of chemical deterioration.

NOTE:

The in-service specifications require rubber gloves and sleeves to be electrically tested initially upon receipt from manufacturer and re-tested at least every three months for rubber gloves (shelf life nine months) and nine months for rubber sleeves. Additionally, a visual inspection of all rubber protective equipment should be made in the field by the electrical supervisor at intervals not to exceed six months to ensure that the users are keeping the equipment in satisfactory condition.

2. To perform this task, follow these steps:

Step 1: Rubber Gloves.

1.1. Electrician's rubber gloves must be carefully inspected before each use. Rubber gloves must be field air-tested before each use and more frequently if there is cause to suspect damage.

1.2. Stretch the rubber and look for cracks, tears, and holes in the gloves especially around the parts of the glove that bend when your hands flex.

1.3. Gloves must be inspected inside and out.

1.4. To perform a field air test, hold the glove with the opening up and quickly roll the cuff trapping air inside the glove.

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1.5. Hold the glove close to your face, squeeze it, listen for air escaping, and try to feel air on your cheek.

SAFETY:

ANY DAMAGED GLOVE IS TO BE REMOVED FROM SERVICE AND DESTROYED.

Step 2: Sleeve inspection.

- 2.1. In inspecting sleeves, inspect the entire inner and outer surface for pinholes, cuts, scratches, abrasions, aging, corona cutting, oil markings, or other chemical injuries.
- 2.2. Stretch or roll the rubber between your fingers or on a flat surface to reveal defects. If any of the above defects are found, the sleeve must be tagged and withdrawn from service.

Step 3: Blanket inspection.

- 3.1. To locate swelling, scratches, tears, abrasions, snags, tracking cutting, or age cracking, roll the blankets twice on each side, with the second roll at a right angle the first roll.
- 3.2. Blankets that show any of the flaws listed above must be removed from service, repaired and re-tested, or destroyed.

Step 4: Rubber insulating line hose, hoods, and covers

- 4.1. Rubber insulating line hose, hoods, and covers must be inspected before each use.
- 4.2. Inspect thoroughly for cuts, scratches, corona cutting, holes, tears and punctures, rope or wire burns, and aged rubber.
- 4.3. Look for texture changes such as swelling, softening, hardening, becoming sticky or inelastic, which are signs of chemical deterioration.
- 4.4. If the mechanical damage extends one-quarter of the wall thickness of the hose or hoods or if there is possible chemical deterioration, they must be removed from service and destroyed. There is no repair for line hoses and hoods.

NOTE:

In-service specifications for line hoses and hoods require electrical testing when there is reason to suspect the electrical integrity of a line hose or cover such as cuts, tears, cracks, deterioration or swelling.

NOTE:

All rubber protective equipment should be stored in a relaxed position, that is, without distortion and mechanical stress. Don't use tape to secure blankets, line hose, hoods, or covers for shipping or storage because the adhesive on the tape may cause chemical deterioration.

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**REVIEW QUESTIONS
FOR
CONDUCT SAFETY INSPECTION OF RUBBER PERSONAL PROTECTIVE
EQUIPMENT**

QUESTION	ANSWER
1. Which type of manufactured rubber protective equipment is subject to ozone and corona deterioration?	a. Type I, Natural or polyisoprene. b. Type II, Elastomeric compound. c. Type III, Polypropylene compound. d. a and b.
2. How often must rubber gloves be field air-tested?	a. Before each use. b. Daily. c. Weekly. d. Monthly.
3. How deep must a cut be in order to have a rubber hood removed from service?	a. 1/2 the thickness of the rubber. b. 1/3 the thickness of the rubber. c. 1/4 the thickness of the rubber. d. 1/5 the thickness of the rubber.
4. How often must the electrical supervisor make a visual inspection of rubber goods?	a. Annually. b. Monthly. c. Quarterly. d. Semi-annually.
5. Rubber gloves need only be inspected on the outside surface.	a. True. b. False.
6. What is the shelf life for rubber gloves?	a. Three months. b. Six months. c. Nine months. d. Twelve months.
7. How should you locate defects in a blanket?	a. Rolling the blanket twice on each side. b. Twisting the blanket in your hands. c. Folding the blanket in quarters. d. Folding the blanket in half.
8. How should rubber blankets be stored?	a. Folded in squares. b. Rolled and taped in a blanket tube. c. Flat. d. Folded diagonally.
9. Rubber hoods can be repaired using an approved patch of the same material and dielectric strength as the original.	a. True. b. False.

