

Sandia National Laboratories

Primary Hazard Screening (PHS)

PHS Number: SNL06A00989-005

CINT Integration lab # 1504 - SEM/FIB

I. Signatures (Electronic signature dates shown)
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Risk Management DeterminationHazard Classification: **SIH**Required Documentation: **PHS**Facility/Project Designator: **Radiological Facility**Date Created: **02/28/2011**DOE Order References: **425.1D**Results as of: **03/07/2011**Submitted for Review by: **Davis, M. Wayne**

Org: 01100 Date: 03/01/2011

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: **03/01/2011**

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

Industrial Facility Safety Basis SME:
Stirrup, Timothy ScottOrg: **04126**CONCUR: **03/01/2011****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: **Davis, M. Wayne**Org: **01100**CONCUR: **03/01/2011****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: **03/03/2011**

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: **03/07/2011**

II. PHS Purpose, Limitations, and Use in Work Planning and Control

Purpose of the PHS

For the scope of work identified, the PHS identifies:

- High-level (primary) hazards (e.g. chemicals, toxic gasses, explosives)
- Some, but not all controls (e.g. PPE, respirators, ventilation, lockout/tagout, and NEPA), please see the [limitations section](#), below for additional information.
- A Hazard Classification, which determines the requirements for additional Safety Basis documents [e.g., Hazard Analysis (HA), Safety Assessment (SA), Safety Assessment Document (SAD), Documented Safety Analysis (DSA) etc.]
- For the hazards and controls identified, the PHS enables the identification and communication of:
 - Requirements documents (such as ES&H Manual chapters, sections, and supplements) that must be reviewed to determine specific requirements applicable to the work.
 - ES&H Manual-required training
 - Action and Warning messages that highlight key requirements.

The Hazard Analysis section of the PHS is used to perform a high-level hazards analysis and controls selection for hazards with a Hazard Classification of 'Low' and, optionally, for Standard Industrial Hazards (SIH).

Limitations of the PHS for Use in Activity-level Work Planning and Control

Unless additional information is specifically added, a PHS **does not** contain all of the detail necessary to identify and control hazards at the activity/task level. The reasons for this include:

- PHSs are typically written at the project or work-area level and therefore, do not contain sufficient detail about individual tasks or the hazards/controls associated with them.
- While the PHS provides requirements for the hazards and controls identified, it **does not** provide a comprehensive list of all requirements in the ES&H Manual and related documents. Furthermore, many of the requirements are identified by reference to sections of the ES&H Manual, which must be evaluated for requirements applicable to the specific work being performed.
- It is impractical to ask enough questions to generate the level of detail necessary for activity/task-level hazard identification and control; human analysis must be employed. Consequently, details must be developed by a work planner, including:
 - Specific details about the hazard (e.g. what chemical, which laser, when, under what conditions, and where)
 - Other controls needed, since the only controls automatically identified are the ones with ES&H Manual requirements that result from their use. Important controls, such as access control, interlocks, shielding, monitoring, and personnel qualifications are not identified.
 - Specificity about controls (e.g. type of PPE, ventilation specifications)
 - Details on how and when you implement each control
 - Information on who needs to take what training

Recommended Use of the PHS to Support Activity-Level Work Planning & Control

The information developed in the PHS and any resultant Safety Basis documents should be utilized when performing the subsequent task of activity-level hazard identification, analysis, and control selection, where (1) the major work steps are identified; (2) the hazards associated with each major step are identified and analyzed; and (3) the controls for each hazard are identified and verified to be adequate to protect the involved workers. For the vast majority of work performed at Sandia, the Job Safety Analysis form (SF 2001-JSA) or equivalent is the recommended tool to use for this purpose. The JSA provides a systematic process for a team of involved workers and SMEs to ensure the activity-level work scope is rigorously analyzed to identify all potential hazards and specify appropriate controls for each hazard. Information from the PHS and Safety Basis documents is used as an input in developing the JSA, and the results of the JSA are used to develop TWDs, procedures, or other work instructions as appropriate.

In some cases, the PHS system may be used for activity level hazard identification, analysis, and controls identification, however, the PHS usually must be supplemented with additional information to provide the level of detail necessary to serve this purpose. In these cases, a PHS should be designated as an "Activity-Level PHS" on the PHS General Information page; however, these PHSs will be reviewed during the review and approval process to confirm that they contain the detail necessary to identify the hazards and controls at any stage of the work being performed. If determined to not be adequate, options include (1) revising the PHS to include adequate information; or (2) removing the "Activity-Level PHS" designation, and using a JSA/JSA-equivalent process to perform activity-level hazard identification, analysis, and control selection.

