



Instrument/Control/Relay/Meter Technician

HISTORIC DACUM CHART FOR INSTRUMENT/CONTROL/ RELAY/METER TECHNICIAN

DACUM Panel

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Duty A: Troubleshoot Systems						
Tasks						
A-1 Obtain problem-specific documents (instructional manual, prints)	A-2 Obtain problem-specific test equipment	A-3 Assess parts/supplies for repair(s)	A-4 Gather problem-specific data	A-5 Obtain problem-specific clearances (take out of service)	A-6 Perform problem-specific troubleshooting technique	A-7 Perform problem-specific repair(s)
A-8 Perform system/equipment test	A-9 Release problem-specific clearances (back into service)	A-10 Complete work order report	A-11 Present knowledge/problem findings to others			

Duty B: Repair/Replace Control Systems					
Tasks					
B-1 Repair power circuit breaker controls	B-2 Repair power transformer controls	B-3 Repair disconnects controls	B-4 Repair station service control(s)	B-5 Repair valve positioners	B-6 Repair pressure/level and temperature controllers
B-7 Repair gauges	B-8 Repair programmable logic control	B-9 Repair data recorders	B-10 Repair pumps	B-11 Repair regulator controls	B-12 Repair capacitor controls
B-13 Repair transmitters	B-14 Repair receivers	B-15 Replace thermocouple	B-16 Replace resistance temperature device (RTD)		

Duty C: Perform System Functional Tests				
Tasks				
C-1 Perform meter/relay in-service tests	C-2 Perform control/instrument tests	C-3 Perform protective relay system tests	C-4 Perform control systems functional test	C-5 Perform metering functional test

Duty D: Perform Protective Relay Calibration Tests						
Tasks						
D-1 Conduct over current relaying	D-2 Conduct differential relaying	D-3 Conduct distance relaying	D-4 Conduct breaker failure relaying	D-5 Conduct communication-aided tripping	D-6 Conduct voltage relaying	D-7 Conduct frequency relaying
D-8 Conduct pilot relaying						

Duty E: Perform Instrumentation Calibration Tests					
Tasks					
E-1 Conduct temperature calibration test	E-2 Conduct flow calibration test	E-3 Conduct pressure calibration test	E-4 Conduct vibration calibration test	E-5 Conduct voltage calibration test	E-6 Conduct current calibration test

Duty F: Perform Metering System Calibration Tests				
Tasks				
F-1 Conduct full load test	F-2 Conduct lead/lag test	F-3 Conduct element balance test	F-4 Conduct light load test	F-5 Conduct power supply test

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Duty G: Plan Work Process						
Tasks						
G-1 Receive job-specific work order	G-2 Obtain system-specific clearances (take out of service)	G-3 Obtain system-specific test equipment	G-4 Release system-specific clearances (return to service)	G-5 Maintain equipment records	G-6 Complete work order report	

Duty H: Maintain Documentation						
Tasks						
H-1 Obtain system-specific documents	H-2 Maintain process system drawings	H-3 Maintain calibration records	H-4 Maintain technical information resource library	H-5 Generate incident reports	H-6 Prepare and submit time sheets	H-7 Participate in tailboard safety process

Duty I: Maintain Inventories						
Tasks						
I-1 Request materials and supplies	I-2 Maintain inventory control	I-3 Receive and verify inventory	I-4 Procure job-specific inventory	I-5 Research vendor/customer lists	I-6 Assess parts/supplies needed for maintenance	

INSTRUMENT/CONTROL/
RELAY/METER TECHNICIAN
Skill Standards Template A

Summary of Highest Ranked Tasks for Instrument/Control/
Relay/Meter Technician

Function/Duty A: Troubleshoot Systems

Tasks:

- A-3 Assess parts/supplies for repair(s)
- A-4 Gather problem-specific data
- A-5 Obtain problem-specific clearances (take out of service)
- A-6 Perform problem-specific troubleshooting technique
- A-7 Perform problem-specific repair(s)
- A-8 Perform system/equipment test

Function/Duty B: Repair/Replace Control Systems

Tasks:

- B-1 Repair power circuit breaker controls
- B-2 Repair power transformer controls
- B-5 Repair valve positioners
- B-6 Repair pressure/level & temperature controllers
- B-8 Repair programmable logic control
- B-11 Repair regulator controls
- B-12 Repair capacitor controls
- B-13 Repair transmitters
- B-14 Repair receivers

Function/Duty C: Perform System Functional Tests

Tasks:

- C-2 Perform control/instrument tests
- C-3 Perform protective relay system tests
- C-4 Perform control systems functional tests

Function/Duty D: Perform Protective Relay Calibration Tests

Tasks:

- D-1 Conduct over current relaying
- D-2 Conduct differential relaying
- D-3 Conduct distance relaying
- D-4 Conduct breaker failure relaying
- D-5 Conduct communication-aided tripping
- D-6 Conduct voltage relaying
- D-7 Conduct frequency relaying
- D-8 Conduct pilot relaying

Function/Duty E: Perform Instrumentation Calibration Tests

Tasks:

- E-1 Conduct temperature calibration test
- E-5 Conduct voltage calibration test
- E-6 Conduct current calibration test

Function/Duty F: Perform Metering System Calibration Tests

Tasks:

- F-1 Conduct full load calibration test
- F-2 Conduct lead/lag calibration test
- F-3 Conduct element balance calibration test
- F-4 Conduct light load calibration test

Function/Duty G: Plan Work Process

Tasks:

- G-2 Obtain system-specific clearances (take out of service)
- G-4 Release system-specific clearances (return to service)
- G-5 Maintain equipment records

Function/Duty H: Maintain Documentation

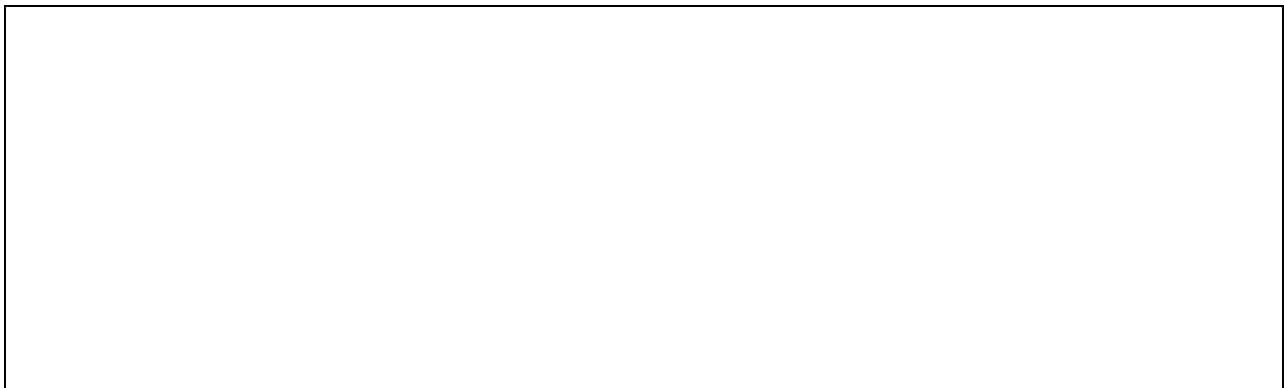
Tasks:

- H-2 Maintain process system drawings
- H-7 Participate in tailboard safety process

Function/Duty I: Maintain Inventories

Tasks:

- I-4 Procure job-specific inventory
- I-6 Maintain inventory control



Instrument/Control/Relay/Meter Technician Picture



Occupation Cluster: Instrument/Control/Relay/Meter Technician
Function or Job Duty: Duty A: Troubleshoot Systems

TASK	Performance Criteria How do we know when the task is performed well?	Technical Knowledge of Skills, Abilities, Tools	SCANS Skills and Personal Qualities Foundational Abilities
A-3 Assess parts/supplies for repair(s)	<ul style="list-style-type: none"> Organization/vendor lists are checked for parts/supplies. Parts/supplies requirements are communicated to appropriate personnel. All required tools, parts and supplies for the repair are identified and obtained for the repair in the correct amount. Part/supply allocation and routing are documented according to organization rules and regulations. Proper material handling procedures are followed. 	<ul style="list-style-type: none"> Parts/supplies required for the repair, and/or where to obtain that information. How to locate parts/supplies and parts and supplier vendors. Parts/supplies allocation and routing documentation procedures and ability to identify material(s). Equipment systems and component requirements. Documentation procedures. 	<ul style="list-style-type: none"> Identifies relevant details, facts and specifications and follows set of instructions. Identifies available technology and understands the requirements of the task and the technological results. Interpret information and analyze possible causes. Acquires and distributes parts and supplies.
A-4 Gather problem-specific data	<ul style="list-style-type: none"> Technician/Operator and their logs are consulted to determine the nature of the problem. Equipment repair and diagnostics reports are checked for previous problems. Equipment is checked to identify problems. Appropriate and accurate sources of information are consulted such as prints, OEM manuals, process diagrams, etc. All safety procedures are followed. 	<ul style="list-style-type: none"> Recognizing and categorizing problems. Equipment/machine operations and functions. Operator/technician logs and equipment repair and diagnostics reports. Checking the safety of the equipment. Sources of equipment-specific information. Vendor equipment and employer's terms and terminology. 	<ul style="list-style-type: none"> Monitors system performance. Identifies the problem, analyzes possible causes/reasons, evaluates solutions and devises action plan. Identifies relevant details, facts, specifications, follows set of instructions. Translates and interprets blueprints, drawings, diagrams. Utilizes integrated/multiple software and locates and retrieves stored information.
A-5 Obtain problem-specific clearances (take out of service)	<ul style="list-style-type: none"> Lockout and tag-out procedures are followed. Plan is developed which includes timeline, equipment, and personnel required to do the job. All required permits are obtained and all laws and regulations are followed. The proper workers are scheduled to ensure effectiveness, efficiency and safety. All requirements, quality and performance expeditions are communicated to team/crew in an effective manner before work is started. 	<ul style="list-style-type: none"> Special tools and parts. Locating information regarding retooled parts and manufacturers' and employer's specifications. Part ordering procedures. Maintenance staffing schedules and skills. Existing preventative maintenance (PM) protocols and PM sheets. 	<ul style="list-style-type: none"> Identifies relevant details, facts, specifications, follows set of instructions. Understands technology applications. Manipulate technology for desired results. Acquires supplies and equipment. Utilizes integrated software, locates and retrieves stored information.