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CONDUCT SAFETY INSPECTION OF RUBBER PERSONAL PROTECTIVE EQUIPMENT

PERFORMANCE CHECKLIST

INSTRUCTIONS:

The trainee must satisfactorily perform all parts of the task without assistance. Evaluate the trainee's performance using this checklist.

DID THE TRAINEE....?	YES	NO
1. Perform an air test on rubber gloves		
2. Inspect inside and outside of rubber gloves		
3. Perform a roll test on rubber sleeves and blankets		
4. Perform a thorough visual inspection of line hoses and hoods		

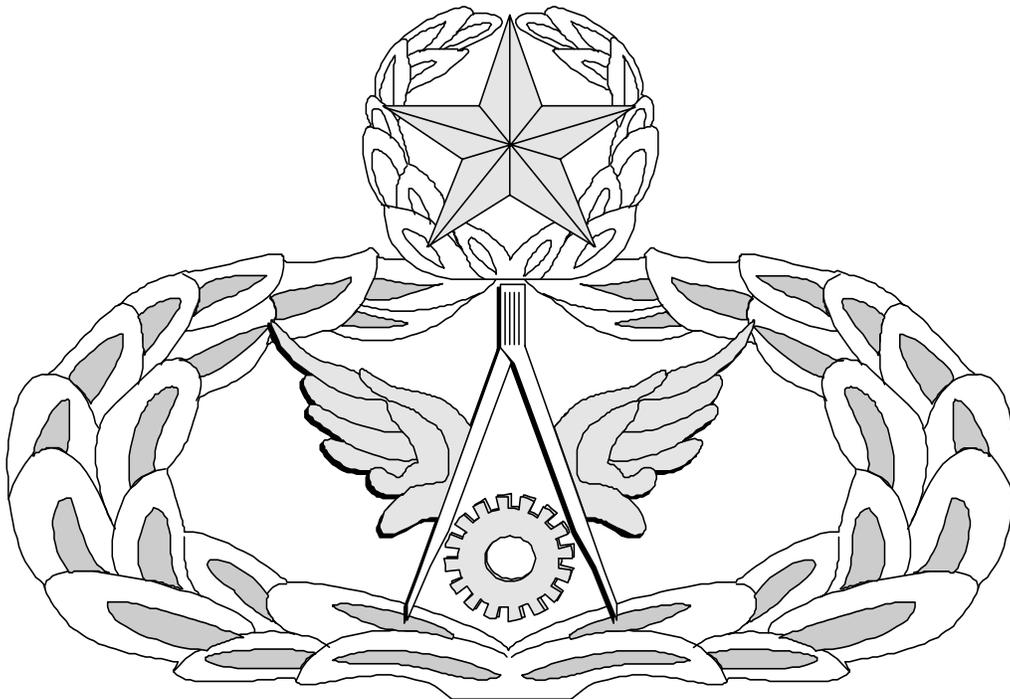
FEEDBACK: Trainer should provide both positive and/or negative feedback to the trainee immediately after the task is performed. This will ensure the issue is still fresh in the mind of both the trainee and trainer.