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III. General Information

Document Status

Question Set Version: **J**Status: **APPROVED**Expiration Date: **03/07/2012**Responsible Organization: **01132**

Radiological Protection Level

Radiological Protection Level for this facility of project: **Normal**

Description

This PHS covers the Focused Ion Beam area (Room 1504 and adjoining Equipment Chase) of the CINT Integration Laboratory and specifically includes normal operations and maintenance for the focused ion beam tool / secondary electron microscope tool. The primary function of the tool is to micro-machine Si micro-fabricated parts into unique geometries using a 10 nanometer wide stream of ionized gallium in a vacuum chamber. The chamber is exhausted to the centralized house exhaust system. In addition, this room contains a Heidelberg Instruments Inc. DWL 66-fs Lithography Mask laser writer, which contains a class 3B HeCd laser, 120 mW @ 442 nm, that is interlocked to be inherently safe during normal operation.

Notes

General Document Notes

Locations

Site	Area	Building	Room	Description
Primary Location				
SSTP	No Tech Area	518	N/A	Lab 1504

Responsible Organization History

Organization Number	Effective (Starting) Date	This Org. Submitted Document for Review
01132	11/22/2006	Y

Planned Changes

IV. 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
Radiation generating devices	Potential for minor injury or illness	QUESTION 1
RGD (inherently safe)	Potential for minor injury or illness	QUESTION 1b(1)
Chemicals	Potential personnel exposure to chemicals & fire protection regulatory requirements	QUESTION 5
Noncompliant storage, dispensing, or use of flammable/combustible liquids	Fire/Explosion Hazard	QUESTION 5g
Circuit breakers or disconnect switches	Potential electrical arc from operating circuit breakers or disconnect switches	QUESTION 6b
Mechanical hazards	Potential injury from mechanical forces	QUESTION 7
Portable power tools	Potential injury from portable power tools	QUESTION 7b
Pressure source	Injury or damage	QUESTION 10
Potential environmental concerns	Potential for regulatory action	QUESTION 15
Air discharge	Potential to emit regulated contaminants	QUESTION 15b
Hazardous waste	Potential for regulatory action	QUESTION 15d
Offsite Work	Hazards associated with the site's other activities	QUESTION 21a
SIH - Offsite Work condition - MOW	Hazards encountered while conducting work offsite by members of the workforce	QUESTION 21b(1)a
Offsite Work - Domestic Travel	Hazards associated with domestic travel	QUESTION 21d

V. Required Actions

Warning Messages

1. Radiological safety training shall include procedures specific to an individual's job assignment. See MN471016, Section 3.4.3.2, "Job-Specific Training," for requirements and guidance. (QUESTION 1)

Response: Radiological safety training includes procedures specific to an individual's job assignment.

2. All operators of the system must be qualified according to the requirements of the Pressure Safety Manual. The Pressure Operator Qualification Form (SF 2001-PQF) is available as an optional tool for documenting the applicable training and qualification requirements for pressure applications. See MN471000, Pressure Safety Manual, Chapter 2, "The Pressure Safety Program," for requirements and guidance on qualification of pressure operators. (QUESTION 10a)

Response: All operators of the system are qualified according to the requirements of the Pressure Safety Manual.

3. There may also be requirements for waste minimization and documentation of waste minimization efforts/results. Contact the Pollution Prevention Team for assistance with waste minimization. (QUESTION 15d)

Response: As needed, personnel will contact the Pollution Prevention Team for assistance with waste minimization.

4. There may be hazards from other operations at the host site that could affect workers covered by this PHS; these hazards may change over time. Identify these hazards and any required safeguards to workers. This often involves establishing ongoing communications with the host facility about their hazards and required safeguards. You can also refer to Sandia's Roving Personnel Guidelines for additional information. (QUESTION 21a)

Response: Personnel have established ongoing communications with the host facility about their hazards and required safeguards via a weekly safety meeting.

5. 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)

Response: As needed, personnel will refer to the portions of Corporate Policy: ESH100, Environment, Safety and Health relevant to the activities being performed for requirements.

6. Flammable and combustible liquids must be bonded in accordance with the requirements in: The Sandia, "Record of Code Decision." (QUESTION 5g)

Response: To prevent a static electricity spark induced fire when pouring flammable liquids, personnel will ensure the pouring container is touching the receiving container. This is called "bonding" the containers.

7. 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)

Response: As needed, personnel will implement the required precautions before entering someone else's non-office work area, (e.g., required PPE, training, procedure review, briefing, escort, etc.).

Action Messages

1. As required by ES&H, Corporate Procedure: ESH100.2.ENV.22, "Manage Hazardous Waste at SNL," Members of the Workforce who are owners or generators of hazardous waste shall plan how to control hazards and appropriately manage their hazardous waste. (QUESTION 15d)

Response: Members of the Workforce who are owners or generators of hazardous waste plan how to control hazards and appropriately manage their hazardous waste.

2. Contact your Division ES&H Team for a survey. (QUESTION 1a)

Response: As required by the RPPM, personnel will contact the Division ES&H Team for a survey.

3. Refer to "Record of Code Decision," with a subject of, "Storage, Dispensing, Bonding, and Grounding of Flammable and Combustible Liquids." Contact Fire Protection Engineering for assistance. See the ES&H Direct Access Services List. (QUESTION 5g)

Response: As needed, personnel will contact Fire Protection Engineering for assistance.

