Millwright

HISTORIC DACUM CHART FOR MILLWRIGHT

DACUM Panel
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Duty A: Develop Job Safety Analyses					
Tasks					
A-1 Coordinate job safety procedures with agencies/ personnel	A-2 Prioritize job safety procedures	A-3 Analyze potential job hazards	A-4 Identify job safety procedures	A-5 Inspect and modify job safety process and procedures	A-6 Critique job safety processes

Duty B: Inspect and Conduct Preventative Maintenance						
Tasks						
B-1 Develop maintenance plan	B-2 Identify required tools/materials	B-3 Coordinate maintenance and equipment outage	B-4 Calibrate equipment and instruments	B-5 Perform required maintenance	B-6 Perform operational checks	B-7 Document performed maintenance
B-8 Review maintenance procedures						

Duty C: Troubleshoot Equipment Problems						
Tasks						
C-1 Discuss equipment problems with operator(s)	C-2 Review technical manual	C-3 Conduct procedural assessment	C-4 Coordinate equipment removal from service	C-5 Acquire required materials to complete repairs	C-6 Complete equipment repair/adjustment	C-7 Confirm repair diagnosis
C-8 Record and adjust preventative maintenance schedule						

Duty D: Perform Rigging Activities					
Tasks					
D-1 Inspect rigging equipment	D-2 Assess lifting hazards	D-3 Analyze lifting requirements	D-4 Gather rigging equipment	D-5 Perform rigging equipment operations	D-6 Store rigging equipment

Duty E: Repair Equipment						
Tasks						
E-1 Assess equipment failure	E-2 Identify equipment problem	E-3 Identify repair requirements	E-4 Coordinate repairs with other agencies/ personnel	E-5 Identify required materials for repair	E-6 Perform operational test	E-7 Complete equipment repair
E-8 Place equipment into service	E-9 Manufacture new parts	E-10 Rework existing parts				

Duty F: Install Equipment						
Tasks						
F-1 Request equipment for Installation	F-2 Inspect received equipment for installation	F-3 Assess installation requirements	F-4 Prepare site for installation	F-5 Transport equipment to site	F-6 Complete equipment installation	F-7 Perform operational rest

Duty G: Modify Equipment						
Tasks						
G-1 Receive modification request	G-2 Review modification requirements	G-3 Analyze equipment blueprints	G-4 Identify required materials	G-5 Identify required materials needed for modification	G-6 Remove old equipment	G-7 Complete equipment modification
G-8 Perform operational test on modified equipment	G-9 Place equipment into service	G-10 Manufacture new parts	G-11 Rework existing parts			

Duty H: Participate in Continuing Education				
Tasks				
H-1 Maintain current level of skill	H-2 Participate in scheduled instruction	H-3 Participate in specialized instruction	H-4 Maintain specialized certification	H-5 Participate in OSHA/safety workshops

MILLWRIGHT Skill Standards Template A

Summary of Highest Ranked Tasks for Electrician

Function/Duty A: **Develop Job Safety Analyses**

Tasks:

- A-1 Coordinate job safety procedures with agencies/personnel
- A-5 Inspect and modify job safety process and procedures
- A-6 Critique job safety processes

Function/Duty B: **Inspect & Conduct Preventative Maintenance**

Tasks:

- B-1 Develop maintenance plan
- B-3 Coordinate maintenance and equipment outage
- B-4 Calibrate equipment and instruments
- B-5 Perform required maintenance
- B-6 Perform operational checks

Function/Duty C: **Troubleshoot Equipment Problems**

Tasks:

- C-1 Discuss equipment problems with operator(s)
- C-3 Conduct procedural assessment
- C-4 Coordinate equipment removal from service
- C-5 Acquire required materials to complete repairs
- C-6 Complete equipment repair/adjustment
- C-7 Confirm repair diagnosis

Function/Duty D: **Perform Rigging Activities**

Tasks:

- D-1 Inspect rigging equipment
- D-2 Assess lifting hazards
- D-3 Analyze lifting requirements
- D-5 Perform rigging equipment operations

Function/Duty E: **Repair Equipment**

Tasks:

- E-1 Assess equipment failure
- E-2 Identify equipment failure
- E-3 Identify repair requirements
- E-4 Coordinate repairs with other agencies/personnel
- E-6 Perform operation test
- E-7 Complete equipment repair

Function/Duty F: **Install Equipment**

Tasks:

- F-3 Assess installation requirements
- F-4 Prepare site for installation
- F-6 Complete equipment installation

Function/Duty G: **Modify Equipment**

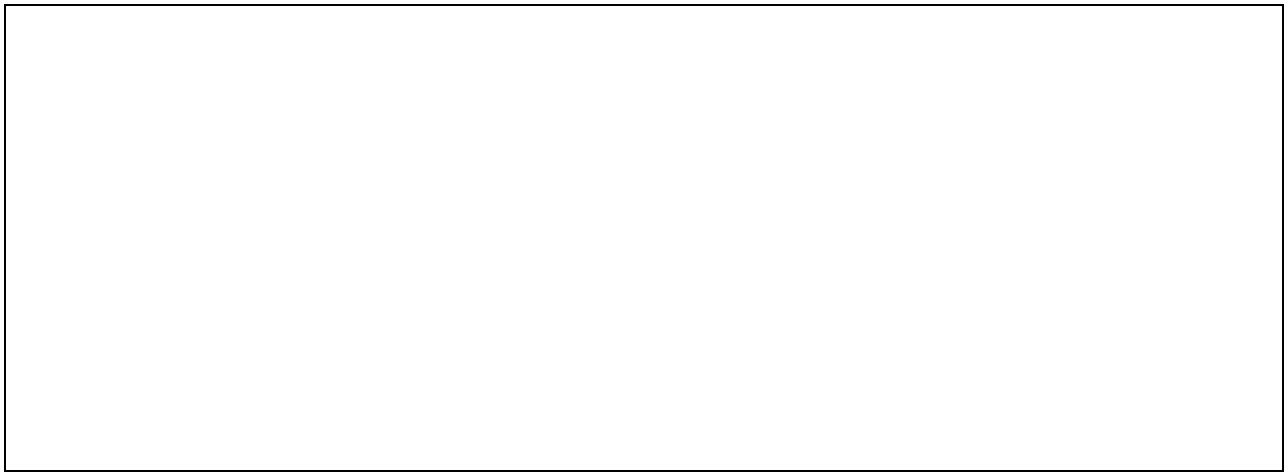
Tasks:

- G-1 Receive modification request
- G-2 Review modification requirements
- G-3 Analyze equipment blueprints
- G-5 Identify required materials needed for modification
- G-8 Perform operational test on modified equipment

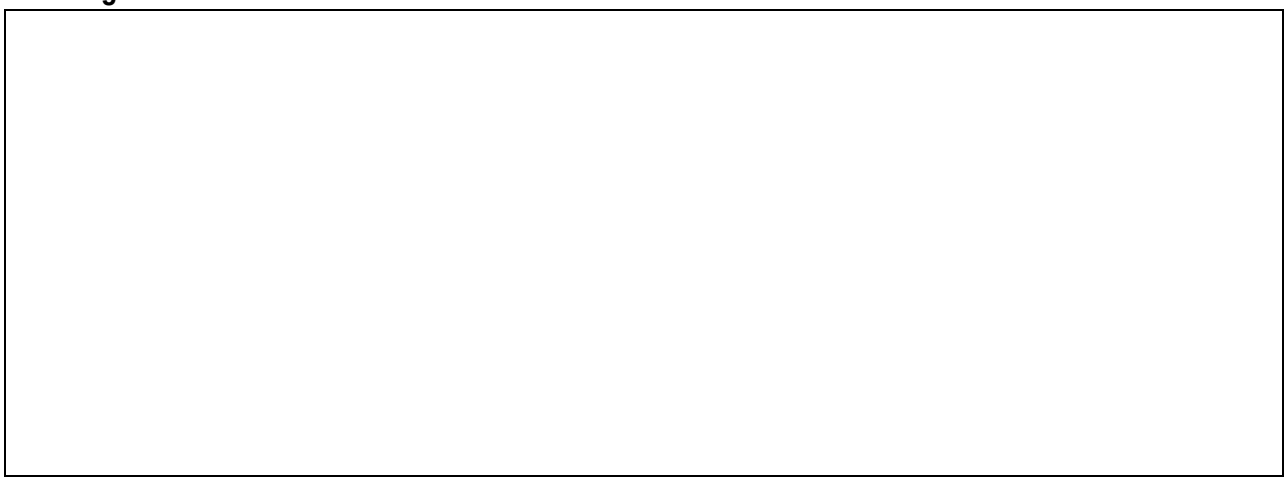
Function/Duty H: **Participate in Continuing Education**

Tasks:

- H-3 Participate in scheduled instruction
- H-4 Participate in specialized instruction
- H-5 Maintain specialized certification



Millwright Picture



Occupation Cluster: **Millwright**
Function or Job Duty: **Duty A: Develop Job Safety Analysis**

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-1 Coordinate job safety procedures with agencies/ personnel	• New technicians are given a complete orientation to the safety procedures. • All important information regarding job safety is communicated clearly and effectively. • Suggestions regarding training materials and content are made to correct parties. • Evaluations and feedback are utilized to improve training materials and methods.	• Equipment behavior, operation and safety. • Tools required and how to locate and obtain them. • Hazardous materials and MSDS (Material Safety Data Sheets). • Employer's job safety procedures.	• Models proper performance/attitudes. • Interprets, clarifies and influences communication between agencies/personnel. • Presents complex ideas/information. • Actively participates in discussion. • Understands system organizations and follows processes/procedures. • Assists and encourages team members.
A-5 Inspect and modify job safety process and procedures	• Lockout/tag-out/clearance procedures are followed. • Personnel and job-specific procedures are checked periodically to ensure compliance with safety requirements. • Any safety problems are immediately identified and corrected with personnel. • Management is consulted to ensure job-specific procedures/standards are adequate and meet regulatory requirements. • Ongoing safety concerns tracked until corrected.	• Lockout/tag-out/clearance procedures. • Hazardous materials and MSDS. • Job safety procedures and personal protective equipment. • Unsafe conditions and practices. • Which problems are critical and the ability to prioritize criticality of problems. • System interrelationships.	• Monitors system performance. • Troubleshoots malfunction/failure, and diagnoses performance deviations. • Pays attention to details. • Follows up on assigned tasks. • Analyzes principles and examines information for relevance and accuracy. • Use proper PPE.
A-6 Critique job safety processes	• All unsafe conditions are identified. • All technicians, operators and relevant personnel are notified of organization safety standards including OSHA/WISHA/OREGON OSHA. • Safety procedures/standards are properly documented. • Management is consulted to ensure organization procedures/standards are adequate and meet regulatory requirements. • Corrective actions identified. • Conditions that pose a threat to health, safety, environment identified reported and documented.	• Organization OSHA/WISHA/OREGON OSHA requirements. • Identifying critical areas of job. • Recognizing unsafe conditions/ practices. • Documentation of job safety procedures.	• Identify relevant details, facts and specifications, and follow a set of instructions. • Examine information/data for relevance and accuracy. • Monitors system performance, • Troubleshoots malfunctions/ failure, analyzes system operation and diagnoses performance deviations. • Records information accurately, prepares messages and writes concise safety procedures.

