

Executive Summary Report

Sandia National Laboratories

Primary Hazard Screening (PHS)

PHS Number: SNL06A00922-006

CINT Rms: 1522 & 1523 - Lithography Bay and Chase

I. Signatures (Electronic signature dates shown)**Risk Management Determination**

Hazard Classification: **Low** Required Documentation: **PHS with integral HA**

Facility/Project Designator: **Non-nuclear Facility** Date Created: **12/19/2011**

DOE Order References: **425.1D** Results as of: **01/10/2012**

Submitted for Review by: **Nogan,John** Org: 01132 Date: 12/19/2011

Author / Technical Review

I am knowledgeable of the activities and hazards covered by this PHS and, after doing due diligence, the description, notes, identified hazards, analyses, and other information contained in this PHS are complete and accurate.

Author: **Nogan,John** Org: **01132** CONCUR ON SUBMIT:
12/19/2011

I have performed the above reviews and concur that those items are complete and accurate.

Industrial Facility Safety Basis SME: **Stirrup,Timothy Scott** Org: **04126** CONCUR: **12/21/2011**

ES&H Coordinator Review

The description and notes describe and scope the activities performed under this PHS. All hazards have been identified. Questions are answered correctly and, as necessary, rationale or clarification is provided. All hazards in the HA have been analyzed, including the identification of controls for each hazard. I have performed the above reviews and concur that those items are complete and accurate.

ES&H Coordinator: **Burkhart,Robert** Org: **01100** CONCUR: **12/21/2011**

Quality Review

This PHS meets minimum Corporate standards for 1) description/notes and 2) required information. There are no gross inconsistencies. I have performed the above reviews and concur that those items are complete and accurate.

PHS Team: **Costanzo,Jessica Amoret** Org: **04126** CONCUR: **12/22/2011**

Approver

The description and notes describe and scope the activities performed under this PHS. All hazards have been identified. Questions are answered correctly and, as necessary, rationale or clarification is provided. All hazards in the HA have been analyzed, including the identification of controls for each hazard. I have reviewed this PHS and concur that its contents are accurate and complete. I will ensure that the requirements and commitments in this PHS are implemented prior to the start of work.

Approving Manager: **Hearne, Sean J.**

Org: **01132**

APPROVE: **01/10/2012**

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II. General Information

Document Status

Question Set Version: **K**Status: **Approved**Expiration Date: **01/10/2013**Responsible Organization: **01132**Operation Type: **Facility or Lab**

Radiological Protection Level

Radiological Protection Level for this facility or project: **None**

Description

Room 1522 and 1523 are designated the lithography room and chase, respectively. Chase 1522's function is to provide space for the return air from lithography room 1523, and to house the gas lines, electrical outlets, vacuum pumps, and exhaust handling system. No laboratory experiments will be performed in this area. However, the area will be used for routine maintenance of the equipment in 1523 and to provide storage for lab user PPE (Personal Protective Equipment). Room 1523 will be used for the process and associated metrology of contact mask lithography. This includes processing of industry standard photoresist, which typically requires spinning the photoresist on a wafer followed by exposing using a UV contact mask aligner and baking at up to 250C on a hot plate or in an oven. The photoresist is then typically developed using a base such as KOH (Potassium Hydroxide) or TMAH (Tetramethylammonium Hydroxide) and can be removed using a common solvent. An O₂ (oxygen) plasma or atmospheric O₃ (ozone) surface clean typically follows the develop step to remove residual photoresist. Metrology equipment used in this process includes an optical microscope for visual inspection.

Locations

Site	Area	Building	Room	Description
Primary Location				
SSTP	No Tech Area	518	1523	
Other Locations				
SSTP	No Tech Area	518	1522	