Occupation Cluster: **Instrument/Control/Relay/Meter Technician**
Function or Job Duty: **Duty A: Troubleshoot Systems**

TASK	Performance Criteria How do we know when the task is performed well?	Technical Knowledge of Skills, Abilities, Tools	SCANS Skills and Personal Qualities Foundational Abilities
A-6 Perform problem-specific troubleshooting technique	<ul style="list-style-type: none"> • Appropriate identification process is used to determine potential problems. • All contributing factors are considered when determining potential problems, including operator logs and equipment, repair and diagnostic reports. • Appropriate tests and inspections are performed on failed components and repeated if necessary. • Data gathered through diagnostic procedures is analyzed to develop a hypothesis regarding possible causes. • Procedure for isolating problems is initiated correctly and followed through completely. • All safety procedures are followed. 	<ul style="list-style-type: none"> • Identification processes, tests and inspections for failed components. • Normal and abnormal equipment behavior and operations and manufacturers' performance specifications. • Nature and possible causes of failure. • Diagnostic tests and test equipment and ability to disassemble equipment. • Safety procedures and personal protective equipment. 	<ul style="list-style-type: none"> • Monitors system performance. • Identifies relevant details, facts, specifications, follows set of instructions and qualifies/analyzes information. • Troubleshoots malfunction/failure, and diagnoses performance deviations. • Selects data relevant to the task, predicts outcomes and analyzes data. • Prioritizes daily tasks, and monitors and adjusts task sequence.
A-7 Perform problem-specific repair(s)	<ul style="list-style-type: none"> • All required tools for the repair are assembled prior to the work. • Tools are checked to ensure they are in safe and proper working order. • Appropriate reference material is selected. • Proper personal protective equipment is inspected and worn. • Existing repair procedures are followed in accordance with OEM manuals or employer's procedures and correct disassembly, repair and reassembly procedures are used. • Repairs are completed within specified time frames. • Equipment is safely checked and a test run performed prior to return to service. • Corrective actions are communicated to appropriate personnel and recommendations for changes in preventative maintenance are communicated clearly. • Documentation is completed for the repair. 	<ul style="list-style-type: none"> • Tools required to perform repair, and/or where to obtain them. • How tools should work and be used. • Equipment reference materials. • Equipment and vendor terminology. • Safety procedures and personal protective equipment. • Repair procedures, disassembly, repair and reassembly procedures. • Safety checks and ability to perform test runs and postrepair tests. • Normal and abnormal equipment behavior and operation. • Documentation procedures. 	<ul style="list-style-type: none"> • Identifies relevant details, facts and specifications and follows set of instructions. • Identifies the problem, analyzes possible causes/reasons, and recommends action plan. • Identifies and corrects malfunctions/failures and evaluates performance of technology. • Acquires supplies and equipment and uses them in a safe and efficient manner. • Monitor personal performance (workmanship) and accept responsibility. • Summarize and translate mathematical data.

Occupation Cluster: **Instrument/Control/Relay/Meter Technician**
 Function or Job Duty: **Duty A: Troubleshoot Systems**

TASK	Performance Criteria	Technical Knowledge of	SCANS Skills and Personal Qualities
	How do we know when the task is performed well?	Skills, Abilities, Tools	Foundational Abilities
A-8 Perform system/ equipment test	<ul style="list-style-type: none"> • Safety checklist is thoroughly completed and checklist results are correctly documented. • Required parts, tools, and equipment are gathered prior to testing the equipment and are used to perform the test safely and efficiently. • Equipment is testrun to ensure it is operating properly and safely. Corrective measures are taken if not running properly. • Appropriate items are inspected and verified according to the preventative maintenance (PM) schedule. • Readiness of equipment to come back into operation is communicated and documented. • Process is repeated to double-check that equipment is working properly. 	<ul style="list-style-type: none"> • Test running equipment. • Required parts, tools, and equipment to perform test. • Inspection procedures. • Normal and abnormal equipment operation. • Corrective measures for equipment. • Documentation and verification procedures. 	<ul style="list-style-type: none"> • Identifies relevant details, facts and specifications and follows set of instructions. • Understands technology applications, manipulates technology for desired results and analyzes technology output. • Pays attention to details. • Monitors performance standards and follows up on assigned tasks. • Identifies and corrects malfunctions/failures. • Summarize and translate mathematical and analytical data.

Occupation Cluster: Instrument/Control/Relay/Meter Technician
Function or Job Duty: Duty B: Repair/Replace Control Systems

TASK	Performance Criteria	Technical Knowledge of Skills, Abilities, Tools	SCANS Skills and Personal Qualities Foundational Abilities
B-1 Repair power circuit breaker controls	<ul style="list-style-type: none"> • Possible causes of failure are identified by drawing on available information, past experience, technician feedback and knowledge of equipment. • Equipment, repair and diagnostics reports are checked for previous problems. • The appropriate reference material for the repair is selected. • Appropriate equipment, tools, and materials are used safely and effectively. • Proper personal protective equipment is worn. • Proper diagnostic tests are performed and repeated as necessary to determine the nature of the problem. • Components needed for repairs are properly identified including serial numbers and model numbers. • Existing repair procedures are followed in accordance with OEM manuals or employer's procedures/specifications. • Correct disassembly, repair/replacement and reassembly procedures are used. • The equipment is test-run to ensure it is operating properly and safely and if equipment is not operational, corrective measures are taken. • Documentation and verification are performed according to employer's policies and procedures. • Preventative maintenance schedule is properly adjusted to reflect repairs made. 	<ul style="list-style-type: none"> • Equipment reference materials and locating required information within reference materials. • Equipment and vendor terminology. • Safety procedures, safety checks and personal protective equipment. • Electrical systems, their components and their relationship to each other. • Safe and proper use of tools, equipment and materials. • Read parts catalogs and identify correct parts/components for repair. • Normal and abnormal equipment operation and behavior. • Diagnostic tests and test equipment. • The nature and possible causes of failure and procedures for isolating problems. • Repair procedures and disassembly, repair/replacement and reassembly procedures. • Preventative maintenance protocols and preventative maintenance revision procedures. • Employer's forms (both location and how to fill out) regarding documentation and filing. 	<ul style="list-style-type: none"> • Evaluate performance of technology and analyze failures. • Understands basics of electricity, mechanical devices and troubleshooting techniques for each. • Generate/evaluate solutions and devise/implement plan of action. • Summarize and translate mathematical data. • Maintain tools and supplies and use them in a safe manner. • Determine system components to be modified or repaired. • Interpret symbols, diagrams, schematics, and analyze application. • Monitor/adjust key activity sequence and prepare schedule. • Interprets and provides accurate information, prepares basic summaries and reports. • Utilize integrated/multiple software.

Occupation Cluster: Instrument/Control/Relay/Meter Technician
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TASK	Performance Criteria How do we know when the task is performed well?	Technical Knowledge of Skills, Abilities, Tools	SCANS Skills and Personal Qualities Foundational Abilities
B-2 Repair power transformer controls	<ul style="list-style-type: none"> Possible causes of failure are identified by drawing on available information, past experience, technician feedback and knowledge of equipment. Equipment, repair and diagnostics reports are checked for previous problems. The appropriate reference material for the repair is selected. Appropriate equipment, tools, and materials are used safely and effectively. Proper personal protective equipment is worn. Proper diagnostic tests are performed and repeated as necessary to determine the nature of the problem. Components needed for repairs are properly identified including serial numbers and model numbers. Existing repair procedures are followed in accordance with OEM manuals or employer's procedures/specifications. Correct disassembly, repair/replacement and reassembly procedures are used. The equipment is test-run to ensure it is operating properly and safely and if equipment is not operational, corrective measures are taken. Documentation and verification are performed according to employer's policies and procedures. Preventative maintenance schedule is properly adjusted to reflect repairs made. 	<ul style="list-style-type: none"> Equipment reference materials and locating required information within reference materials. Equipment and vendor terminology. Safety procedures, safety checks and personal protective equipment. Electrical systems, their components and their relationship to each other. Safe and proper use of tools, equipment and materials. Read parts catalogs and identify correct parts/components for repair. Normal and abnormal equipment operation and behavior. Diagnostic tests and test equipment. The nature and possible causes of failure and procedures for isolating problems. Repair procedures and disassembly, repair/replacement and reassembly procedures. Preventative maintenance protocols and preventative maintenance revision procedures. Employer's forms (both location and how to fill out) regarding documentation and filing. 	<ul style="list-style-type: none"> Evaluate performance of technology and analyze failures. Understands basics of electricity, mechanical devices and troubleshooting techniques for each. Generate/evaluate solutions and devise/implement plan of action. Summarize and translate mathematical data. Maintain tools and supplies and use them in a safe manner. Determine system components to be modified or repaired. Interpret symbols, diagrams, schematics, and analyze application. Monitor/adjust key activity sequence and prepare schedule. Interprets and provides accurate information, prepares basic summaries and reports. Utilize integrated/multiple software.