Occupation Cluster: **Millwright**
Function or Job Duty: **Duty B: Inspect & Conduct Preventative Maintenance**

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-1 Develop maintenance plan	• The schedule includes routine jobs that need to be completed in a timely manner. • Schedule priorities are determined according to employer's procedures considering production needs, output, and critical equipment use. • Preventative maintenance requirements for all equipment are included in the schedule. • The schedule provides adequate time for preventative maintenance. • Staffing and parts required for maintenance are available when needed.	• Routine jobs and completion times for each. • Production needs, output and critical equipment. • Preventative maintenance requirements for all equipment. • Staffing needs to perform preventative maintenance. • System interrelationships	• Efficiently manages time, prioritizes daily tasks, and monitors and adjusts task sequence. • Matches talent to positions and delegates responsibilities. • Monitors safe and efficient utilization of materials. • Monitors system performance.
B-3 Coordinate maintenance and equipment outage	• 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 expectations are communicated to team/crew in an effective manner before work is started. • Work is completed on time.	• Lockout and tag-out procedures. • Availability of materials, personnel and vendors. • Organization's/employer's approval process. • Equipment and the time and personnel required to complete the work or job.	• Monitors system performance. • Troubleshoots malfunction/failure. • Diagnoses performance deviations. • Distributes work assignments, matches talent to positions and delegates responsibilities. • Monitors safe and efficient utilization of materials.
B-4 Calibrate equipment and instruments	• Calibration schedule is implemented according to specifications. • Instrument certification is checked both by reviewing documentation and through careful observation during use. • Instruments that are out of calibration are immediately recalibrated or referred to the appropriate parties for recalibration or repairs.	• Calibration schedule. • Normal and abnormal operation of instrumentation. • Recalibrating instruments. • Instrumentation documentation and terminology. • Instrumentation parameters.	• Identifies and corrects malfunctions/failures and evaluates performance of technology. • Understands technology applications and manipulates technology for desired results. • Summarizes and translates mathematical data. • Maintain tools and supplies and use them in a safe manner. • Understands computer operation and utilizes integrated software.

Occupation Cluster: **Millwright**
Function or Job Duty: **Duty B: Inspect & Conduct Preventative Maintenance**

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-5 Perform required maintenance	• Maintenance is performed with proper workers to ensure that the job is performed safely and efficiently. • The required parts, tools and equipment are gathered prior to starting the maintenance and are used to perform work safely and efficiently. • Maintenance job is documented and verified according to employer's or organization's procedure(s). • Housekeeping is performed when job is finished and after completion the machine is tested to make sure it is operating properly.	• Maintenance procedures and required parts, tools, and equipment for maintenance. • Documentation and verification procedures. • Names and location of equipment. • Frequency of maintenance required and cost to maintain the equipment. • Housekeeping procedures. • Welding and materials properties. • Machining. • Hydraulics/fluid dynamics. • Pumps and pump applications. • Equipment set-up and alignment. • Use math skills to solve problems.	• Identifies relevant details. • Follows set of instructions. • Understands technology applications and analyzes and interprets information. • Records information accurately. • Identifies and corrects malfunctions and failures and evaluates performance of technology.
B-6 Perform operational checks	• Observation of equipment is performed regularly. • All unusual behaviors or unsafe conditions observed are reported immediately to appropriate personnel. • All aspects of equipment operations are documented. • Safety requirements are in place during observation. • Equipment and process operations are observed at timed intervals for consistency.	• Production goals and sequence of operation of the equipment. • Normal and abnormal equipment behavior and operation, including visual, sound and vibration and ability to analyze equipment and process data. • Safe and unsafe conditions for operating equipment. • Critical (safety) versus non-critical potential problems. • Equipment operations manuals. • Documentation procedure	• Monitors system performance. • Troubleshoots malfunction/failure. • Diagnoses performance deviations. • Records information accurately. • Develops and applies creative solutions to new and existing situations.

Occupation Cluster: **Millwright**
Function or Job Duty: **Duty C: Troubleshoot Equipment Problems**

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-1 Discuss equipment problems with operator(s)	• Communication is clear, accurate and effective and is conducted on an ongoing basis. • Suggestions are properly documented and include all supporting materials. • Suggestions are based on appropriate and accurate data or observations made during operation of equipment and repairs. • The need for changes in procedure is clearly communicated and recommendations are thoroughly discussed. • Any safety problems are identified and corrected with appropriate personnel.	• Prioritizing and identifying urgent problems. • Urgent problems and unsafe conditions. • Normal and abnormal equipment operation. • Safety procedures and personal protective equipment. • Documentation procedures. • System interrelationships.	• Understands the requirements of the task/technological results and analyzes task/technology relationship. • Analyzes possible causes/reasons, evaluates solutions and devises action plan. • Uses logic to draw conclusions. • Suggests system modifications/improvements.
C-3 Conduct procedural assessment	• The correct tests and inspections are performed on failed component(s). • Data gathered through diagnostic procedures is analyzed to develop a hypothesis regarding possible root causes. • All contributing factors are considered when determining root cause. • All specialized technicians are consulted as appropriate. • Findings are accurately recorded and filed for future reference. • Fault identified.	• Tests and inspections. • Nature and possible causes of failure. • Normal and abnormal equipment behavior and operation, including visual, sound and vibration and ability to analyze equipment and process data. • Safe and unsafe conditions for operating equipment. • Manufacturers' performance specifications. • Procedure for isolating problems.	• Understands basics of troubleshooting techniques for each. • Monitors system performance. • Diagnoses performance deviations. • Identifies and corrects malfunctions/failures and evaluates performance of technology. • Integrates multiple items of data and contrasts conflicting data. • Develops and applies creative solutions to new and existing situations. • Records information accurately.

