

Training and Evaluation Outline Report

Task Number: 05-3-5702

Task Title: Install Underground Electrical-Power Distribution Equipment

Supporting Reference(s):

Step Number	Reference ID	Reference Name	Required	Primary
	FM 3-34.480	ENGINEER PRIME POWER OPERATIONS	Yes	Yes
	FM 5-125	RIGGING TECHNIQUES, PROCEDURES, AND APPLICATIONS	Yes	No
	FM 5-19	COMPOSITE RISK MANAGEMENT	Yes	No
	FM 5-34	ENGINEER FIELD DATA	Yes	No
	TB 43-0142	SAFETY INSPECTION AND TESTING OF LIFTING DEVICES	Yes	No
	TM 43-0156	DEPOT PACKAGING, DEPRESERVATION AND FIELD PACKAGING INSTRUCTIONS FOR NONTACTICAL GENERATOR SETS AND POWER PLANTS; GENERATOR SET, 700 KW, ELECTRIC (NSN 6115-00-596-3405); GENERATOR SET, 750 KW, ELECTRIC (6	Yes	No
	TM 5-6120-250-12	OPERATORS AND ORGANIZATIONAL MAINTENANCE MANUAL FOR SUBSTATIONS, TRAILER MTD, 500 KVA, AC, 4160-416Y/240 V;208Y/120 V, 3 PHASE, 50/60 HZ (AVIONICS MODEL 950-2200A) (FSN 6120-422-1047)	Yes	No
	TM 9-6115-604-12	Operator and Unit Maintenance Manual for Generator Set, Diesel Engine Driven, Air Transportable Skid Mounted, 750 kW, 3 Phase, 4 Wire, 2400/4160 and 2200/3800 Volts (DOD Model MEP-208A) Class Prime Utility . . . NAVFAC P-8-6-33-12.	Yes	No

Condition: The element receives an operation order (OPORD) with a directive to Install Underground Electrical-Power Distribution Equipment. All organic tools, equipment and materials are available. Plans, drawings, specifications, safety standing operating procedures (SOPs), applicable manufacturer's literature, a bill of materials (BOM), and a critical path method (CPM) are provided. This task should not be trained in MOPP.

Standard: The element Install's Underground Electrical-Power Distribution Equipment. Install's Underground Electrical-Power Distribution Equipment according to the specifications and within the time stated in the directive. Systems must adhere to local and National Electrical Code (NEC) specifications.

Special Equipment: None

Task Statements

Cue: None

DANGER

NA

WARNING

NA

CAUTION

None

Remarks: None

Notes: None

TASK STEPS

1. The element establishes job site security.
- * 2. The element leader performs construction management functions.
 - a. Prepares a bill of materials (BOMs) for the project.
 - b. Prepares a critical path method (CPM) diagram for the project.
 - c. Ensures that construction materials are available.
 - d. Assembles work crews and assigns their responsibilities.
 - e. Coordinates nonorganic construction support requirements.
- * 3. The element leader conducts a work project safety briefing.
 - a. Identifies the requirements for wearing the proper safety equipment and clothing.
 - b. Identifies the requirements for using ground guides for vehicles and materials-handling equipment.
 - c. Identifies the requirements for using the correct hand-and-arm signals to communicate boom, hook, or fork movement for materials-handling equipment.
 - d. Identifies the requirements for safe clearance procedures.
4. The element performs an equipment safety inspection.
 - a. Inspects individual safety and protective equipment for serviceability.
 - b. Inspects cable-handling and -laying equipment for serviceability.
 - c. Inspects rigging equipment for serviceability.
 - d. Tests existing manholes for air quality.
5. The element verifies the cable right-of-way selection.
6. The element performs a pre-installation inspection and a test of system electrical equipment.
7. The element pre-stages materials and equipment along the right-of-way.
8. The power plant electrical crew installs underground distribution system substation equipment.
 - a. Prepares a mounting pad for the substation equipment.
 - b. Positions the substation equipment on the pad.
 - c. Installs the distribution system equipment grounds.
9. The power plant electrical crew installs underground distribution system cables.

- a. Performs a cable acceptance test on the reel.
 - b. Prepares a trench that had a minimum depth of 24 inches.
 - c. Lays cable in the trench.
 - d. Performs splicing and testing operations, as needed.
 - e. Back-fills the trench.
 - f. Terminates power cables, and performed a resistance test.
 - g. Connects power cables into the system.
10. The power plant electrical crew installs the underground distribution system and equipment protective barriers.
- * 11. The element leader performs an after installation inspection of the distribution system and acceptance testing.
- a. Reviews the data from the cable acceptance test and verified power cable serviceability.
 - b. Inspects the splices and terminations for serviceability.
 - c. Verifies the phase sequencing of power cables.
 - d. Verifies the servicing and proper setup of the substation equipment.
- * 12. The element leader prepares the distribution system according to the built diagram.
- * 13. The element leader prepares an after-action report and conducts a briefing according to the unit standing operating procedure (SOP).

(Asterisks indicates a leader performance step.)