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Function or Job Duty: Duty B: Repair/Replace Control Systems

TASK	Performance Criteria	Technical Knowledge of	SCANS Skills and
	How do we know when the task is performed well?	Skills, Abilities, Tools	Personal Qualities Foundational Abilities
B-5 Repair valve positioners	<ul style="list-style-type: none"> Possible causes of failure are identified by drawing on available information, past experience, technician feedback and knowledge of equipment. Equipment, repair and diagnostics reports are checked for previous problems. The appropriate reference material for the repair is selected. Appropriate equipment, tools, and materials are used safely and effectively. Proper personal protective equipment is worn. Proper diagnostic tests are performed and repeated as necessary to determine the nature of the problem. Components needed for repairs are properly identified including serial numbers and model numbers. Existing repair procedures are followed in accordance with OEM manuals or employer's procedures/specifications. Correct disassembly, repair/replacement and reassembly procedures are used. The equipment is test-run to ensure it is operating properly and safely and if equipment is not operational, corrective measures are taken. Documentation and verification are performed according to employer's policies and procedures. Preventative maintenance schedule is properly adjusted to reflect repairs made. 	<ul style="list-style-type: none"> Equipment reference materials and locating required information within reference materials. Equipment and vendor terminology. Safety procedures, safety checks and personal protective equipment. Electrical systems, their components and their relationship to each other. Safe and proper use of tools, equipment and materials. Read parts catalogs and identify correct parts/components for repair. Normal and abnormal equipment operation and behavior. Diagnostic tests and test equipment. The nature and possible causes of failure and procedures for isolating problems. Repair procedures and disassembly, repair/replacement and reassembly procedures. Preventative maintenance protocols and preventative maintenance revision procedures. Employer's forms (both location and how to fill out) regarding documentation and filing. 	<ul style="list-style-type: none"> Evaluate performance of technology and analyze failures. Understands basics of electricity, mechanical devices and troubleshooting techniques for each. Generate/evaluate solutions and devise/implement plan of action. Summarize and translate mathematical data. Maintain tools and supplies and use them in a safe manner. Determine system components to be modified or repaired. Interpret symbols, diagrams, schematics, and analyze application. Monitor/adjust key activity sequence and prepare schedule. Interprets and provides accurate information, prepares basic summaries and reports. Utilize integrated/multiple software.

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Function or Job Duty: Duty B: Repair/Replace Control Systems

TASK	Performance Criteria	Technical Knowledge of	SCANS Skills and
	How do we know when the task is performed well?	Skills, Abilities, Tools	Personal Qualities Foundational Abilities
B-6 Repair pressure/ level & temperature controllers	<ul style="list-style-type: none"> Possible causes of failure are identified by drawing on available information, past experience, technician feedback and knowledge of equipment. Equipment, repair and diagnostics reports are checked for previous problems. The appropriate reference material for the repair is selected. Appropriate equipment, tools, and materials are used safely and effectively. Proper personal protective equipment is worn. Proper diagnostic tests are performed and repeated as necessary to determine the nature of the problem. Components needed for repairs are properly identified including serial numbers and model numbers. Existing repair procedures are followed in accordance with OEM manuals or employer's procedures/specifications. Correct disassembly, repair/replacement and reassembly procedures are used. The equipment is test-run to ensure it is operating properly and safely and if equipment is not operational, corrective measures are taken. Documentation and verification are performed according to employer's policies and procedures. Preventative maintenance schedule is properly adjusted to reflect repairs made. 	<ul style="list-style-type: none"> Equipment reference materials and locating required information within reference materials. Equipment and vendor terminology. Safety procedures, safety checks and personal protective equipment. Electrical systems, their components and their relationship to each other. Safe and proper use of tools, equipment and materials. Read parts catalogs and identify correct parts/components for repair. Normal and abnormal equipment operation and behavior. Diagnostic tests and test equipment. The nature and possible causes of failure and procedures for isolating problems. Repair procedures and disassembly, repair/replacement and reassembly procedures. Preventative maintenance protocols and preventative maintenance revision procedures. Employer's forms (both location and how to fill out) regarding documentation and filing. 	<ul style="list-style-type: none"> Evaluate performance of technology and analyze failures. Understands basics of electricity, mechanical devices and troubleshooting techniques for each. Generate/evaluate solutions and devise/implement plan of action. Summarize and translate mathematical data. Maintain tools and supplies and use them in a safe manner. Determine system components to be modified or repaired. Interpret symbols, diagrams, schematics, and analyze application. Monitor/adjust key activity sequence and prepare schedule. Interprets and provides accurate information, prepares basic summaries and reports. Utilize integrated/multiple software.

Occupation Cluster: Instrument/Control/Relay/Meter Technician
Function or Job Duty: Duty B: Repair/Replace Control Systems

TASK	Performance Criteria How do we know when the task is performed well?	Technical Knowledge of Skills, Abilities, Tools	SCANS Skills and Personal Qualities Foundational Abilities
B-8 Repair programmable logic control	<ul style="list-style-type: none"> Possible causes of failure are identified by drawing on available information, past experience, technician feedback and knowledge of equipment. Equipment, repair and diagnostics reports are checked for previous problems. The appropriate reference material for the repair is selected. Appropriate equipment, tools, and materials are used safely and effectively. Proper personal protective equipment is worn. Proper diagnostic tests are performed and repeated as necessary to determine the nature of the problem. Components needed for repairs are properly identified including serial numbers and model numbers. Existing repair procedures are followed in accordance with OEM manuals or employer's procedures/specifications. Correct disassembly, repair/replacement and reassembly procedures are used. The equipment is test run to ensure it is operating properly and safely and if equipment is not operational, corrective measures are taken. Documentation and verification are performed according to employer's policies and procedures. Preventative maintenance schedule is properly adjusted to reflect repairs made. 	<ul style="list-style-type: none"> Equipment reference materials and locating required information within reference materials. Equipment and vendor terminology. Safety procedures, safety checks and personal protective equipment. Electrical systems, their components and their relationship to each other. Safe and proper use of tools, equipment and materials. Read parts catalogs and identify correct parts/components for repair. Normal and abnormal equipment operation and behavior. Diagnostic tests and test equipment. The nature and possible causes of failure and procedures for isolating problems. Repair procedures and disassembly, repair/replacement and reassembly procedures. Preventative maintenance protocols and preventative maintenance revision procedures. Employer's forms (both location and how to fill out) regarding documentation and filing. 	<ul style="list-style-type: none"> Evaluate performance of technology and analyze failures. Understands basics of electricity, mechanical devices and troubleshooting techniques for each. Generate/evaluate solutions and devise/implement plan of action. Summarize and translate mathematical data. Maintain tools and supplies and use them in a safe manner. Determine system components to be modified or repaired. Interpret symbols, diagrams, schematics, and analyze application. Monitor/adjust key activity sequence and prepare schedule. Interprets and provides accurate information, prepares basic summaries and reports. Utilize integrated/multiple software.

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Function or Job Duty: Duty B: Repair/Replace Control Systems

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	How do we know when the task is performed well?	Skills, Abilities, Tools	Personal Qualities Foundational Abilities
B-11 Repair regulator controls	<ul style="list-style-type: none"> Possible causes of failure are identified by drawing on available information, past experience, technician feedback and knowledge of equipment. Equipment, repair and diagnostics reports are checked for previous problems. The appropriate reference material for the repair is selected. Appropriate equipment, tools, and materials are used safely and effectively. Proper personal protective equipment is worn. Proper diagnostic tests are performed and repeated as necessary to determine the nature of the problem. Components needed for repairs are properly identified including serial numbers and model numbers. Existing repair procedures are followed in accordance with OEM manuals or employer's procedures/specifications. Correct disassembly, repair/replacement and reassembly procedures are used. The equipment is test-run to ensure it is operating properly and safely and if equipment is not operational, corrective measures are taken. Documentation and verification are performed according to employer's policies and procedures. Preventative maintenance schedule is properly adjusted to reflect repairs made. 	<ul style="list-style-type: none"> Equipment reference materials and locating required information within reference materials. Equipment and vendor terminology. Safety procedures, safety checks and personal protective equipment. Electrical systems, their components and their relationship to each other. Safe and proper use of tools, equipment and materials. Read parts catalogs and identify correct parts/components for repair. Normal and abnormal equipment operation and behavior. Diagnostic tests and test equipment. The nature and possible causes of failure and procedures for isolating problems. Repair procedures and disassembly, repair/replacement and reassembly procedures. Preventative maintenance protocols and preventative maintenance revision procedures. Employer's forms (both location and how to fill out) regarding documentation and filing. 	<ul style="list-style-type: none"> Evaluate performance of technology and analyze failures. Understands basics of electricity, mechanical devices and troubleshooting techniques for each. Generate/evaluate solutions and devise/implement plan of action. Summarize and translate mathematical data. Maintain tools and supplies and use them in a safe manner. Determine system components to be modified or repaired. Interpret symbols, diagrams, schematics, and analyze application. Monitor/adjust key activity sequence and prepare schedule. Interprets and provides accurate information, prepares basic summaries and reports. Utilize integrated/multiple software.