Occupation Cluster: **Millwright**
Function or Job Duty: **Duty C: Troubleshoot Equipment Problems**

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-4 Coordinate equipment removal from service	• The proper workers are scheduled to ensure effectiveness, efficiency and safety during equipment removal. • Move or removal of equipment is completed safely including lockout/tag-out/clearance, and according to employer's and vendor procedures. • Personal protective gear is worn according to organization policy and all applicable regulations. • Equipment is properly disposed of in accordance with all organization procedures and all applicable regulations. • Hazardous materials and safety procedures are followed with respect to handling and disposal. • Housekeeping is performed when job is finished.	• Removal procedures and equipment maintenance. • Safety procedures. • Equipment capabilities and behavior. • Utilizing personal protective gear. • Disposal procedures and all applicable regulations. • Vendors and contacts within vendors to assist with moving and removing equipment safely. • Welding and materials properties. • Machining. • Hydraulics/fluid dynamics. • Pumps and pump applications. • Equipment set-up and alignment. • Use math skills to solve problems.	• Distributes work assignments, matches talent to positions and delegates responsibilities. • Monitor performance standards and follow up on assigned key activities. • Models proper performance/attitudes. • Understands technology applications, manipulates technology for desired results and analyzes technology output.
C-5 Acquire required materials to complete repairs	• All worn, damaged, and subsequently damaged parts are completely identified for replacement or repair. • The appropriate reference material for the repair is accurately referenced. • Parts list is accurately created and is submitted to supervisor for approval. • Required materials are received and verified for proper usage. • Documentation of received materials is prepared and filed for future reference.	• Parts terminology. • Damaged or worn parts associated with failure. • Completing an accurate list of parts to order. • Documentation procedures.	• Recognizes details that affect system operation. • Record information and complete forms accurately. • Follow rules, policies, and procedures. • Interpret information regarding equipment functions.

Occupation Cluster: **Millwright**
Function or Job Duty: **Duty C: Troubleshoot Equipment Problems**

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-6 Complete equipment repair/ adjustment	• Applicable safety procedures including lockout/tag-out/clearance, equipment guarding and housekeeping are used. • Proper protective equipment is worn. • Existing repair procedures are followed in accordance with OEM manuals or employer's procedures. • Correct disassembly, repair/replacement and reassembly procedures are used. • Equipment is safety checked and a test run performed prior to return to production. • Post-repair tests confirm that equipment performs to requirements. • Corrective action plan is communicated to appropriate personnel in a timely manner.	• Repair procedures and disassembly, repair/replacement and reassembly procedures. • Equipment and vendor terminology. • Safety checks, safety procedures and ability to perform test runs. • Conducting post-repair tests. • Normal and abnormal equipment behavior and operation. • Tools required to perform repair. • Personal protective equipment. • System interrelationships. • Welding and materials properties. • Machining. • Hydraulics/fluid dynamics. • Pumps and pump applications. • Equipment set-up and alignment. • Use math skills to solve problems.	• Identifies and corrects malfunctions/failures. • Records information accurately. • Selects and analyzes data relevant to the task. • Integrates multiple items of data and contrasts conflicting data. • Translates and interprets blueprints, drawings, diagrams. • Develops and applies creative solutions to new and existing situations.
C-7 Confirm repair diagnosis	• All damaged and/or worn components are accurately identified. • All information is completely evaluated and possible causes of failure are determined. • Problem is accessed following established procedure for repair/disassembly. • Equipment and tools for the job are identified for repair.	• Equipment and/or components and their operations and functions. • Safe and proper use of special tools and equipment. • Comparing repair situations to equipment specifications. • Visually inspecting parts and recognizing damage or wear. • Proper procedure(s) for disassembly and assembly (repair) of equipment and/or components.	• Select appropriate references. • Identify relevant specifications. • Understand requirements of the task and technological results. • Recognize details associated with system/equipment operation. • Identify system/equipment malfunction/failure. • Interpret information and analyze possible causes.

Occupation Cluster: **Millwright**
Function or Job Duty: **Duty D: Perform Rigging Activities**

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-1 Inspect rigging equipment	• Organization/OSHA/WISHA/OREGON OSHA policies and procedures for rigging are followed. • Equipment and tools needed to carry out the work are obtained in accordance with established procedures and checked for correct operation and safety. • All cables are visually inspected before use for signs of misuse or wear. • Management is consulted to ensure procedures/standards are adequate and meet regulatory requirements.	• Organization/OSHA/WISHA/OREGON OSHA rigging policies and procedures. • What rigging devices are available and their use. • Safety precautions for rigging and personnel.	• Adheres to standards. • Monitors system performance. • Troubleshoots malfunction/failure. • Pays attention to detail. • Recognize details associated with system/equipment operation.
D-2 Assess lifting hazards	• Rigging of loads is planned and prepared for to ensure Occupational Health and Safety polices and procedures are followed. • Work is appropriately sequenced in accordance with job requirements. • Preparatory work is checked to ensure no unnecessary damage has occurred and complies with requirements. • Unplanned events or conditions are responded to in accordance with established procedures.	• Construction of the object—what materials is it made of, how heavy is it and how large is it. • Sequence of work/lifting activities. • Equipment operation and safety. • Unsafe conditions and practices. • Path of lift. • Proper equipment and gear.	• Analyze system (lifting) configuration/stability and recognize system strengths/ limitations. • Analyze situation and consider risks/implications. • Understand technology applications and follow proper procedures. • Recognize details associated with system/equipment operation.
D-3 Analyze lifting requirements	• Mass/weight of the object is determined before it is moved. • Appropriate personnel are consulted to ensure the work is coordinated effectively with others involved on the work site. • Rigging of loads is checked against job requirements. • Path of the object is determined and approved.	• How to calculate the volume/weight of objects/load. • Rigging devices are available. • What path the object/load will travel. • Rigging and roping procedures/lifts. • Safe working loads and load limits. • Lifting systems and their capabilities. • Safety equipment requirements.	• Interpret information regarding equipment functions. • Understand technology applications and follow proper procedures. • Interpret weights and measures and summarize and translate mathematical data. • Examine information/data for relevance and accuracy. • Monitor safe and efficient utilization of equipment.

