WCD 69188.0 Facility Hazard Analysis-Dry Lab Activities

Hazard Level: Moderate M

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	-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. -APS Sector Specific Orientation

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Authorization Status: See Authorization Package

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

Chemicals

Cylinders

1	Use or storage of cylinders	

Using Chemicals in Research

1	< 5 gal in use	Low

Electrical

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

1	Non-QEW	Low

Quality

1	Measuring and testing equipment	Low

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

Machinery and Equipment

1	Stationary tools	Moderate

Pinch or nip hazard

1	Pinch or nip	Low

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

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

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	

Task-Hazard Relationship

Some work activities may require brief interactions of workers spaced <6 ft apart from one another.

Additional Requirements

Inform ESH Coordinator if such tasks must be carried out and seek additional controls.

Engineering Control

Physical barrier - Identify physical barrier

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

When cleaning and disinfecting potentially contaminated surfaces	

Task-Hazard Relationship

Surfaces, tools, and equipment will need to be cleaned after use.

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

Personal Protective Equipment

Eye protection - Safety glasses with side shields

Gloves - Nitrile gloves

General Site Hazard

In a laboratory	Low

Task-Hazard Relationship

Personnel will be working within a dry lab and must follow all

Additional Requirements

Employees must follow all guidance and where appropriate PPE in designated areas.

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

Task-Hazard Relationship

NRTL approved/DEEI inspected electrical equipment may be used inside the dry labs.

Administrative Control

See training

Quality

Measuring and testing equipment	Low

Task-Hazard Relationship

Measuring and testing equipment will be used when performing receipt and technical inspection of equipment.

Administrative Control

Verify required calibrations are current prior to use

Workplace

Ergonomics

Lifting, lowering, carrying, pushing, pulling, or reaching < 30 lbs	Low

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.

Additional Requirements

Stretch prior to lifting, ensure good posture. Request additional help if needed.

Administrative Control

Rest component - Specify: duration and frequency of rest

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

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.

Additional Requirements

Ensure good posture. Request additional help when needed.

Administrative Control

Rest component - Specify: duration and frequency of rest

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

Workplace

Hand Tools

Non-Powered Hand Tools	Low

Task-Hazard Relationship

Experimental work activities in this area often require use of common hand tools

Additional Requirements

-Do not carry hand tools in pockets.
-Inspect tools prior to each use.

Personal Protective Equipment

Eye protection - Safety glasses with side shields.

Powered Hand Tool	Low

Task-Hazard Relationship

Powered hand tools may be used for light fabrication and assembly work.

Personal Protective Equipment

Eye protection - Safety glasses with side shields

Ladders, scaffolds, elevated platforms

Portable ladders	Low

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.

Administrative Control

See training

Machinery and Equipment

Stationary tools	Moderate

Task-Hazard Relationship

Machine tools are to be used to work on equipment and components to support experimental activities.

Engineering Control

OSHA compliant guarding

Administrative Control

Equipment must be inspected daily or prior to use

Personal Protective Equipment

Eye protection - Safety glasses with side shields

Foot protection - Leather work shoes.

Pinch or nip hazard

Pinch or nip	Low

Task-Hazard Relationship

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

Workplace

Pinch or nip hazard

Pinch or nip	Low

Some of the beam line components can be potential nip or pinch hazards.

Additional Requirements

-Inspect components to become fully aware of potential nip or pinch hazards.

Personal Protective Equipment

Gloves - Sturdy leather work gloves

Sharps

Use of scalpels, razor blades, and similar tools	Low

Task-Hazard Relationship

Sharps such as box cutters and razor blades may be used for components supporting experimental activities.

Administrative Control

Storage - Store with sharp edge covered.

Personal Protective Equipment

Gloves - Cut resistant gloves when feasible.

Stored Energy

Differential Vacuum Vessels Category II	Moderate

Task-Hazard Relationship

Many experimental activities require vacuum conditions to reduce the influence of air on measurements, sample preparations, or characterization.

Additional Requirements

Pressure relief device.

Administrative Control

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

Personal Protective Equipment

safety glasses with sideshields (ANSI Z87.1)

Differential pressure system (excluding vacuum)	Moderate

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

Verify piping/tubing rated for operating temperature and pressure simultaneously.

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.