III. Identified Hazards

Hazard Name	Hazard Description	Source
Traffic	Traffic related hazards for injury	general corporate business process
SIH - Roving Personnel and Visitors	Roving Personnel or Visitors entering work area	general corporate business process
Common electrical hazards	Common electrical hazards	general corporate business process
Chemicals	Potential personnel exposure to chemicals & fire protection regulatory requirements	QUESTION 5
Unbound Engineering Nanoscale particles	Unbound Engineered Nanoscale Particles(UNP); Potential inhalation and dermal exposure to UNP.	QUESTION 5c
Corrosive chemical	Corrosive chemical; Potential exposure to skin and eyes.	QUESTION 5e
Noncompliant storage, dispensing, or use of flammable/combustible liquids	Fire/Explosion Hazard	QUESTION 5g
Chemical physical hazards	Hazards from fires, reactions, and explosions	QUESTION 5h
Exposed energized circuits	Potential electrical shock or arc	QUESTION 6a
Electrical equipment (not approved by NRTL or Sandia)	Unknown hazard potential since items have not gone through the standards, testing rigor, and hazard analysis associated with an NRTL-evaluation	QUESTION 6d(1)
Mechanical hazards	Potential injury from mechanical forces	QUESTION 7
Portable power tools	Potential injury from portable power tools	QUESTION 7b
Nonionizing radiation	Potential exposure to nonionizing radiation.	QUESTION 8a
Nonionizing radiation	Potential exposure to nonionizing radiation below exposure limits.	QUESTION 8a(1)
Thermal hazard	Contact with hot or cold objects	QUESTION 9a
Potential environmental concerns	Potential for regulatory action	QUESTION 15
Wastewater discharge	Potential to exceed permitted quantities	QUESTION 15a
Air discharge	Potential to emit regulated contaminants	QUESTION 15b
Hazardous waste	Potential for regulatory action	QUESTION 15d
Low - Offsite Work Condition -MOW	Hazards from work conducted offsite by Members of the Workforce	QUESTION 21a(1)a

IV. Required Actions

Warning Messages

1. There are requirements for waste minimization and documentation of waste minimization efforts/results. Contact the Pollution Prevention (P2) Team and/or refer to website <http://info.sandia.gov/esh/p2/TechnicalAssistance.html> if assistance with waste minimization documentation is needed. (QUESTION 15d)
2. If working under multiple PHSs, integrate the hazards, controls, and requirements from all applicable PHSs into your Work Planning and Controls. (QUESTION 22a(1))
3. There are a variety of requirements applicable to chemicals. Refer to the portions of Corporate Policy: ESH100, Environment, Safety and Health relevant to the activities being performed for requirements. (QUESTION 5)
4. **WARNING:** Work on energized electrical circuits is restricted to certain individuals. Ensure only qualified personnel perform work on electrical equipment/systems at SNL. It is the responsibility of the department manager to determine an employee's electrical qualifications. To become qualified to perform electrical work a person shall do the following:
 - Demonstrate a familiarity, through interview, demonstrated experience (i.e., resume/review) or direct observation, with the hazards of the workplace and the specific equipment to be worked on, as well as any associated ES&H Standard Operating Procedures (SOPs) and Operating Procedures (OPs).
 - Demonstrate a familiarity, through interview, demonstrated experience (i.e., resume/reference) or direct observation, with electrical maintenance techniques, codes and other general electrical knowledge.
 - Have qualifications reviewed and approved by their department manager to ensure they are qualified for a particular job assignment.

NOTE: A person qualified to work with certain equipment may be considered "unqualified" to work on similar equipment without first being advised of any differing hazards involved. (QUESTION 6a)
5. Any activity inside the Limited Approach Boundary is considered working near energized parts and requires a senior-manager-approved technical work document (TWD). (QUESTION 6a)
6. Hazards in your work area could impact Roving Personnel or Visitors. Evaluate these hazards and implement the appropriate precautions to protect these persons (e.g., access control, required PPE, training, escorts, pre-entry briefings, emergency procedures briefing). (general corporate business process)

Action Messages

1. Obtain a National Environmental Policy Act (NEPA) checklist determination for all activities. Contact your ES&H Coordinator, NEPA Subject Matter Expert (SME), or Qualified NEPA Reviewer (QNR) if assistance is desired with this determination and/or process. (QUESTION 15)
2. Submit documentation for discharge permits and request written approval for all process discharges. Contact the Waste Water Subject Matter Expert or the appropriate wastewater contact under the ES&H/EM Contact List if assistance is needed. (QUESTION 15a)
3. Contact the Environmental Compliance Coordinator or the Hazardous Waste Management Facility (HWMF) at (505)844-3470 (SNL/NM only) to determine how to appropriately manage hazardous waste. (QUESTION 15d)
4. Ensure suitable facilities for emergency quick drenching or flushing of the eyes and body are provided within the work area for immediate emergency use, where eyes or body of any person may be exposed to injurious corrosive materials. See Corporate Procedure: ESH100.2.IH.13, "Work with Injurious Corrosive Materials and Manage Safety Shower and Eyewash Use," as needed for requirements. (QUESTION 5e)

5. Store, dispense and bond flammable and combustible liquids in accordance with the requirements in the SNL, "Record of Code Decision." (QUESTION 5g)

6. Develop and use a technical work document (TWD) to perform energized work as follows:

- If the energized work is diagnostic (such as troubleshooting, measuring voltage, etc.), an OP is required. You can find an example of a completed energized electrical OP on the Electrical Safety home page. This could easily be used as a template for any R&D electrical activity.