Occupation Cluster: **Millwright**
Function or Job Duty: **Duty D: Perform Rigging Activities**

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 Perform rigging equipment operations	• Loads are rigged in accordance with requirements, without damage or distortion to the surrounding location or service. • Approval is obtained in accordance with established procedures from appropriate personnel before any contingencies are implemented. • On-going checks of the quality of the work are undertaken in accordance with established procedures. • Final inspections are undertaken to ensure the work conforms to requirements. • Appropriate parties are notified in accordance with established procedures.	• Functions of the lift. • Handling of materials and anchoring the load securely. • Lifting loads and fall protection. • Safe working loads and load limits. • Safety issues to adhere to while lifting objects. • Lifting signals are only given by one person.	• Manipulate technology for desired results. • Analyze system configuration/ stability and recognize system strengths/limitations. • Understand technology applications and follow proper procedures . • Monitor safe and efficient utilization of equipment/supplies. • Plan ahead.

Occupation Cluster: **Millwright**
Function or Job Duty: **Duty E: Repair Equipment**

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 Assess equipment failure	• Information about the nature and possible causes of failure is systematically gathered through visual inspection, observation of equipment during operator feedback and disassembly of equipment, as appropriate. • Proper diagnostic tests are performed and repeated as necessary to determine the nature of the problem. • Manufacturers' performance specifications are used when evaluating equipment performance. • Procedure for isolating problems is initiated correctly and followed through completion of the task.	• Nature and possible causes of failure and procedures for isolating problems. • Safety procedures. • Normal and abnormal equipment behavior and operations and manufacturers' performance specifications. • Diagnostic tests and test equipment. • Disassembling and assembling equipment.	• Identifies the problem, analyzes possible cause/reasons, evaluates solutions and devises action plan. • Understands technology applications. • Extracts information, uses logic to draw conclusions and examines information for relevance and accuracy.
E-2 Identify equipment failure	• Operator and operator logs are consulted to determine the nature of the problem. • Equipment, repair and diagnostics reports are checked for previous problems. • Equipment is visually checked to identify problems. • The most appropriate information is gathered to rapidly diagnose the problem. • All safety procedures are followed.	• Operator logs and equipment repair and diagnostics reports. • Safely checking the equipment. • Sources of information. • Vendor, equipment and employer's terms and terminology. • Recognizing and categorizing problems. • Equipment operations and functions.	• Identifies the problem, analyzes possible cause/reasons, evaluates solutions and devises action plan. • Record information and complete forms accurately. • Integrates multiple items of data and contrasts conflicting data.
E-3 Identify repair requirements	• Action plan addresses the need for timely repair. • Plan includes proper repair procedures, proper tools and parts and estimated time required for repair. • The right people needed for the repair are informed and involved. • Plan accounts for variables in schedule, staffing and availability of parts. • Plan is communicated to appropriate personnel.	• Repair procedures and disassembly, repair/replacement and reassembly procedures. • Estimating repair times. • Accessing information regarding availability of parts. • Skill levels required for work, and personnel possessing those skills. • Welding and materials properties. • Machining. • Hydraulics/fluid dynamics. • Pumps and pump applications. • Equipment set-up and alignment. • Use math skills to solve problems.	• Identifies the problem, analyzes possible causes/reasons, evaluates solutions and devises action plan. • Identifies and corrects malfunctions and failures. • Records information accurately.

Occupation Cluster: **Millwright**
Function or Job Duty: **Duty E: Repair Equipment**

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-4 Coordinate repairs with other agencies/ personnel	• Pertinent information is properly discussed. • Scheduling problems are clearly defined and solutions are established with coworkers in accordance with repair and organization procedures. • Work activities are prioritized to meet customer needs. • Recommendations for improvement are made as appropriate.	• Organization procedures. • Scheduling requirements and issues associated with individual repairs. • Organization norms/standards. • Work group responsibilities. • Interfacing with contacts and departments. • Available resources for resolving workplace issues.	• Ability to work in a team environment. • Accept responsibility for own behavior and understands impact on others involved. • Moderate discussions, demonstrate composure, and interpret complaints/concerns from others. • Present complex ideas/information and analyze group/individual response(s).
E-6 Perform operational test	• Safety checklist is thoroughly completed and checklist results are correctly documented. • The equipment is test-run to ensure it is operating properly and safely and if equipment is not operational, corrective measures are taken. • The appropriate items are inspected and verified according to preventative maintenance record(s). • Readiness of equipment to come back onto production line is documented according to employer's procedures and communicated to correct parties.	• Test running equipment. • Normal and abnormal equipment operation. • Corrective measures for equipment. • Documentation procedures. • Equipment specifications and safety standards. • Safety procedures. • System interrelationships.	• Pays attention to details. • Monitors performance standards. • Understand technology applications and follow proper procedures. • Identifies and corrects malfunctions/failures. • Troubleshoots malfunction.
E-7 Complete equipment repair	• Applicable safety procedures including lockout/tag-out/clearance are used. • Existing repair procedures are followed in accordance to OEM manuals or employer's procedures and correct disassembly procedures are used. • Equipment is safety checked and a test run performed prior to return to production. • Post-repair tests confirm that equipment performs to requirements. • Repairs are completed within specified time frames and/or in a timely manner. • Corrective actions are communicated to appropriate personnel effectively and in a timely manner.	• Safety procedures and personal protective equipment. • Repair procedures, disassembly, repair/replacement and reassembly procedures and the ability to use tools required. • Equipment and vendor terminology. • Normal and abnormal equipment behavior and operation. • Organization procedures and manufacturer's specifications. • Skill levels required for the work, and personnel possessing those skills. • Welding and materials properties. • Machining. • Hydraulics/fluid dynamics. • Pumps and pump applications. • Equipment set-up and alignment. • Use math skills to solve problems.	• Identifies and corrects malfunctions/failures and evaluates performance of technology. • Manipulates technology for desired results and analyzes technology output. • Monitor/adjust key activity sequence. • Summarize and translate mathematical data.