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Air Force Civil Engineer

QUALIFICATION TRAINING PACKAGE (QTP)

REVIEW ANSWER KEY



FOR
ELECTRICAL SYSTEMS
(3E0X1)

MODULE 11

AFSC SPECIFIC SAFETY STANDARDS

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Key-1

**USE AF FORM 269 WHEN PERFORMING SWITCHING AND BLOCKING AND
TAGGING
(3E0X1-11.1.3.1. & 11.1.3.2.)**

QUESTION	ANSWER
1. Who would you receive the AF Form 269 Record Number from?	f. c or d Safe Clearance Manager or the Base Civil Engineering Operations Chief.
2. What is the primary use for AF Form 269?	c. For switching primary distribution lines.
3. Who signs the "Released By" block?	b. Electrical Supervisor.
4. Who performs the actual switching?	c. Person receiving clearance.
5. To re-energize, perform details of blocking and tagging in reverse order.	a. True.
6. The AF Form 269 is a general outline used to accomplish high voltage switching.	b. False The AF Form 269 is a detailed outline of switching procedures.
7. What time(s) are written on AF Form 269?	f. a,b,& c.

**PLAN SAFE CLEARANCE
(3E0X1-11.1.4.)**

QUESTION	ANSWER
1. What is the first step in planning an outage?	a. Determine area affected.
2. Who may issue a safe clearance?	d. a & c.
3. Who is responsible for the release of all safe clearances?	d. Safe clearance manager.
4. When is a visible line break not required before work can be done under a safe clearance?	d. When working on an underground system which has an oil disconnect switch or subway switch that can be locked open.
5. What time is written on an AF Form 269?	d. All of the above.
6. The responsibility of reversing the switching procedures belongs to the Chief of Operations.	b. False it is the responsibility of the electrical supervisor.

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**CONDUCT SAFETY INSPECTION OF HOTLINE TOOLS
(3E0X1-11.5.1.)**

QUESTION	ANSWER
1. What is the purpose of using hotline tools?	a. Minimize power outages.
2. How often does the supervisor inspect hot-line tools visually?	c. Semi-annually.
3. Silicone cloths should be used to maintain the finish on fiberglass hot-sticks.	b. False.
4. Hotline tools used for mobility are electrically tested at intervals not to exceed _____.	d. twelve months.
5. What is the minimum acceptance voltage for fiberglass sticks?	d. 100kv AC for 5 minutes.
6. You may use household detergent to clean hot-sticks under field conditions.	b. False.

**CONDUCT SAFETY INSPECTION OF RUBBER PERSONAL PROTECTIVE EQUIPMENT
(3E0X1-11.5.2.)**

QUESTION	ANSWER
1. Which type of manufactured rubber protective equipment is subject to ozone and corona deterioration?	a. Type I, Natural or polyisoprene.
2. How often must rubber gloves be field air-tested?	a. Before each use.
3. How deep must a cut be in order to have a rubber hood removed from service?	c. 1/4 the thickness of the rubber.
4. How often must the electrical supervisor make a visual inspection of rubber goods?	d. Semi-annually.
5. Rubber gloves need only be inspected on the outside surface.	b. False.
6. What is the shelf life for rubber gloves?	c. Nine months.
7. How should you locate defects in a blanket?	a. Rolling the blanket twice on each side.
8. How should rubber blankets be stored?	c. Flat.
9. Rubber hoods can be repaired using an approved patch of the same material and dielectric strength as the original.	b. False.

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MEMORANDUM FOR HQ AFCESA/CEOF
139 Barnes Drive Suite 1
Tyndall AFB, FL 32403-5319

FROM:

SUBJECT: Qualification Training Package Improvement

1. Identify module.

Module # and title _____

2. Identify improvement/correction section(s):

- | | |
|--|--|
| <input type="checkbox"/> STS Task Reference | <input type="checkbox"/> Performance Checklist |
| <input type="checkbox"/> Training Reference | <input type="checkbox"/> Feedback |
| <input type="checkbox"/> Evaluation Instructions | <input type="checkbox"/> Format |
| <input type="checkbox"/> Performance Resources | <input type="checkbox"/> Other |
| <input type="checkbox"/> Steps in Task Performance | |

3. Recommended changes--use a continuation sheet if necessary.

4. You may choose to call in your recommendations to DSN 523-6392 or FAX DSN/Commercial 523-6488 or (850) 283-6488 or email ceof.helpdesk@tyndall.af.mil.

5. Thank you for your time and interest.

YOUR NAME, RANK, USAF
Title/Position