- If the work involves manipulation or reconfiguration of an energized component an Energized Work Permit (EWP) must be completed. An EWP is needed each time such tasks are to be completed. An EWP may be obtained from the SNL internal web under Corporate Forms EWP- SF 2005-EWP (10-2005). (QUESTION 6a)

7. Conduct an evaluation using the energized work decision tool to determine appropriate electrical PPE prior to work on each energized system. Prior to PPE use, workers shall receive site-specific PPE training. See Corporate Procedure: ESH100.2.IS.8, "Assess Workplace Hazards and Provide and Maintain Personal Protective Equipment" for requirements regarding site-specific PPE training. Refer to MN471004, Electrical Safety Manual, Section 2.10, "Electrical Personal Protective Equipment" for additional information as needed. (QUESTION 6a)

8. Include all TWD/OPs in the Documents Section of the PHS. (QUESTION 6a)

9. All electrical equipment that is not NRTL-listed must be evaluated by an authorized equipment inspector. Contact your ES&H Coordinator if additional information is needed on equipment inspections or to identify an authorized equipment inspector. (QUESTION 6d(1))

10. Implement actions and control measures specified in the applicable Industrial Hygiene exposure assessment. (QUESTION 8a)

Required Training

PHS Identified Training

[Note: This training is a regulatory requirement for one or more people involved in operations associated with identified hazards. Each class may not be required by all people working in the area. Please note that some training classes are only provided occasionally. Please be sure to allow adequate lead-time for personnel to schedule and complete training.]

Course Code	Course Title	Exclusions	Training Interval (years)	One-time Training
CHM100	CHEMICAL SAFETY TRAINING		3	No
	Required by: QUESTION 5			
CHM103	SITE-SPECIFIC CHEMICAL SAFETY TRAINING		3	No
	Required by: QUESTION 5			
ELC106	R&D ELECTRICAL SAFETY (> 50 VOLTS)	ELC106, unless not required by the energized work decision tool	--	Yes
	Required by: QUESTION 6a(2)			

ELC106R	R&D ELECTRICAL SAFETY REFRESHER (> 50 VOLTS)	ELC106R, R&D Electrical Safety (> 50 volts) unless not required by the energized work decision tool.	3	No
Required by: QUESTION 6a(2)				
ENV112	HAZARDOUS WASTE & ENVIRONMENTAL MANAGEMENT TRAINING	(all locations other than SNL/CA will take ENV112)	1	No
Required by: QUESTION 15d				
ESH100	ES&H AWARENESS		1	No
Required by: general corporate business process				
ESH200	SAFETY MANAGEMENT	ESH200 for new managers only	--	Yes
Required by: general corporate business process				
MCH200	HAND AND POWER TOOL SAFETY	MCH200, unless approved OJT has been completed	--	Yes
Required by: QUESTION 7b				
NANO101	NANOTECHNOLOGY SAFETY AWARENESS TRAINING		3	No
Required by: QUESTION 5c				
RSP215	AIR-PURIFYING RESPIRATORY PROTECTION	RSP215 (only for operations which require the use of air purifying respirators)	1	No
Required by: QUESTION C2a(1)b				
RSP217	COMPREHENSIVE RESPIRATORY PROTECTION	RSP217 (only for operations which require the use of air-supplying respirators) or (air-supplying respirators and air purifying respirators)	1	No
Required by: QUESTION C2a(1)b				
RSP230	RESPIRATORY PROTECTION FOR SUPERVISORS	RSP230 (only for manager overseeing individuals authorized for respirator use)	1	No
Required by: QUESTION C2a(1)b				

Regulatory Requirements

The full version of the PHS lists documents (e.g. CPSs) that contain requirements associated with the hazards and controls identified in this PHS. As necessary, review these documents to determine the requirements applicable to your activities. Note: while the Training, Action Items, and Warnings in PHS attempt to identify the critical requirements, they are not a comprehensive list of regulatory requirements. Requirements specific to your activity must be identified during your Work Planning and Controls process; the identified documents may be helpful in that process.