PERFORMANCE MEASURES	GO	NO-GO	N/A
1. The element emplaced security.			
2. Element leader conducted all construction management functions.			
3. Element leader identified safety requirements and briefed personnel.			
4. The element performed all inspections for safety.			
5. Verified cable right-of-way.			
6. Conducted the pre-installation inspection, and tested the electrical system equipment.			
7. The element pre-staged materials and equipment along the right-of-way.			
8. Installed underground distribution system substation equipment.			
9. The power plant electrical crew installed underground distribution system cables.			
10. The power plant electrical crew installed the underground distribution system and equipment protective barriers.			
11. The element leader performed the after installation inspection of the distribution system and acceptance testing.			
12. The element leader prepared the distribution system IAW the built diagram.			
13. Conducted AAR and or briefing in accordance with unit SOP.			

Step Number	Task Number	Title	Proponent	Status
	052-204-1115	Rescue an Injured Victim From a Manhole	052 - Engineer (Individual)	Approved
	052-204-1121	Install High-Intensity Lights and Ballasts	052 - Engineer (Individual)	Approved
	052-204-1122	Install Distribution Equipment (De-energized)	052 - Engineer (Individual)	Approved
	052-204-1128	Interpret an Electrical One-Line Diagram	052 - Engineer (Individual)	Approved
	052-204-1129	Splice a Medium-Voltage Power Cable	052 - Engineer (Individual)	Approved
	052-204-1130	Terminate a Medium-Voltage Power Cable	052 - Engineer (Individual)	Approved
	052-204-2116	Prepare an Underground, Electrical-System Manhole for Work	052 - Engineer (Individual)	Approved
	052-204-2207	Conduct a Safety Briefing	052 - Engineer (Individual)	Approved
	052-204-2208	Conduct a Safety Inspection	052 - Engineer (Individual)	Approved
	052-204-2209	Install Distribution Equipment (Energized)	052 - Engineer (Individual)	Approved
	052-204-2211	Develop a Bill of Materials (BOM) List	052 - Engineer (Individual)	Approved
	052-204-2212	Energize an Electrical Distribution System	052 - Engineer (Individual)	Approved
	052-204-2213	Locate an Underground Cable and/or a Fault	052 - Engineer (Individual)	Approved
	052-204-2214	Perform Live-Line Testing	052 - Engineer (Individual)	Approved
	052-204-2216	Perform Maintenance on Electrical Distribution Equipment	052 - Engineer (Individual)	Approved
	052-204-2217	Manage a Power Line Crew	052 - Engineer (Individual)	Approved
	052-204-2218	Supervise the Installation of Underground Cable	052 - Engineer (Individual)	Approved
	052-204-4003	Supervise Risk-Management Procedures	052 - Engineer (Individual)	Approved
	052-205-2105	Perform Oxyfuel Cutting	052 - Engineer (Individual)	Approved
	052-206-2101	Install a Medium-Voltage, Nonaerial Air Switch	052 - Engineer (Individual)	Approved
	052-206-2102	Service an Oil Switch	052 - Engineer (Individual)	Approved
	052-206-2103	Service a Vacuum Switch	052 - Engineer (Individual)	Approved
	052-206-2104	Service a System Ground	052 - Engineer (Individual)	Approved
	052-206-2105	Service a Nonaerial Air Switch	052 - Engineer (Individual)	Approved
	052-206-2108	Service an Electrical-Equipment Grounding System	052 - Engineer (Individual)	Approved
	052-206-2114	Service a Power Transformer	052 - Engineer (Individual)	Approved
	052-206-2115	Service a Distribution Transformer	052 - Engineer (Individual)	Approved
	052-206-2116	Service Bus Bars	052 - Engineer (Individual)	Approved
	052-206-2119	Perform an Insulation Resistance Test to Determine the Condition of the Insulation	052 - Engineer (Individual)	Approved
	052-206-2122	Service a Switchgear Enclosure	052 - Engineer (Individual)	Approved
	052-206-2123	Perform a Power Factor and Dissipation Factor Test	052 - Engineer (Individual)	Approved
	052-206-2124	Service an Air-Magnetic Circuit Breaker	052 - Engineer (Individual)	Approved
	052-206-2127	Service a Sulfur Hexafluoride (SF6) Circuit Breaker	052 - Engineer (Individual)	Approved
	052-206-2133	Identify Electrical Faults Using an Infrared (IR) Camera	052 - Engineer (Individual)	Approved
	052-206-2134	Service a Sulfur Hexafluoride (SF6) Switch	052 - Engineer (Individual)	Approved
	052-206-2135	Service a Vacuum Circuit Breaker	052 - Engineer (Individual)	Approved
	052-207-2118	Service an Induction Disk and/or Electromagnetic Relay	052 - Engineer (Individual)	Approved
	052-210-1012	Manage the Construction/Repair of Electrical Utilities	052 - Engineer (Individual)	Approved
	052-210-1101	Manage Risk Management of Power Generation Systems	052 - Engineer (Individual)	Approved
	052-210-1102	Develop a Power Plant Safety SOP	052 - Engineer (Individual)	Approved