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B-12 Repair capacitor controls	<ul style="list-style-type: none"> Possible causes of failure are identified by drawing on available information, past experience, technician feedback and knowledge of equipment. Equipment, repair and diagnostics reports are checked for previous problems. The appropriate reference material for the repair is selected. Appropriate equipment, tools, and materials are used safely and effectively. Proper personal protective equipment is worn. Proper diagnostic tests are performed and repeated as necessary to determine the nature of the problem. Components needed for repairs are properly identified including serial numbers and model numbers. Existing repair procedures are followed in accordance with OEM manuals or employer's procedures/specifications. Correct disassembly, repair/replacement and reassembly procedures are used. The equipment is test-run to ensure it is operating properly and safely and if equipment is not operational, corrective measures are taken. Documentation and verification are performed according to employer's policies and procedures. Preventative maintenance schedule is properly adjusted to reflect repairs made. 	<ul style="list-style-type: none"> Equipment reference materials and locating required information within reference materials. Equipment and vendor terminology. Safety procedures, safety checks and personal protective equipment. Electrical systems, their components and their relationship to each other. Safe and proper use of tools, equipment and materials. Read parts catalogs and identify correct parts/components for repair. Normal and abnormal equipment operation and behavior. Diagnostic tests and test equipment. The nature and possible causes of failure and procedures for isolating problems. Repair procedures and disassembly, repair/replacement and reassembly procedures. Preventative maintenance protocols and preventative maintenance revision procedures. Employer's forms (both location and how to fill out) regarding documentation and filing. 	<ul style="list-style-type: none"> Evaluate performance of technology and analyze failures. Understands basics of electricity, mechanical devices and troubleshooting techniques for each. Generate/evaluate solutions and devise/implement plan of action. Summarize and translate mathematical data. Maintain tools and supplies and use them in a safe manner. Determine system components to be modified or repaired. Interpret symbols, diagrams, schematics, and analyze application. Monitor/adjust key activity sequence and prepare schedule. Interprets and provides accurate information, prepares basic summaries and reports. Utilize integrated/multiple software.

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Function or Job Duty: Duty B: Repair/Replace Control Systems

TASK	Performance Criteria How do we know when the task is performed well?	Technical Knowledge of Skills, Abilities, Tools	SCANS Skills and Personal Qualities Foundational Abilities
B-13 Repair transmitters	<ul style="list-style-type: none"> Possible causes of failure are identified by drawing on available information, past experience, technician feedback and knowledge of equipment. Equipment, repair and diagnostics reports are checked for previous problems. The appropriate reference material for the repair is selected. Appropriate equipment, tools, and materials are used safely and effectively. Proper personal protective equipment is worn. Proper diagnostic tests are performed and repeated as necessary to determine the nature of the problem. Components needed for repairs are properly identified including serial numbers and model numbers. Existing repair procedures are followed in accordance with OEM manuals or employer's procedures/specifications. Correct disassembly, repair/replacement and reassembly procedures are used. The equipment is test-run to ensure it is operating properly and safely and if equipment is not operational, corrective measures are taken. Documentation and verification are performed according to employer's policies and procedures. Preventative maintenance schedule is properly adjusted to reflect repairs made. 	<ul style="list-style-type: none"> Equipment reference materials and locating required information within reference materials. Equipment and vendor terminology. Safety procedures, safety checks and personal protective equipment. Electrical systems, their components and their relationship to each other. Safe and proper use of tools, equipment and materials. Read parts catalogs and identify correct parts/components for repair. Normal and abnormal equipment operation and behavior. Diagnostic tests and test equipment. The nature and possible causes of failure and procedures for isolating problems. Repair procedures and disassembly, repair/replacement and reassembly procedures. Preventative maintenance protocols and preventative maintenance revision procedures. Employer's forms (both location and how to fill out) regarding documentation and filing. 	<ul style="list-style-type: none"> Evaluate performance of technology and analyze failures. Understands basics of electricity, mechanical devices and troubleshooting techniques for each. Generate/evaluate solutions and devise/implement plan of action. Summarize and translate mathematical data. Maintain tools and supplies and use them in a safe manner. Determine system components to be modified or repaired. Interpret symbols, diagrams, schematics, and analyze application. Monitor/adjust key activity sequence and prepare schedule. Interprets and provides accurate information, prepares basic summaries and reports. Utilize integrated/multiple software.

Occupation Cluster: Instrument/Control/Relay/Meter Technician
Function or Job Duty: Duty B: Repair/Replace Control Systems

TASK	Performance Criteria	Technical Knowledge of	SCANS Skills and
	How do we know when the task is performed well?	Skills, Abilities, Tools	Personal Qualities Foundational Abilities
B-14 Repair receivers	<ul style="list-style-type: none"> Possible causes of failure are identified by drawing on available information, past experience, technician feedback and knowledge of equipment. Equipment, repair and diagnostics reports are checked for previous problems. The appropriate reference material for the repair is selected. Appropriate equipment, tools, and materials are used safely and effectively. Proper personal protective equipment is worn. Proper diagnostic tests are performed and repeated as necessary to determine the nature of the problem. Components needed for repairs are properly identified including serial numbers and model numbers. Existing repair procedures are followed in accordance with OEM manuals or employer's procedures/specifications. Correct disassembly, repair/replacement and reassembly procedures are used. The equipment is test-run to ensure it is operating properly and safely and if equipment is not operational, corrective measures are taken. Documentation and verification are performed according to employer's policies and procedures. Preventative maintenance schedule is properly adjusted to reflect repairs made. 	<ul style="list-style-type: none"> Equipment reference materials and locating required information within reference materials. Equipment and vendor terminology. Safety procedures, safety checks and personal protective equipment. Electrical systems, their components and their relationship to each other. Safe and proper use of tools, equipment and materials. Read parts catalogs and identify correct parts/components for repair. Normal and abnormal equipment operation and behavior. Diagnostic tests and test equipment. The nature and possible causes of failure and procedures for isolating problems. Repair procedures and disassembly, repair/replacement and reassembly procedures. Preventative maintenance protocols and preventative maintenance revision procedures. Employer's forms (both location and how to fill out) regarding documentation and filing. 	<ul style="list-style-type: none"> Evaluate performance of technology and analyze failures. Understands basics of electricity, mechanical devices and troubleshooting techniques for each. Generate/evaluate solutions and devise/implement plan of action. Summarize and translate mathematical data. Maintain tools and supplies and use them in a safe manner. Determine system components to be modified or repaired. Interpret symbols, diagrams, schematics, and analyze application. Monitor/adjust key activity sequence and prepare schedule. Interprets and provides accurate information, prepares basic summaries and reports. Utilize integrated/multiple software.

Occupation Cluster: Instrument/Control/Relay/Meter Technician
Function or Job Duty: Duty C: Perform System Functional Tests

TASK	Performance Criteria How do we know when the task is performed well?	Technical Knowledge of Skills, Abilities, Tools	SCANS Skills and Personal Qualities Foundational Abilities
C-2 Perform control/instrument tests	<ul style="list-style-type: none"> Equipment, repair and diagnostics reports are checked for previous testing. The required parts, tools and equipment are gathered prior to testing and are used to perform work safely and efficiently. Identify and use safety techniques established for the use of test and advanced testing equipment. OSHA/WISHA/OREGON OSHA organization standards as they relate to the electrical trades for job site safety are followed, including the use of personal protective equipment. Identify/comply with lockout/tag-out procedures, where applicable. Interpretations and questions to materials, specifications and diagnostics are discussed and resolved. Test procedures and methods are properly performed and test results are correctly interpreted. The test indicates that equipment performs to specification and meets safety standards. Suggestions for improvements in work methods and procedures in testing are shared and documented for future reference. The testing is documented and verified according to organization or manufacturer's procedures. Documentation is maintained according to policy and procedures, and submitted to correct parties for processing. Housekeeping is performed when testing is finished. 	<ul style="list-style-type: none"> Required parts, tools, and equipment to complete testing. Local codes and National Electrical Code (NEC) to calculate various general testing requirements. Safety procedures and personal protective equipment to use when working with electricity. Equipment operating manuals and ability to access model and serial numbers. Equipment and vendor terminology and documentation and how to access it. Software and its protocols, backup procedures and interface protocols. Type of information included in electrical specifications. Electrical laws and theories as they relate to testing and repair of electrical service. Identifying and interpreting symbols used in electric circuits. Normal and abnormal equipment behavior and their effect on testing. Analyzing testing results and processing data to complete the job. Lockout/tag-out procedures. Recognizing unsafe job/working conditions. Documentation and verification procedures and procedures to revising testing process. Housekeeping procedures. 	<ul style="list-style-type: none"> Identify relevant details, facts and specifications, and follow a set of instructions. Monitors system performance. Understands electrical wiring diagrams, schematics, and plans. Identifies and corrects malfunctions and failures and evaluates performance of technology. Understands technology applications and manipulates technology for desired results and analyzes technology output. Distinguish trends in performance and diagnose performance deviations. Solicits assistance for creative solutions to new and existing situations. Summarizes and translates mathematical data. Interprets and provides accurate information and prepares basic summaries and reports. Understands computer operation and utilizes integrated software and locates and retrieves stored information.

