



WCD 69188.0 Facility Hazard Analysis-Dry Lab Activities

Hazard Level: Moderate



WCD Status: Approved **Status Date:** 06/17/2020

Authorization Status: See Authorization Package

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Approving Division: PSC Approver: Rossi, Paul

Review Interval: 1 Years Annual Review: 06/17/2021

Scope

Routine dry-lab work to support experimental activities at the APS. This work typically involves assembly, repair, and testing of beam line equipment. Accordingly, this WCD covers:

- Mechanical work with hand tools, power tools, or battery-operated tools
- Fabrication and testing signal and motor cables
- Configuration and repair of beamline equipment such as vacuum pumps, motors, actuators, amplifiers, compressors, and sample stages.
- soldering of electrical connections
- testing of software communication with beamline equipment
- unpacking and assembly of beamline components
- Use of light machine tools

Scope Limits

This WCD does not cover high hazards or tasks that are considered non-routine or high risk. The WCD is limited routine dry lab activities.

Work covered under an approved ESAF is outside the scope of this module.

Task Summary

Task 1	Routine Dry Lab Activities in Support of APS Experimental Activities	
	OJT	<p>-A continuing training program allows highly skilled beamline staff to work with new employees and lesser skilled staff, in providing the opportunity to develop expertise and skills in the dry lab activities.</p> <p>-APS Sector Specific Orientation</p>

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Hazard Summary



Campus

Potential exposure due to Pandemic

1	When cleaning and disinfecting potentially contaminated surfaces	
1	When close contact CANNOT be avoided, but a barrier can be installed	
1	When close contact CAN be avoided (distancing > than 6 feet, other than "incidental" contact)	

General Site Hazard

1	In a laboratory	Low
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Chemicals

Cylinders

1	Use or storage of cylinders	
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Using Chemicals in Research

1	< 5 gal in use	Low
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Electrical

Hazard Class 1.x, 50-60 Hz Nominal Power

1	Non-QEW	Low
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Quality

1	Measuring and testing equipment	Low
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Workplace

Ergonomics

1	Lifting, lowering, carrying, pushing, pulling, or reaching < 30 lbs	Low
1	Lifting, lowering, carrying, pushing, pulling, or reaching, 30-50 lbs	Moderate

Hand Tools

1	Powered Hand Tool	Low
1	Non-Powered Hand Tools	Low

Ladders, scaffolds, elevated platforms

1	Portable ladders	Low
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Machinery and Equipment

1	Stationary tools	Moderate
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Pinch or nip hazard

1	Pinch or nip	Low
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Sharps

1	Use of scalpels, razor blades, and similar tools	Low
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Hazard Summary



Workplace

Stored Energy

1	Differential Vacuum Vessels Category II	Moderate
1	Differential pressure system (excluding vacuum)	Moderate

Welding-related hazard, (Brazing, soldering, torch-cutting)

1	Soldering, Non-flame small scale electrical.	Low
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PPE Summary

TASK	PPE
1	Clothing
1	Eye protection
1	Foot protection
1	Gloves
1	safety glasses with sideshields (ANSI Z87.1)
1	safety glasses with sideshields (ANSI Z87.1) or safety goggles

Training Summary

TASK	COURSE	COURSE NAME
1	COVID100	Guidance to Working Safely in a COVID-19 Environment
1	ESH117	Ladder Safety
1	ESH377	Recognizing NRTLs
1	ESH562	Machine Guarding
1	ESH566	Machine Tool Qualification and Operation

Permit Summary

TASK	PERMIT
	No permits required

WCD Attachments

TASK	DATE	FILE NAME	DESCRIPTION
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**TASK 1 Routine Dry Lab Activities in Support of APS
Experimental Activities**

Response to unplanned events:

Stop work immediately and dial 911

Locations:

400 All dry labs located in the 400 area.

Task Scope:

Routine, low or moderate hazard dry lab work in support of operations and maintenance at the APS. Common activities include:

- Mechanical work with hand tools, power tools, or battery-operated tools
- Fabrication and testing signal and motor cables
- Configuration and repair of beamline equipment such as vacuum pumps, motors, actuators, amplifiers, compressors, and sample stages.
- soldering of electrical connections
- testing of software communication with beamline equipment
- unpacking and assembly of beamline components
- Use of light machine tools

Task Scope Limits:

Limited to low or moderate hazard tasks, that are considered routine and fall within the skill level of the personnel assigned.

Work covered under an approved ESAF is outside of the scope of this module.

Work Instructions:

Use the skills and training developed by your JHQ to do work safely. Perform work within the ISM guidelines. You have the authority and responsibility to suspend or stop work. When in doubt, suspend work and notify your supervisor.