	052-210-1103	Manage Installation of a Medium Voltage Non-Aerial Air Switch	052 - Engineer (Individual)	Approved
	052-210-1104	Manage Lock out and Tag out Procedures	052 - Engineer (Individual)	Approved
	052-210-1106	Perform Quality Assurance (QA) Quality Control (QC)	052 - Engineer (Individual)	Approved
	052-210-1110	Manage Load Assessment	052 - Engineer (Individual)	Approved
	052-210-1117	Design a Temporary Medium Voltage Distribution System	052 - Engineer (Individual)	Approved
	052-210-1124	Manage Risk Mgmt Proc. for Power Systems	052 - Engineer (Individual)	Approved
	052-210-1134	Manage Construction Survey Operations	052 - Engineer (Individual)	Approved
	052-210-1136	Select a Temporary Power Plant Site	052 - Engineer (Individual)	Approved
	052-210-1144	Manage Disaster Relief Operations	052 - Engineer (Individual)	Approved
	052-239-3001	Prepare a Bill of Materials	052 - Engineer (Individual)	Approved
	052-239-3029	Schedule Work	052 - Engineer (Individual)	Approved
	052-239-3030	Read Construction Prints	052 - Engineer (Individual)	Approved
	052-239-3030	Read Construction Prints (DRAFT)	052 - Engineer (Individual)	Analysis
	052-244-2102	Splice a Medium-Voltage Power Cable	052 - Engineer (Individual)	Approved
	052-244-2103	Terminate a Medium-Voltage Power Cable	052 - Engineer (Individual)	Approved
	052-244-2105	Rescue a Victim From a Nonaerial Electrical Conductor	052 - Engineer (Individual)	Approved
	052-244-2106	Perform Preventive Maintenance on Safety Equipment	052 - Engineer (Individual)	Approved
	052-244-2108	Repair a Low-Voltage Power or Control Cable	052 - Engineer (Individual)	Analysis
	052-244-2112	Perform Lockout and Tagout Procedures	052 - Engineer (Individual)	Approved
	052-244-2118	Perform Preventive-Maintenance Checks and Services (PMCS) on a Mobile Electric Power (MEP)-012 or -208 Generator	052 - Engineer (Individual)	Approved
	052-244-2121	Read an Electrical One-Line Diagram	052 - Engineer (Individual)	Approved
	052-244-2122	Read an Electrical Schematic	052 - Engineer (Individual)	Analysis
	052-244-2127	Identify the Hazards of a Power Generation and Distribution System	052 - Engineer (Individual)	Approved
	052-244-2130	Perform a Load Assessment	052 - Engineer (Individual)	Approved
	052-244-2138	Install Low-Voltage Wiring	052 - Engineer (Individual)	Approved
	052-244-3101	Check Power Plant to Load Compatibility	052 - Engineer (Individual)	Approved
	052-244-3107	Design a Temporary Medium-Voltage Distribution System	052 - Engineer (Individual)	Analysis
	052-244-4202	Perform a Power Plant After-Installation Inspection	052 - Engineer (Individual)	Approved

Supporting Drill Task(s): None

TADSS

Step ID	TADSS ID	Title	Product Type	Quantity
No TADSS specified				

Equipment (LIN)

Step ID	LIN	Nomenclature	Qty
No equipment specified			

Materiel Items (NSN)

Step ID	NSN	LIN	Title	Qty
No equipment specified				

Environment: Environmental protection is not just the law but the right thing to do. It is a continual process and starts with deliberate planning. Always be alert to ways to protect our environment during training and missions. In doing so, you will contribute to the sustainment of our training resources while protecting people and the environment from harmful effects. Refer to FM 3-34.5 Environmental Considerations and GTA 05-08-002 ENVIRONMENTAL-RELATED RISK ASSESSMENT

Safety: In a training environment, leaders must perform a risk assessment in accordance with FM 5-19, Composite Risk Management. Leaders will complete a DA Form 7566 COMPOSITE RISK MANAGEMENT WORKSHEET during the planning and completion of each task and sub-task by assessing mission, enemy, terrain and weather, troops and support available-time available and civil considerations, (METT-TC). Note: During MOPP training, leaders must ensure personnel are monitored for potential heat injury. Local policies and procedures must be followed during times of increased heat category in order to avoid heat related injury. Consider the MOPP work/rest cycles and water replacement guidelines IAW FM 3-11.4, NBC Protection, FM 3-11.5, CBRN Decontamination. In a training environment, leaders must perform a risk assessment in accordance with FM 5-19, Composite Risk Management. Leaders will complete a DA Form 7566 COMPOSITE RISK MANAGEMENT WORKSHEET during the planning and completion of each task and sub-task by assessing mission, enemy, terrain and weather, troops and support available-time available and civil considerations, (METT-TC). Note: During MOPP training, leaders must ensure personnel are monitored for potential heat injury. Local policies and procedures must be followed during times of increased heat category in order to avoid heat related injury. Consider the MOPP work/rest cycles and water replacement guidelines IAW FM 3-11.4, NBC Protection, FM 3-11.5, CBRN Decontamination.