Occupation Cluster: **Millwright**
Function or Job Duty: **Duty F: Install Equipment**

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-3 Assess installation requirements	• Worksite-specific documentation is correctly verified. • All worksite considerations, parts and materials meet all code and regulatory requirements. • Scheduling takes into account the availability of personnel and vendors and materials. • Job is coordinated with other departments/agencies to avoid conflict. • Budget concerns are taken into account. • Plan is complete and thorough and includes compatibility with existing equipment or processes, if required.	• Worksite-specific documentation. • Installation standards. • Scheduling and budget procedures and the ability to access information regarding the availability of personnel, vendors and materials. • Coordination of work activities. • Print reading. • System functions.	• Follows procedures and pays attention to details. • Identify relevant details, facts and specifications. • Examine information/data for relevance and accuracy. • Understands decision-making process. • Prioritizes daily tasks and monitors/adjusts task sequence.
F-4 Prepare site for installation	• Installation is coordinated with all departments to avoid conflicts. • Site plan is complete and thorough and includes compatibility with existing equipment or processes. • All job site considerations, parts and materials meet all code and regulatory requirements. • Procedures for setting up and maintaining a safe job site are correctly established and followed. • Awareness of changing conditions at the job site is demonstrated. • Compliance with applicable standards, regulation, laws and labor-management negotiated safety practices are ensured.	• Safety requirements and safety inspection procedures. • Maintenance of job specific supplies and equipment. • Materials required and inventory and discrepancy procedures. • Proper procedures for placing flags, signs, cones, and flares, if applicable. • Direct traffic flow safely around site, if needed. • Communicate appropriate safety precautions to the public.	• Pays attention to details. • Follows up on assigned tasks. • Ability to visualize job activities to determine safe outcomes. • Translates and interprets blueprints, drawings, diagrams, visually analyzes relationship between parts/whole. • Acquires supplies and equipment and uses materials in a safe and efficient manner. • Efficiently manages time while prioritizing tasks.
F-6 Complete equipment installation	• All safety procedures are followed. • Tools, equipment, and personnel are efficiently organized to do the job. • Blueprint and plan of action are followed to customize or upgrade equipment. • Appropriate lockout/tag-out/clearance devices are properly implemented. • Equipment is installed/upgraded and configured according to specifications. • Equipment and applications are tested using appropriate tools and procedures. • Installation is documented according to protocol.	• Safety procedures. • Tools and equipment. • Terminology and symbols used on blueprints and plans. • Lockout/tag-out/clearance procedures. • Installation procedures and operations. • Welding and materials properties. • Machining. • Hydraulics/fluid dynamics. • Pumps and pump applications. • Equipment set-up and alignment. • Use math skills to solve problems.	• Understands the requirements of the task/technological results. • Manipulates technology for desired results and analyzes technology output. • Pays attention to details, monitors performance standards. • Translates and interprets blueprints, drawings and diagrams. • Summarizes and interprets mathematical data.

Occupation Cluster: **Millwright**
Function or Job Duty: **Duty G: Modify Equipment**

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-1 Receive modification request	• Documentation is reviewed for accuracy and completeness. • Documentation is organized into logical sequence for immediate use. • Information regarding documentation is communicated with appropriate parties.	• Documentation and reporting procedures. • Sources of information and ability to recognize and categorize information. • Documentation input, filing and/or distribution procedures.	• Acquires materials and supplies and uses both in a safe and efficient manner. • Identifies relevant details, facts, specifications and follows a set of instructions. • Probes, analyzes and interprets information. • Records information accurately and summarizes/ paraphrases information.
G-2 Review modification requirements	• All relevant materials are easily available. • Information relevant and specific to the modification requirements of the work to be performed is pulled from the documents and is up-to-date. • Machine identifiers, equipment lists and process data are utilized to locate relevant information. • All relevant databases, if needed, are used in a timely manner. • Interpretations and questions on materials, specifications and diagnostics are discussed and resolved.	• Locating documentation for equipment. • Terminology of modification. • Filing procedures for equipment documentation. • Locating specifications and diagnostics. • Tools for modification.	• Identifies process, interprets information and applies processes to new information. • Utilizes integrated/multiple software, locates and retrieves stored information. • Selects data relevant to the task, analyzes data, integrates multiple items of data. • Develops and applies creative solutions to new and existing situations.
G-3 Analyze equipment blueprints	• Plans are consolidated and cross-referenced. • Plans are reviewed for potential problems, concerns, and scheduling factors are correctly identified. • Plan is complete and thorough and includes compatibility with existing equipment and processes.	• Characteristics and uses of equipment. • Blueprint specifications, equipment specifications and schematics. • Equipment specifications and safety standards.	• Interpret symbols, diagrams, schematics, and analyze application(s). • Interpret information and summarize/paraphrase information. • Convert numerical data and predict arithmetic results. • Understand technology applications and follow proper procedures. • Utilizes integrated/multiple software, if applicable.