Hazard Analysis and Controls



Campus

Potential exposure due to Pandemic

/Campus/ Potential exposure due to Pandemic / For SARS-CoV-2 (COVID-19)

When close contact CAN be avoided (distancing > than 6 feet, other than "incidental" contact)	
Task-Hazard Relationship Workers may be in a shared workspace, but to the greatest extent possible, will maintain > 6 ft from one another during most activities.	
Administrative Control Avoid sharing PPE - Follow shared PPE guidelines Base-level controls are in place Distancing control - Specify tape floors, stagger shifts Using disposable PPE - Dispose of used PPE in regular trash, and then immediately wash/sanitize hands	

**TASK 1 Routine Dry Lab Activities in Support of APS
Experimental Activities**



Campus

Potential exposure due to Pandemic

/Campus/ Potential exposure due to Pandemic / For SARS-CoV-2 (COVID-19)

When close contact CANNOT be avoided, but a barrier can be installed	
<p>Task-Hazard Relationship Some work activities may require brief interactions of workers spaced <6 ft apart from one another.</p> <p>Additional Requirements Inform ESH Coordinator if such tasks must be carried out and seek additional controls.</p> <p>Engineering Control Physical barrier - Identify physical barrier</p> <p>Administrative Control Additional safe work practice - Specify additional safe work practices, or n/a Avoid sharing PPE - Follow shared PPE guidelines Base-level controls are in place Using disposable PPE - Dispose of used PPE in regular trash, and then immediately wash/sanitize hands</p>	

When cleaning and disinfecting potentially contaminated surfaces	
<p>Task-Hazard Relationship Surfaces, tools, and equipment will need to be cleaned after use.</p> <p>Administrative Control Do not mix disinfectant Evaluate surface, the cleaning solution, and disinfectant being used to ensure compatible - For example, using stainless steel for high temperature service, chlorine and other halogens can contribute to stress corrosion cracking Follow label requirements - For the cleaner and the disinfectant No spark or heat operation near by Use EPA-approved disinfectant to clean Use in a well-ventilated area</p> <p>Personal Protective Equipment Eye protection - Safety glasses with side shields Gloves - Nitrile gloves</p>	

General Site Hazard

In a laboratory	Low
<p>Task-Hazard Relationship Personnel will be working within a dry lab and must follow all</p> <p>Additional Requirements Employees must follow all guidance and where appropriate PPE in designated areas.</p>	

**TASK 1 Routine Dry Lab Activities in Support of APS
Experimental Activities**



Campus

General Site Hazard

In a laboratory	Low
Administrative Control Signage - Verify entry requirements on signage prior to entry.	
Personal Protective Equipment Clothing - Long trousers without cuffs over shoe tops and 1/4 length or longer sleeves Eye protection - Safety glasses with side shields or safety goggles. Foot protection - Closed toe shoes (e.g., leather composite)	



Chemicals

Cylinders

Use or storage of cylinders	
Task-Hazard Relationship High pressure gas cylinders are used in various applications to supply non-hazardous gases to experimental equipment including detectors, beam line sections, chambers, etc.	
Additional Requirements -gas pressure regulators inspected -verify piping/tubing in compliance -verify piping/tubing rated for operating temperature and pressure simultaneously. No Engineering, Administrative or PPE Controls identified for this hazard	

Using Chemicals in Research

/Chemicals/Using Chemicals in Research/Flammable or combustible, liquid or solid

< 5 gal in use	Low
Task-Hazard Relationship Common industrial chemicals such as solvents, detergents, aerosols, paints, adhesives, epoxies, etc. are often required for routine use in this area.	
Additional Requirements Follow SDS recommendations.	
Engineering Control Containment - specify type of container requirements (e.g. glass, original container, approved safety can)	
Administrative Control Storage and usage limits - must not have > 5 gallons in use and/or in UL listed refrigerator AND must not exceed 120 gallons total per flammable liquids cabinet and 120 gallons for class 1A or 480 gallons for all others total for a fire area (combined in use and in storage cabinets)	
Personal Protective Equipment safety glasses with sideshields (ANSI Z87.1) or safety goggles	

**TASK 1 Routine Dry Lab Activities in Support of APS
Experimental Activities**



Electrical

Hazard Class 1.x, 50-60 Hz Nominal Power

/Electrical/Hazard Class 1.x, 50-60 Hz Nominal Power/Mode: All.