Occupation Cluster: Instrument/Control/Relay/Meter Technician
Function or Job Duty: Duty C: Perform System Functional Tests

TASK	Performance Criteria	Technical Knowledge of	SCANS Skills and
	How do we know when the task is performed well?	Skills, Abilities, Tools	Personal Qualities Foundational Abilities
C-3 Perform protective relay system tests	<ul style="list-style-type: none"> Equipment, repair and diagnostics reports are checked for previous testing. The required parts, tools and equipment are gathered prior to testing and are used to perform work safely and efficiently. Identify and use safety techniques established for the use of test and advanced testing equipment. OSHA/WISHA/OREGON OSHA/organization standards as they relate to the electrical trades for job site safety are followed, including the use of personal protective equipment. Identify/comply with lockout/tag-out/clearance procedures, where applicable. Interpretations and questions to materials, specifications and diagnostics are discussed and resolved. Test procedures and methods are properly performed and test results are correctly interpreted. The test indicates that equipment performs to specification and meets safety standards. Suggestions for improvements in work methods and procedures in testing are shared and documented for future reference. The testing is documented and verified according to organization or manufacturer's procedures. Documentation is maintained according to policy and procedures, and submitted to correct parties for processing. Housekeeping is performed when testing is finished. 	<ul style="list-style-type: none"> Required parts, tools, and equipment to complete testing. Local codes and National Electrical Code (NEC) to calculate various general testing requirements. Safety procedures and personal protective equipment to use when working with electricity. Equipment operating manuals and ability to access model and serial numbers. Equipment and vendor terminology and documentation and how to access it. Software and its protocols, backup procedures and interface protocols. Type of information included in electrical specifications. Electrical laws and theories as they relate to testing and repair of electrical service. Identifying and interpreting symbols used in electric circuits. Normal and abnormal equipment behavior and their effect on testing. Analyzing testing results and processing data to complete the job. Lockout/tag-out/clearance procedures. Recognizing unsafe job/working conditions. Documentation and verification procedures and procedures to revising testing process. Housekeeping procedures. 	<ul style="list-style-type: none"> Identify relevant details, facts and specifications, and follow a set of instructions. Monitors system performance. Understands electrical wiring diagrams, schematics, and plans. Identifies and corrects malfunctions and failures and evaluates performance of technology. Understands technology applications and manipulates technology for desired results and analyzes technology output. Distinguish trends in performance and diagnose performance deviations. Solicits assistance for creative solutions to new and existing situations. Summarizes and translates mathematical data. Interprets and provides accurate information and prepares basic summaries and reports. Understands computer operation and utilizes integrated software and locates and retrieves stored information.

Occupation Cluster: Instrument/Control/Relay/Meter Technician
Function or Job Duty: Duty C: Perform System Functional Tests

TASK	Performance Criteria	Technical Knowledge of	SCANS Skills and
	How do we know when the task is performed well?	Skills, Abilities, Tools	Personal Qualities Foundational Abilities
C-4 Perform control systems functional tests	<ul style="list-style-type: none"> Equipment, repair and diagnostics reports are checked for previous testing. The required parts, tools and equipment are gathered prior to testing and are used to perform work safely and efficiently. Identify and use safety techniques established for the use of test and advanced testing equipment. OSHA/WISHA/OREGON OSHA/organization standards as they relate to the electrical trades for job site safety are followed, including the use of personal protective equipment. Identify/comply with lockout/tag-out/clearance procedures, where applicable. Interpretations and questions to materials, specifications and diagnostics are discussed and resolved. Test procedures and methods are properly performed and test results are correctly interpreted. The test indicates that equipment performs to specification and meets safety standards. Suggestions for improvements in work methods and procedures in testing are shared and documented for future reference. The testing is documented and verified according to organization or manufacturer's procedures. Documentation is maintained according to policy and procedures, and submitted to correct parties for processing. Housekeeping is performed when testing is finished. 	<ul style="list-style-type: none"> Required parts, tools, and equipment to complete testing. Local codes and National Electrical Code (NEC) to calculate various general testing requirements. Safety procedures and personal protective equipment to use when working with electricity. Equipment operating manuals and ability to access model and serial numbers. Equipment and vendor terminology and documentation and how to access it. Software and its protocols, backup procedures and interface protocols. Type of information included in electrical specifications. Electrical laws and theories as they relate to testing and repair of electrical service. Identifying and interpreting symbols used in electric circuits. Normal and abnormal equipment behavior and their effect on testing. Analyzing testing results and processing data to complete the job. Lockout/tag-out/clearance procedures. Recognizing unsafe job/working conditions. Documentation and verification procedures and procedures to revising testing process. Housekeeping procedures. 	<ul style="list-style-type: none"> Identify relevant details, facts and specifications, and follow a set of instructions. Monitors system performance. Understands electrical wiring diagrams, schematics, and plans. Identifies and corrects malfunctions and failures and evaluates performance of technology. Understands technology applications and manipulates technology for desired results and analyzes technology output. Distinguish trends in performance and diagnose performance deviations. Solicits assistance for creative solutions to new and existing situations. Summarizes and translates mathematical data. Interprets and provides accurate information and prepares basic summaries and reports. Understands computer operation and utilizes integrated software and locates and retrieves stored information.

Occupation Cluster: Instrument/Control/Relay/Meter Technician
Function or Job Duty: Duty D: Perform Protective Relay Calibration Tests

TASK	Performance Criteria	Technical Knowledge of Skills, Abilities, Tools	SCANS Skills and Personal Qualities Foundational Abilities
D-1 Conduct over current relaying	<ul style="list-style-type: none"> • Determine the scheduled availability of the test item. • Review available test design plan and/or detailed test. • Acquire and review all descriptive, instructional, and specific reference material on the test. • Equipment/instrument is correctly calibrated in accordance with manufacturers' specifications utilizing the proper tool/test equipment. • Calibration methodology and frequency meet specifications. • Problems are accurately identified and corrected. • Calibrations are accurately and legibly documented. • Technicians/Quality Control are communicated with to ensure smooth operations. 	<ul style="list-style-type: none"> • Characteristics of required instrumentation and performance specifications of the individual equipment or system. • Sources of information and test plans. • Test equipment performance and manufacturer's specifications. • Necessary calibration tools. • Safety hazards and procedures. • Documentation procedures. • Certification and calibration of calibration equipment and the requirements for each. 	<ul style="list-style-type: none"> • Identifies and corrects malfunctions/failures and evaluates performance of technology. • Understands technology applications, manipulates technology for desired results and analyzes technology output. • Uses materials in a safe and efficient manner and maintains job specific supplies and equipment. • Performs basic computations and measurements, converts numerical data and predicts arithmetic results. • Records results and writes simple documents. • Understands computer operation and utilize integrated software.
D-2 Conduct differential relaying	<ul style="list-style-type: none"> • Determine the scheduled availability of the test item. • Review available test design plan and/or detailed test. • Acquire and review all descriptive, instructional, and specific reference material on the test. • Equipment/instrument is correctly calibrated in accordance with manufacturers' specifications utilizing the proper tool/test equipment. • Calibration methodology and frequency meet specifications. • Problems are accurately identified and corrected. • Calibrations are accurately and legibly documented. • Technicians/Quality Control are communicated with to ensure smooth operations. 	<ul style="list-style-type: none"> • Characteristics of required instrumentation and performance specifications of the individual equipment or system. • Sources of information and test plans. • Test equipment performance and manufacturer's specifications. • Necessary calibration tools. • Safety hazards and procedures. • Documentation procedures. • Certification and calibration of calibration equipment and the requirements for each. 	<ul style="list-style-type: none"> • Identifies and corrects malfunctions/failures and evaluates performance of technology. • Understands technology applications, manipulates technology for desired results and analyzes technology output. • Uses materials in a safe and efficient manner and maintains job specific supplies and equipment. • Performs basic computations and measurements, converts numerical data and predicts arithmetic results. • Records results and writes simple documents. • Understands computer operation and utilize integrated software.