Occupation Cluster: **Millwright**
Function or Job Duty: **Duty G: Modify Equipment**

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-5 Identify required materials needed for modification	• Established product specifications are properly obtained in accordance with organization protocol. • Proper materials/tools are gathered for the job. • Materials/tools are correct according to certifications and safety applications. • Materials/tools are handled in accordance with specifications and organization guidelines, if applicable.	• Materials, tools, their uses and characteristics. • Safety procedures regarding materials and tools. • Material/tool handling procedures. • Part ordering procedures. • Welding and materials properties. • Machining. • Hydraulics/fluid dynamics. • Pumps and pump applications. • Equipment set-up and alignment. • Use math skills to solve problems.	• Identifies relevant details, facts and specifications. • Utilizes integrated software, locates and retrieves stored information. • Maintains job specific materials and tools. • Maintains materials and tools and uses them in a safe manner. • Understands technology applications and follows proper procedures.
G-8 Perform operational test on modified equipment	• Observation of equipment is performed regularly. • All unusual behaviors or unsafe conditions observed are reported immediately to appropriate personnel. • All aspects of equipment operations are documented. • Safety requirements are in place during observation. • Equipment and process operations are observed at timed intervals for consistency.	• Documentation procedures. • Production goals and sequence of operation of the equipment. • Normal and abnormal equipment behavior and operation, including visual, sound and vibration and ability to analyze equipment and process data. • Safe and unsafe conditions for operating equipment. • Critical (safety) versus non-critical potential problems. • Equipment operations manuals. • System interrelations.	• Monitors system performance. • Troubleshoots malfunction/failure. • Diagnoses performance deviations. • Records information accurately. • Develops and applies creative solutions to new and existing situations.

Occupation Cluster: **Millwright**
Function or Job Duty: **Duty H: Participate in Continuing Education**

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
H-3 Participate in scheduled instruction	• Seminars, workshops and courses in technology are attended with full participation. • Current professional literature about the application of emerging technologies are selected and read on a regular basis. • Appropriate activities are thoroughly researched and properly identified and completed. • Return-to-industry opportunities are pursued and followed up in a timely manner.	• Seminars and workshops offered that relate to technology. • Professional literature related to emerging technology. • Return-to-industry opportunities and application procedures. • Accessing information related to seminars, courses, and workshops. • Creating opportunities to apply current technical knowledge and skills.	• Adheres to standards, demonstrates commitment to excellence. • Demonstrates commitment to self improvement, and analyzes and adjusts goals. • Examine information/data for relevance and accuracy. • Records information and summarizes/paraphrases information.
H-4 Participate in specialized instruction	• Seminars, workshops and courses in technology are attended with full participation. • Current professional literature about the application of emerging technologies are selected and read on a regular basis. • Appropriate activities are thoroughly researched and identified and completed. • Return-to-industry opportunities are pursued and followed up in a timely manner.	• Seminars and workshops offered that relate to technology. • Professional literature related to emerging technology. • Return-to-industry opportunities and application procedures. • Accessing information related to seminars, courses, and workshops. • Creating opportunities to apply current technical knowledge and skills.	• Adheres to standards, demonstrates commitment to excellence. • Demonstrates commitment to self improvement, and analyzes and adjusts goals. • Examine information/data for relevance and accuracy. • Records information and summarizes/paraphrases information.
H-5 Maintain specialized certification	• All applicable certification requirements are kept in an organized and accessible fashion. • Appropriate activities for certification are accurately and effectively identified and completed. • Documentation is accurately maintained and submitted according to requirements of certifying bodies. • Certification reviews are scheduled to ensure compliance and assist in planning for anticipated changes. • All necessary training is obtained.	• Accessing sources of information related to the activities needed for certification. • Requirements of the certifying bodies. • Certification training programs and their availability and cost. • Documentation submittal and filing procedures. • Successfully complete certification requirements.	• Adheres to standards, demonstrates commitment to excellence. • Demonstrates commitment to self improvement, and analyzes and adjusts goals. • Examine information/data for relevance and accuracy. • Records information and summarizes/paraphrases information.

SCANS SURVEY RESULTS FOR MILLWRIGHTS

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

Rankings are averaged.

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

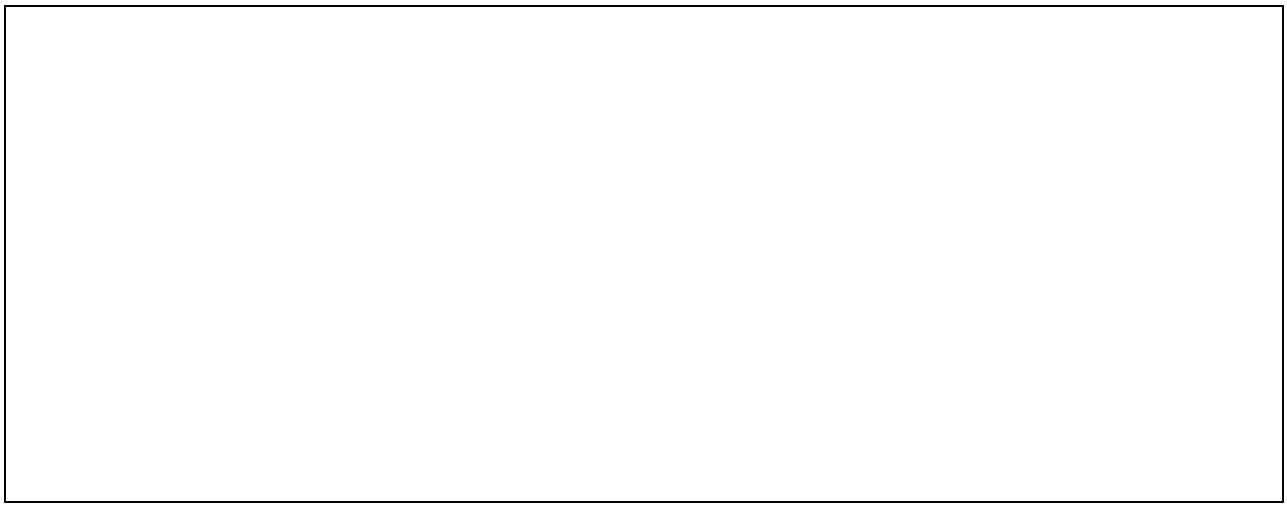
Foundation Skills and Personal Qualities	0	1	2	3	4	5	Critical Competencies
Management of Time and Resources							
Manages Time							*Efficiently manages time, adjusts schedule as required by supervisor and prioritizes daily tasks*
Manages Money							*Not applicable*
Manages Materials/Facilities		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

Rankings are averaged.