Non-QEW	Low
<p>Task-Hazard Relationship NRTL approved/DEEI inspected electrical equipment may be used inside the dry labs.</p> <p>Administrative Control See training</p>	



Quality

Measuring and testing equipment	Low
<p>Task-Hazard Relationship Measuring and testing equipment will be used when performing receipt and technical inspection of equipment.</p> <p>Administrative Control Verify required calibrations are current prior to use</p>	



Workplace

Ergonomics

Lifting, lowering, carrying, pushing, pulling, or reaching < 30 lbs	Low
<p>Task-Hazard Relationship Lifting, lowering, carrying, may be required when installing accelerator and beamline component support systems. In general, material handling equipment should be utilized to the extent possible.</p> <p>Additional Requirements Stretch prior to lifting, ensure good posture. Request additional help if needed.</p> <p>Administrative Control Rest component - Specify: duration and frequency of rest</p>	
Lifting, lowering, carrying, pushing, pulling, or reaching, 30-50 lbs	Moderate
<p>Task-Hazard Relationship Lifting, lowering, carrying, may be required when working on components and equipment to support experimental activities. In general, material handling equipment should be utilized to the extent possible.</p> <p>Additional Requirements Ensure good posture. Request additional help when needed.</p> <p>Administrative Control Rest component - Specify: duration and frequency of rest</p>	

**TASK 1 Routine Dry Lab Activities in Support of APS
Experimental Activities**



Workplace

Hand Tools

Non-Powered Hand Tools	Low
<p>Task-Hazard Relationship Experimental work activities in this area often require use of common hand tools</p> <p>Additional Requirements -Do not carry hand tools in pockets. -Inspect tools prior to each use.</p> <p>Personal Protective Equipment Eye protection - Safety glasses with side shields.</p>	

Powered Hand Tool	Low
<p>Task-Hazard Relationship Powered hand tools may be used for light fabrication and assembly work.</p> <p>Personal Protective Equipment Eye protection - Safety glasses with side shields</p>	

Ladders, scaffolds, elevated platforms

Portable ladders	Low
<p>Task-Hazard Relationship Step ladders and step stools may occasionally be used in the lab to access tools and components necessary to assist in experimental activities.</p> <p>Administrative Control See training</p>	

Machinery and Equipment

Stationary tools	Moderate
<p>Task-Hazard Relationship Machine tools are to be used to work on equipment and components to support experimental activities.</p> <p>Engineering Control OSHA compliant guarding</p> <p>Administrative Control Equipment must be inspected daily or prior to use</p> <p>Personal Protective Equipment Eye protection - Safety glasses with side shields Foot protection - Leather work shoes.</p>	

Pinch or nip hazard

Pinch or nip	Low
<p>Task-Hazard Relationship</p>	

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**TASK 1 Routine Dry Lab Activities in Support of APS
Experimental Activities**



Workplace

Pinch or nip hazard

Pinch or nip	Low
<p>Some of the beam line components can be potential nip or pinch hazards.</p> <p>Additional Requirements</p> <p>-Inspect components to become fully aware of potential nip or pinch hazards.</p> <p>Personal Protective Equipment</p> <p>Gloves - Sturdy leather work gloves</p>	

Sharps

Use of scalpels, razor blades, and similar tools	Low
<p>Task-Hazard Relationship</p> <p>Sharps such as box cutters and razor blades may be used for components supporting experimental activities.</p> <p>Administrative Control</p> <p>Storage - Store with sharp edge covered.</p> <p>Personal Protective Equipment</p> <p>Gloves - Cut resistant gloves when feasible.</p>	

Stored Energy

Differential Vacuum Vessels Category II	Moderate
<p>Task-Hazard Relationship</p> <p>Many experimental activities require vacuum conditions to reduce the influence of air on measurements, sample preparations, or characterization.</p> <p>Additional Requirements</p> <p>Pressure relief device.</p> <p>Administrative Control</p> <p>Verify that a vessel/system - Verify that a vessel/system is either (1) designed & rated for vacuum and pressure applications by a manufacturer, or (2) if maximum operating pressure is greater than 15 psig - that pressure vessel is ASME-stamped & rated for vacuum applications, or (3) perform equivalency-to-ASME calculations</p> <p>Personal Protective Equipment</p> <p>safety glasses with sideshields (ANSI Z87.1)</p>	

Differential pressure system (excluding vacuum)	Moderate
<p>Task-Hazard Relationship</p> <p>High pressure gas cylinders are used in various applications to supply non-hazardous gases to experimental equipment including detectors, beam line sections, chambers, etc.</p> <p>Additional Requirements</p> <p>Verify piping/tubing rated for operating temperature and pressure simultaneously.</p>	

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**TASK 1 Routine Dry Lab Activities in Support of APS
Experimental Activities**



Workplace

Stored Energy

Differential pressure system (excluding vacuum)	Moderate
Administrative Control Pressure relief - Verify the pressure relief devices are documented, inspected and tested. Pressure system. - Verify that the pressure system is inspected and tested.	
Personal Protective Equipment Eye protection - Safety glasses with side shields.	

Welding-related hazard, (Brazing, soldering, torch-cutting)

Soldering, Non-flame small scale electrical.	Low
Task-Hazard Relationship Some soldering may be required to perform incidental repairs.	
Additional Requirements -Collect spend solder and dispose properly. -Perform housekeeping tasks no less frequently than at the end of each shift.	
Engineering Control Ventilation - Well ventilated area or local exhaust ventilation.	