Occupation Cluster: Instrument/Control/Relay/Meter Technician
Function or Job Duty: Duty D: Perform Protective Relay Calibration Tests

TASK	Performance Criteria How do we know when the task is performed well?	Technical Knowledge of Skills, Abilities, Tools	SCANS Skills and Personal Qualities Foundational Abilities
D-3 Conduct distance relaying	<ul style="list-style-type: none"> Determine the scheduled availability of the test item. Review available test design plan and/or detailed test. Acquire and review all descriptive, instructional, and specific reference material on the test. Equipment/instrument is correctly calibrated in accordance with manufacturers' specifications utilizing the proper tool/test equipment. Calibration methodology and frequency meet specifications. Problems are accurately identified and corrected. Calibrations are accurately and legibly documented. Technicians/Quality Control are communicated with to ensure smooth operations. 	<ul style="list-style-type: none"> Characteristics of required instrumentation and performance specifications of the individual equipment or system. Sources of information and test plans. Test equipment performance and manufacturer's specifications. Necessary calibration tools. Safety hazards and procedures Documentation procedures. Certification and calibration of calibration equipment and the requirements for each. 	<ul style="list-style-type: none"> Identifies and corrects malfunctions/failures and evaluates performance of technology. Understands technology applications, manipulates technology for desired results and analyzes technology output. Uses materials in a safe and efficient manner and maintains job specific supplies and equipment. Performs basic computations and measurements, converts numerical data and predicts arithmetic results. Records results and writes simple documents. Understands computer operation and utilize integrated software.
D-4 Conduct breaker failure relaying	<ul style="list-style-type: none"> Determine the scheduled availability of the test item. Review available test design plan and/or detailed test. Acquire and review all descriptive, instructional, and specific reference material on the test. Equipment/instrument is correctly calibrated in accordance with manufacturers' specifications utilizing the proper tool/test equipment. Calibration methodology and frequency meet specifications. Problems are accurately identified and corrected. Calibrations are accurately and legibly documented. Technicians/Quality Control are communicated with to ensure smooth operations. 	<ul style="list-style-type: none"> Characteristics of required instrumentation and performance specifications of the individual equipment or system. Sources of information and test plans. Test equipment performance and manufacturer's specifications. Necessary calibration tools. Safety hazards and procedures Documentation procedures. Certification and calibration of calibration equipment and the requirements for each. 	<ul style="list-style-type: none"> Identifies and corrects malfunctions/failures and evaluates performance of technology. Understands technology applications, manipulates technology for desired results and analyzes technology output. Uses materials in a safe and efficient manner and maintains job specific supplies and equipment. Performs basic computations and measurements, converts numerical data and predicts arithmetic results. Records results and writes simple documents. Understands computer operation and utilize integrated software.

Occupation Cluster: Instrument/Control/Relay/Meter Technician
Function or Job Duty: Duty D: Perform Protective Relay Calibration Tests

TASK	Performance Criteria How do we know when the task is performed well?	Technical Knowledge of Skills, Abilities, Tools	SCANS Skills and Personal Qualities Foundational Abilities
D-5 Conduct communication aided tripping	<ul style="list-style-type: none"> • Determine the scheduled availability of the test item. • Review available test design plan and/or detailed test. • Acquire and review all descriptive, instructional, and specific reference material on the test. • Equipment/instrument is correctly calibrated in accordance with manufacturers' specifications utilizing the proper tool/test equipment. • Calibration methodology and frequency meet specifications. • Problems are accurately identified and corrected. • Calibrations are accurately and legibly documented. • Technicians/Quality Control are communicated with to ensure smooth operations. 	<ul style="list-style-type: none"> • Characteristics of required instrumentation and performance specifications of the individual equipment or system. • Sources of information and test plans. • Test equipment performance and manufacturer's specifications. • Necessary calibration tools. • Safety hazards and procedures • Documentation procedures. • Certification and calibration of calibration equipment and the requirements for each. 	<ul style="list-style-type: none"> • Identifies and corrects malfunctions/failures and evaluates performance of technology. • Understands technology applications, manipulates technology for desired results and analyzes technology output. • Uses materials in a safe and efficient manner and maintains job specific supplies and equipment. • Performs basic computations and measurements, converts numerical data and predicts arithmetic results. • Records results and writes simple documents. • Understands computer operation and utilize integrated software.
D-6 Conduct voltage relaying	<ul style="list-style-type: none"> • Determine the scheduled availability of the test item. • Review available test design plan and/or detailed test. • Acquire and review all descriptive, instructional, and specific reference material on the test. • Equipment/instrument is correctly calibrated in accordance with manufacturers' specifications utilizing the proper tool/test equipment. • Calibration methodology and frequency meet specifications. • Problems are accurately identified and corrected. • Calibrations are accurately and legibly documented. • Technicians/Quality Control are communicated with to ensure smooth operations. 	<ul style="list-style-type: none"> • Characteristics of required instrumentation and performance specifications of the individual equipment or system. • Sources of information and test plans. • Test equipment performance and manufacturer's specifications. • Necessary calibration tools. • Safety hazards and procedures • Documentation procedures. • Certification and calibration of calibration equipment and the requirements for each. 	<ul style="list-style-type: none"> • Identifies and corrects malfunctions/failures and evaluates performance of technology. • Understands technology applications, manipulates technology for desired results and analyzes technology output. • Uses materials in a safe and efficient manner and maintains job specific supplies and equipment. • Performs basic computations and measurements, converts numerical data and predicts arithmetic results. • Records results and writes simple documents. • Understands computer operation and utilize integrated software.

Occupation Cluster: Instrument/Control/Relay/Meter Technician
Function or Job Duty: Duty D: Perform Protective Relay Calibration Tests

TASK	Performance Criteria	Technical Knowledge of Skills, Abilities, Tools	SCANS Skills and Personal Qualities Foundational Abilities
D-7 Conduct frequency relaying	<ul style="list-style-type: none"> • Determine the scheduled availability of the test item. • Review available test design plan and/or detailed test. • Acquire and review all descriptive, instructional, and specific reference material on the test. • Equipment/instrument is correctly calibrated in accordance with manufacturers' specifications utilizing the proper tool/test equipment. • Calibration methodology and frequency meet specifications. • Problems are accurately identified and corrected. • Calibrations are accurately and legibly documented. • Technicians/Quality Control are communicated with to ensure smooth operations. 	<ul style="list-style-type: none"> • Characteristics of required instrumentation and performance specifications of the individual equipment or system. • Sources of information and test plans. • Test equipment performance and manufacturer's specifications. • Necessary calibration tools. • Safety hazards and procedures • Documentation procedures. • Certification and calibration of calibration equipment and the requirements for each. 	<ul style="list-style-type: none"> • Identifies and corrects malfunctions/failures and evaluates performance of technology. • Understands technology applications, manipulates technology for desired results and analyzes technology output. • Uses materials in a safe and efficient manner and maintains job specific supplies and equipment. • Performs basic computations and measurements, converts numerical data and predicts arithmetic results. • Records results and writes simple documents. • Understands computer operation and utilize integrated software.
D-8 Conduct pilot relaying	<ul style="list-style-type: none"> • Determine the scheduled availability of the test item. • Review available test design plan and/or detailed test. • Acquire and review all descriptive, instructional, and specific reference material on the test. • Equipment/instrument is correctly calibrated in accordance with manufacturers' specifications utilizing the proper tool/test equipment. • Calibration methodology and frequency meet specifications. • Problems are accurately identified and corrected. • Calibrations are accurately and legibly documented. • Technicians/Quality Control are communicated with to ensure smooth operations. 	<ul style="list-style-type: none"> • Characteristics of required instrumentation and performance specifications of the individual equipment or system. • Sources of information and test plans. • Test equipment performance and manufacturer's specifications. • Necessary calibration tools. • Safety hazards and procedures • Documentation procedures. • Certification and calibration of calibration equipment and the requirements for each. 	<ul style="list-style-type: none"> • Identifies and corrects malfunctions/failures and evaluates performance of technology. • Understands technology applications, manipulates technology for desired results and analyzes technology output. • Uses materials in a safe and efficient manner and maintains job specific supplies and equipment. • Performs basic computations and measurements, converts numerical data and predicts arithmetic results. • Records results and writes simple documents. • Understands computer operation and utilize integrated software.

Occupation Cluster: Instrument/Control/Relay/Meter Technician
Function or Job Duty: Duty E: Perform Instrumentation Calibration Test

TASK	Performance Criteria How do we know when the task is performed well?	Technical Knowledge of Skills, Abilities, Tools	SCANS Skills and Personal Qualities Foundational Abilities
E-1 Conduct temperature calibration test	<ul style="list-style-type: none"> Determine the scheduled availability of the test item. Review available test design plan and/or detailed test. Acquire and review all descriptive, instructional, and specific reference material on the test. Equipment/instrument is correctly calibrated in accordance with manufacturers' specifications utilizing the proper tool/test equipment. Calibration methodology and frequency meet specifications. Problems are accurately identified and corrected. Calibrations are accurately and legibly documented. Technicians/Quality Control are communicated with to ensure smooth operations. 	<ul style="list-style-type: none"> Characteristics of required instrumentation and performance specifications of the individual equipment or system. Sources of information and test plans. Test equipment performance and manufacturer's specifications. Necessary calibration tools. Safety hazards and procedures for dealing with them. Documentation procedures. Certification and calibration of calibration equipment and the requirements for each. 	<ul style="list-style-type: none"> Understands technology applications, manipulates technology for desired results and analyzes technology output. Identifies and corrects malfunctions/failures and evaluates performance of technology. Uses materials in a safe and efficient manner and maintains job specific supplies and equipment. Performs basic computations and measurements, converts numerical data and predicts arithmetic results. Records results and writes simple documents. Understands computer operation and utilize integrated software.
E-5 Conduct voltage calibration test	<ul style="list-style-type: none"> Determine the scheduled availability of the test item. Review available test design plan and/or detailed test. Acquire and review all descriptive, instructional, and specific reference material on the test. Equipment/instrument is correctly calibrated in accordance with manufacturers' specifications utilizing the proper tool/test equipment. Calibration methodology and frequency meet specifications. Problems are accurately identified and corrected. Calibrations are accurately and legibly documented. Technicians/Quality Control are communicated with to ensure smooth operations. 	<ul style="list-style-type: none"> Characteristics of required instrumentation and performance specifications of the individual equipment or system. Sources of information and test plans. Test equipment performance and manufacturer's specifications. Necessary calibration tools. Safety hazards and procedures for dealing with them. Documentation procedures. Certification and calibration of calibration equipment and the requirements for each. 	<ul style="list-style-type: none"> Understands technology applications, manipulates technology for desired results and analyzes technology output. Identifies and corrects malfunctions/failures and evaluates performance of technology. Uses materials in a safe and efficient manner and maintains job specific supplies and equipment. Performs basic computations and measurements, converts numerical data and predicts arithmetic results. Records results and writes simple documents. Understands computer operation and utilize integrated software.