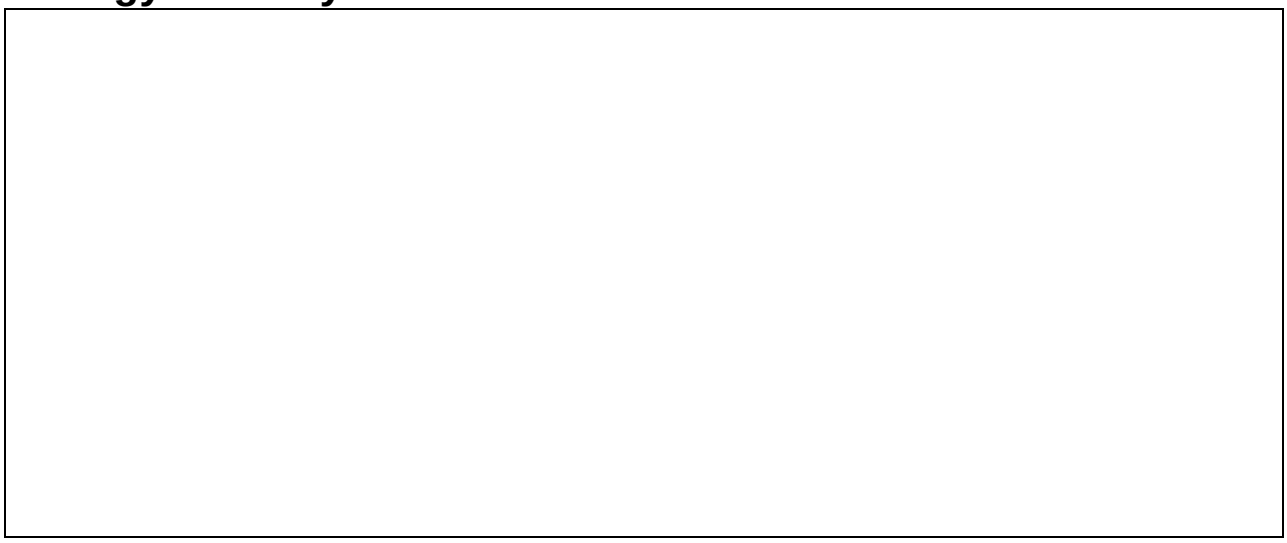
0 = Not Important
1 = Somewhat Important
2 = Moderately Important
3 = Important
4 = Very Important
5 = Critical

APPENDIX A

Resources & Order Form



Energy Industry Picture



Resources

Bailey, Thomas, and Donna Merritt. Making Sense of Industry-Based Skill Standards. Berkeley, CA: National Center for Research in Vocational Education, University of California, Berkeley, 1995.

Institute of Educational Leadership. An Overview of Skill Standards Systems in Education and Industry; Vol. I-IV. The Institute for Educational Leadership. (No date).

Manufacturing Skill Standards, State of Washington, 1999.

National Alliance of Business. Skill Standards: Benchmarks of Excellence. National Alliance of Business. Washington, DC. 1995.

Stevenson, RoseAnn. Skill Standards Guidebook I. Washington State Board of Community and Technical Colleges; The Center for Career and Work-Related Education; The Boeing Company. October 1997.

Skill Standards for Agriculture, State of Washington, 1999.

Skill Standards for Food Processing Workers, State of Washington, 1999.

Skill Standards for Professional-Technical College Instructors and Customized Trainers, State of Washington, 2000.

U.S. Department of Labor. (1993). Teaching the SCANS Competencies. The Secretary's Commission on Achieving Necessary Skills. U.S. Department of Labor, Washington, DC. 1993.

Internet Resources

Making Sense of Industry-Based Skill Standards
vocserve.berkeley.edu/summaries/777sum.html

National Skill Standards Board
wwwstc.cabwnet.gov/STWGLOSS/DEF32.btm

SCANS 2000
inet.ed.gov/G2K/standard.html

Washington State Website for Skill Standards
www.wa-skills.com

Order Form

For additional copies of ***Skill Standards for Energy Industry***, please photocopy this order form and return it to:

Skill Standards Resource Center (25-5A)
Highline Community College
P. O. Box 98000
Des Moines, WA 98198-9800

If you have any questions about ordering, please call (206) 870- 3759.

Payment can be made by check, money order, VISA, MasterCard, or by purchase order.

Checks or money orders should be made payable to ***Highline Community College***. For residents or organizations in the State of Washington, please add 8.6% sales tax.

Order Form

	Quantity	Cost
Skill Standards for Energy Industry @ $20.00 each	_____	_____
Washington State Sales Tax @ 8.6% (State of Washington only)		_____
Shipping & Handling: *(Please add $3.50 for shipping and handling a single order, $2.00 for each additional item per shipment.)*		_____
	Total	_____

Name *(please print)* _____

Address _____

City _____ State _____ Zip _____

Email Address _____

Check or money order enclosed VISA MasterCard Purchase Order

Card Number _____ Expiration Date _____

Purchase Order # _____

Signature _____