Occupation Cluster: **Instrument/Control/Relay/Meter Technician**
Function or Job Duty: **Duty E: Perform Instrumentation Calibration Test**

TASK	Performance Criteria	Technical Knowledge of	SCANS Skills and
	How do we know when the task is performed well?	Skills, Abilities, Tools	Personal Qualities Foundational Abilities
E-6 Conduct current calibration test	<ul style="list-style-type: none"> • Determine the scheduled availability of the test item. • Review available test design plan and/or detailed test. • Acquire and review all descriptive, instructional, and specific reference material on the test. • Equipment/instrument is correctly calibrated in accordance with manufacturers' specifications utilizing the proper tool/test equipment. • Calibration methodology and frequency meet specifications. • Problems are accurately identified and corrected. • Calibrations are accurately and legibly documented. • Technicians/Quality Control are communicated with to ensure smooth operations. 	<ul style="list-style-type: none"> • Characteristics of required instrumentation and performance specifications of the individual equipment or system. • Sources of information and test plans. • Test equipment performance and manufacturer's specifications. • Necessary calibration tools. • Safety hazards and procedures for dealing with them. • Documentation procedures. • Certification and calibration of calibration equipment and the requirements for each. 	<ul style="list-style-type: none"> • Understands technology applications, manipulates technology for desired results and analyzes technology output. • Identifies and corrects malfunctions/failures and evaluates performance of technology. • Uses materials in a safe and efficient manner and maintains job specific supplies and equipment. • Performs basic computations and measurements, converts numerical data and predicts arithmetic results. • Records results and writes simple documents. • Understands computer operation and utilize integrated software.

Occupation Cluster: Instrument/Control/Relay/Meter Technician
Function or Job Duty: Duty F: Perform Metering System Calibration Tests

TASK	Performance Criteria How do we know when the task is performed well?	Technical Knowledge of Skills, Abilities, Tools	SCANS Skills and Personal Qualities Foundational Abilities
F-1 Conduct full load calibration test	<ul style="list-style-type: none"> • Determine the scheduled availability of the test item. • Review available test design plan and/or detailed test. • Acquire and review all descriptive, instructional, and specific reference material on the test. • Equipment/instrument is correctly calibrated in accordance with manufacturers' specifications utilizing the proper tool/test equipment. • Calibration methodology and frequency meet specifications. • Problems are accurately identified and corrected. • Calibrations are accurately and legibly documented. • Technicians/Quality Control are communicated with to ensure smooth operations. 	<ul style="list-style-type: none"> • Characteristics of required instrumentation and performance specifications of the individual equipment or system. • Sources of information and test plans. • Test equipment performance and manufacturer's specifications. • Necessary calibration tools. • Safety hazards and procedures for dealing with them. • Documentation procedures. • Certification and calibration of calibration equipment and the requirements for each. 	<ul style="list-style-type: none"> • Understands technology applications, manipulates technology for desired results and analyzes technology output. • Identifies and corrects malfunctions/failures and evaluates performance of technology. • Uses materials in a safe and efficient manner and maintains job specific supplies and equipment. • Performs basic computations and measurements, converts numerical data and predicts arithmetic results. • Records results and writes simple documents. • Understands computer operation and utilize integrated software.
F-2 Conduct lead/lag calibration test	<ul style="list-style-type: none"> • Determine the scheduled availability of the test item. • Review available test design plan and/or detailed test. • Acquire and review all descriptive, instructional, and specific reference material on the test. • Equipment/instrument is correctly calibrated in accordance with manufacturers' specifications utilizing the proper tool/test equipment. • Calibration methodology and frequency meet specifications. • Problems are accurately identified and corrected. • Calibrations are accurately and legibly documented. • Technicians/Quality Control are communicated with to ensure smooth operations. 	<ul style="list-style-type: none"> • Characteristics of required instrumentation and performance specifications of the individual equipment or system. • Sources of information and test plans. • Test equipment performance and manufacturer's specifications. • Necessary calibration tools. • Safety hazards and procedures for dealing with them. • Documentation procedures. • Certification and calibration of calibration equipment and the requirements for each. 	<ul style="list-style-type: none"> • Understands technology applications, manipulates technology for desired results and analyzes technology output. • Identifies and corrects malfunctions/failures and evaluates performance of technology. • Uses materials in a safe and efficient manner and maintains job specific supplies and equipment. • Performs basic computations and measurements, converts numerical data and predicts arithmetic results. • Records results and writes simple documents. • Understands computer operation and utilize integrated software.

Occupation Cluster: Instrument/Control/Relay/Meter Technician
Function or Job Duty: Duty F: Perform Metering System Calibration Tests

TASK	Performance Criteria	Technical Knowledge of Skills, Abilities, Tools	SCANS Skills and Personal Qualities Foundational Abilities
F-3 Conduct element balance calibration test	<ul style="list-style-type: none"> • Determine the scheduled availability of the test item. • Review available test design plan and/or detailed test. • Acquire and review all descriptive, instructional, and specific reference material on the test. • Equipment/instrument is correctly calibrated in accordance with manufacturers' specifications utilizing the proper tool/test equipment. • Calibration methodology and frequency meet specifications. • Problems are accurately identified and corrected. • Calibrations are accurately and legibly documented. • Technicians/Quality Control are communicated with to ensure smooth operations. 	<ul style="list-style-type: none"> • Characteristics of required instrumentation and performance specifications of the individual equipment or system. • Sources of information and test plans. • Test equipment performance and manufacturer's specifications. • Necessary calibration tools. • Safety hazards and procedures for dealing with them. • Documentation procedures. • Certification and calibration of calibration equipment and the requirements for each. 	<ul style="list-style-type: none"> • Understands technology applications, manipulates technology for desired results and analyzes technology output. • Identifies and corrects malfunctions/failures and evaluates performance of technology. • Uses materials in a safe and efficient manner and maintains job specific supplies and equipment. • Performs basic computations and measurements, converts numerical data and predicts arithmetic results. • Records results and writes simple documents. • Understands computer operation and utilize integrated software.
F-4 Conduct light load calibration test	<ul style="list-style-type: none"> • Determine the scheduled availability of the test item. • Review available test design plan and/or detailed test. • Acquire and review all descriptive, instructional, and specific reference material on the test. • Equipment/instrument is correctly calibrated in accordance with manufacturers' specifications utilizing the proper tool/test equipment. • Calibration methodology and frequency meet specifications. • Problems are accurately identified and corrected. • Calibrations are accurately and legibly documented. • Technicians/Quality Control are communicated with to ensure smooth operations. 	<ul style="list-style-type: none"> • Characteristics of required instrumentation and performance specifications of the individual equipment or system. • Sources of information and test plans. • Test equipment performance and manufacturer's specifications. • Necessary calibration tools. • Safety hazards and procedures for dealing with them. • Documentation procedures. • Certification and calibration of calibration equipment and the requirements for each. 	<ul style="list-style-type: none"> • Understands technology applications, manipulates technology for desired results and analyzes technology output. • Identifies and corrects malfunctions/failures and evaluates performance of technology. • Uses materials in a safe and efficient manner and maintains job specific supplies and equipment. • Performs basic computations and measurements, converts numerical data and predicts arithmetic results. • Records results and writes simple documents. • Understands computer operation and utilize integrated software.

Occupation Cluster: **Instrument/Control/Relay/Meter Technician**
 Function or Job Duty: **Duty G: Plan Work Process**

TASK	Performance Criteria How do we know when the task is performed well?	Technical Knowledge of Skills, Abilities, Tools	SCANS Skills and Personal Qualities Foundational Abilities
G-2 Obtain system-specific clearances (take out of service)	<ul style="list-style-type: none"> Lockout and tag-out procedures are followed. Plan is developed which includes timeline, equipment, and personnel required to do the job. All required permits are obtained and all laws and regulations are followed. The proper workers are scheduled to ensure effectiveness, efficiency and safety. All requirements, quality and performance expeditions are communicated to team/crew in an effective manner before work is started. 	<ul style="list-style-type: none"> Special tools and parts. Locate information regarding retooled parts and manufacturers' and employer's specifications. Part ordering procedures. Maintenance staffing schedules and skills. Existing preventative maintenance (PM) protocols and PM sheets. 	<ul style="list-style-type: none"> Identifies relevant details, facts, specifications and follows set of instructions. Understands technology applications. Manipulate technology for desired results. Acquires supplies and equipment. Utilizes integrated software, locates and retrieves stored information.
G-4 Release system-specific clearances (return to service)	<ul style="list-style-type: none"> Release procedure is implemented according to organization/employer's procedures. All approvals are obtained before release/return to service. Release approvals are properly documented. System is started according to established procedures. All components are inspected and evaluated. 	<ul style="list-style-type: none"> Organization/employer's procedures regarding release/return to service. Inspection and verification procedures. Approval procedure(s). Documentation procedure(s). 	<ul style="list-style-type: none"> Follows procedures and pays attention to details. Understands the operation of the system. Recognizes accuracy of information, interprets information and prepares basic summaries. Adheres to standards and demonstrates commitment to excellence.
G-5 Maintain equipment records	<ul style="list-style-type: none"> Accurate records of equipment, parts and components are reviewed and kept. All warranty paperwork is completely filled out and maintained for future reference. Equipment records are filed in accordance with the organization/employer's policies and procedures. Equipment records are accurately organized and logged according to organization/employer's naming conventions. Quality standards regarding equipment records and filing procedures are established and maintained. Equipment records are accessible to all appropriate personnel. 	<ul style="list-style-type: none"> Organization policies and procedures regarding filing and distribution. Product auditing procedures and end-product specifications. Proper recording and documentation procedures. Dissemination procedures. 	<ul style="list-style-type: none"> Follows procedures and pays attention to details. Adheres to standards. Selects appropriate categories, applies processes to new information and transfers information between formats. Understands the system organization and follows procedures.

Occupation Cluster: **Instrument/Control/Relay/Meter Technician**
Function or Job Duty: **Duty H: Maintain Documentation**

TASK	Performance Criteria	Technical Knowledge of	SCANS Skills and Personal Qualities
	How do we know when the task is performed well?	Skills, Abilities, Tools	Foundational Abilities
H-2 Maintain process system drawings	<ul style="list-style-type: none"> Files for drawings are created and maintained in accordance with organization/employer's procedures. Drawings are accurately organized and logged according to organization/employer's naming conventions. Drawing files are accessible to appropriate personnel. 	<ul style="list-style-type: none"> Organization/employer's procedures regarding files. Organization and logging procedures. Naming conventions. Accessibility requirements for drawings to personnel. 	<ul style="list-style-type: none"> Follows procedures and pays attention to details. Understands the system organization and follows procedures. Selects appropriate categories, applies processes to new information and transfers information between formats.
H-7 Participate in tailboard safety process	<ul style="list-style-type: none"> Meetings are attended with active participation. Information regarding job safety is accurately given and received. Information regarding unsafe behavior/ work practices and/or work areas is accurately given and received. Questions are answered in a courteous and respectful manner. Issues are accurately discussed and solutions are defined. Communication is respectfully performed without discrimination. 	<ul style="list-style-type: none"> Organization/employer's procedures and standards and labor-management negotiated health and safety practices/issues. Roles, responsibilities and policies of labor-management health and safety committees/associations. Work/job area safety requirements/policies. 	<ul style="list-style-type: none"> Present basic information and ideas and actively participate in discussion. Identifies the problem, analyzes possible causes or reasons, generates and evaluates solutions and devises and implements plan of action. Responds to verbal and nonverbal communication and confirms information. Takes active interest in and willingly helps others and modifies behavior to others and environment.

Occupation Cluster: **Instrument/Control/Relay/Meter Technician**
 Function or Job Duty: **Duty I: Maintain Inventories**

TASK	Performance Criteria	Technical Knowledge of	SCANS Skills and Personal Qualities
	How do we know when the task is performed well?	Skills, Abilities, Tools	Foundational Abilities
I-4 Procure job-specific inventory	<ul style="list-style-type: none"> Parts list is accurately created and the order is submitted for approval. Parts warranty is correctly identified. All required paperwork is completed accurately and legibly. Inventory are properly identified and labeled. All warranty paperwork is completely filled-out. Inventory not read for release are properly stored or redirected for other use. 	<ul style="list-style-type: none"> Inspecting parts and supplies and recognizing damage or wear. Parts/supplies terminology. Locating and identifying parts and their serial and model numbers. Reading parts catalogs and identifying correct parts/supplies for maintenance. Documentation procedures. Identifying and defining warranty information. Material labeling procedures. Storage and redirection procedure. 	<ul style="list-style-type: none"> Understands details associated with system operation. Follows procedures and pays attention to detail. Record information and complete forms accurately. Follow policies/procedures. Data entry and uses multiple integrated software and networks. Acquires supplies and equipment and orders and maintains inventory. Adheres to standards.
I-6 Maintain inventory control	<ul style="list-style-type: none"> Inventory system is established to maintain inventory. Inventory of parts and supplies needed to keep system in operation is maintained. Parts and supplies purchased for inventory are of desired quality and quantity. Inventory records are accurate and up-to-date. Warranty items are handled according to manufacturer's and employer's instructions. 	<ul style="list-style-type: none"> Vendor quality and service. Evaluating parts and components. Utilizing computer database and parts and supplies ordering software. Appropriate parts and supplies recordkeeping system. 	<ul style="list-style-type: none"> Prepare warranty documents. Identify relevant components and record information accurately. Translate blueprints, drawings, and schematics. Perform routine recordkeeping functions. Maintain balanced accounts. Identify future parts and supplies needed. Perform data entry and understand computer operation.

SCANS SURVEY RESULTS FOR INSTRUMENT/CONTROL/RELAY/METER TECHNICIAN

Foundation Skills and Personal Qualities	0 3	1 4	2 5	Critical Competencies
Basic Skills				
Demonstrates Effective Reading Strategies				<i>Selects and identifies information and follows a set of instructions</i>
Demonstrates Effective Writing Strategies				<i>Accurately records information, prepares documents/messages, and summarizes information</i>
Applies Arithmetic Processes				<i>Performs basic computations, performs/interprets measurements and analyzes numerical data</i>
Applies Mathematics Processes				<i>Summarizes mathematical data and records results</i>
Demonstrates Effective Listening Skills				<i>Responds to verbal/nonverbal communication and interprets and confirms information</i>
Demonstrates Effective Speaking Skills				<i>Presents basic ideas, explains concepts and actively participates in discussion</i>
Thinking Skills				
Applies Creative Thinking/Generates Ideas				<i>Demonstrates creative thinking process while problem solving</i>
Applies Decision Making Strategies				<i>Analyzes situations and information, considers risks, compiles alternative solutions</i>
Recognizes and Solves Problems				<i>Identifies problems, analyzes possible causes and generates solutions</i>
Demonstrates Visualization				<i>Visually analyzes relationship between parts/whole and interprets symbols, charts and pictures</i>
Knows How to Learn				<i>Draws upon experience and prior knowledge, interprets and applies new knowledge and experience</i>
Applies Reasoning Skills				<i>Applies rules/principles to process and uses logic to draw conclusions</i>
Personal Qualities				
Demonstrates Responsibility				<i>Performs assigned tasks, follows policies/procedures, and works with minimal supervision</i>
Demonstrates Belief in Self Worth				<i>Identifies own skills and abilities, defends own beliefs and viewpoints, values own individually</i>
Demonstrates Sociability in Groups				<i>Responds appropriately to others, modifies behavior to environment and shows empathy for others</i>
Demonstrates Self Management				<i>Identifies own strengths and limitations, maintains self-control, responsible for own behavior and applies self-management skills</i>
Demonstrates Integrity/Honesty				<i>Demonstrates honesty and trustworthiness and accepts responsibility for own behavior</i>

Rankings are averaged.

- 0 = Not Important
- 1 = Somewhat Important
- 2 = Moderately Important
- 3 = Important
- 4 = Very Important
- 5 = Critical

82 SKILL STANDARDS FOR ENERGY INDUSTRY

Foundation Skills and Personal Qualities	0	1	2				Critical Competencies
	3	4	5				
Management of Time and Resources							
Manages Time							<i>Efficiently manages time, adjusts schedule as required by supervisor and prioritizes daily tasks</i>
Manages Money							<i>Not applicable</i>
Manages Materials/Facilities							<i>Orders and maintains inventory and monitors safe and efficient use of materials</i>
Manages Human Resources							<i>Assesses individual skills, determines work load and monitors work assignments</i>
Management and Use of Information							
Acquires/Evaluates Information							<i>Selects and obtains information relevant to the task</i>
Organizes/Maintains Information							<i>Interprets information and applies processes to new information</i>
Interprets/Communicates Information							<i>Interprets information and selects methods of communication</i>
Uses Computers to Process Information							<i>Uses integrated software, locates and retrieves stored information and interprets data</i>
Interpersonal Skills							
Participates as Team Member							<i>Demonstrates commitment, identifies with the team, obeys team rules, assists team members</i>
Teaches Others							<i>Conducts task-specific training, coaches others and provides constructive feedback</i>
Serves Customers							<i>Recognizes, analyzes and responds to customer needs, obtains additional resources to meet customer needs</i>
Exhibits Leadership							<i>Leads by example and demonstrates commitment to excellence</i>
Negotiates Agreements							<i>Moderates discussion, demonstrates composure, and interprets complaints/concerns</i>
Works with Diversity							<i>Recognizes differences, respects rights of others, supports correct course of action</i>
Understanding and Management of Systems							
Understands System							<i>Understands the system/hierarchy and follows processes and procedures</i>
Monitors/Corrects System Performance							<i>Adjusts and monitors system operation and troubleshoots system malfunction(s)</i>
Improves/Designs Systems							<i>Identifies needed systematic improvements and suggests system modifications/improvements</i>
Use of Technology							
Selected Appropriate Technology							<i>Understands the requirements of the task and technological results and proposes simple technological solutions</i>
Applies Technology to Task							<i>Understands technology applications and applies appropriate technologies</i>
Maintains/Troubleshoots Technology							<i>Follows specified maintenance, identifies and troubleshoots malfunctions and failures</i>

Rankings are averaged.

- 0 = Not Important
- 1 = Somewhat Important
- 2 = Moderately Important
- 3 = Important
- 4 = Very Important

5 = *Critical*