4. Identify PPE, shock approach, and arc flash boundary prior to operating disconnect switches. In addition, personnel shall be trained on safe switching techniques/hazards. See MN471004, Electrical Safety Manual, Sections: 2.1, "Electrical Work Requirements - General," 2.2 "Qualifications and Training," and 2.10, "Electrical Personal Protective Equipment" for requirements and guidance. (QUESTION 6b)

Response: Personnel will identify PPE, shock approach, and arc flash boundary prior to operating disconnect switches. In addition, personnel are trained on safe switching techniques/hazards.

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 Required by: QUESTION 5		3	No
CHM103	SITE-SPECIFIC CHEMICAL SAFETY TRAINING Required by: QUESTION C2a(1), QUESTION 5		3	No
ELC901	SAFE SWITCHING BRIEFING Required by: QUESTION 6b		--	Yes

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	unless OJT	--	Yes
	Required by: QUESTION 7b			
PPE106	PERSONAL PROTECTIVE EQUIPMENT TRAINING	PPE106 unless CHM103 trained. (CHM103 identifies PPE associated with Chemicals; PPE106 is all other PPE)	2	No
	Required by: QUESTION C2a(1)			
PRS150	PRESSURE SAFETY ORIENTATION	for all operators of the system	--	Yes
	Required by: QUESTION 10a			
PRS150R	PRESSURE SAFETY ORIENTATION REFRESHER		3	No
	Required by: QUESTION 10a			
RAD102	GENERAL EMPLOYEE RADIOLOGICAL TRAINING	RAD102 unless RAD210, RAD214 (recommended), RAD230, or SNL qualified RCT training.	2	No
	Required by: QUESTION 1b(1)			
RAD219	RADIATION-GENERATING DEVICE CUSTODIAN TRAINING	for both primary alternate custodians	2	No
	Required by: QUESTION 1			
RAD250	MANAGEMENT OF RADIOLOGICAL OPERATIONS		2	No
	Required by: QUESTION 1			

Regulatory Requirements

- 1: Corporate Procedure: ESH100.1.EP.2, "Implement NEPA, Cultural Resources, and Historic Properties Requirements" (QUESTION C4)
- 2: Corporate Procedure: ESH100.2.ENV.12, "Obtain and Comply with Air Permits" (QUESTION 15b)
- 3: Corporate Procedure: ESH100.2.ENV.13, "Control Ozone Depleting Substances" (QUESTION 15b)
- 4: Corporate Procedure: ESH100.2.ENV.14, "Comply with Radionuclide National Emissions Standards for Hazardous Air Pollutants" (QUESTION 15b)
- 5: Corporate Procedure: ESH100.2.ENV.15, "Manage Hazardous Waste at SNL/CA" (QUESTION 15d)
- 6: Corporate Procedure: ESH100.2.ENV.16, "Manage Radioactive Waste at SNL/CA" (QUESTION 15d)
- 7: Corporate Procedure: ESH100.2.ENV.17, "Manage Mixed Waste at SNL/CA" (QUESTION 15d)
- 8: Corporate Procedure: ESH100.2.ENV.20, "Manage Other Waste at SNL/CA" (QUESTION 15d)
- 9: Corporate Procedure: ESH100.2.ENV.21, "Recycle or Reuse Waste at SNL/CA" (QUESTION 15d)
- 10: Corporate Procedure: ESH100.2.ENV.22, "Manage Hazardous Waste at SNL/NM" (QUESTION 15d)
- 11: Corporate Procedure: ESH100.2.ENV.23, "Manage Radioactive Waste at SNL" (QUESTION 15d)
- 12: Corporate Procedure: ESH100.2.ENV.24, "Manage Mixed Waste at SNL" (QUESTION 15d)
- 13: Corporate Procedure: ESH100.2.ENV.26, "Manage Other Waste at SNL/NM" (QUESTION 15d)
- 14: Corporate Procedure: ESH100.2.FP.1, "Manage Fire Protection Requirements" (QUESTION 5g)
- 15: Corporate Procedure: ESH100.2.IH.15, "Control Hazards Using Local Exhaust Ventilation and High Efficiency Particulate Air Filters" (QUESTION C1)
- 16: Corporate Procedure: ESH100.2.IH.20, "Maintain an Accurate Chemical and Biological Material Inventory" (QUESTION 5)
- 17: Corporate Procedure: ESH100.2.IH.4, "Evaluate and Control Chemical Hazards" (QUESTION 5)
- 18: Corporate Procedure: ESH100.2.IS.10, "Manage Industrial Machine and Portable Power Tool Safety" (QUESTION 7b)
- 19: Corporate Procedure: ESH100.2.IS.8, "Assess Workplace Hazards and Provide and Maintain Personal Protective Equipment" (QUESTION C2a(1))
- 20: MN471000, Pressure Safety Manual, Chapter 2, "The Pressure Safety Program" (QUESTION 10a)
- 21: MN471000, Pressure Safety Manual, Chapter 6, "Testing and Evaluating Pressure Systems" (QUESTION 10f)
- 22: MN471000, Pressure Safety Manual, Chapter 7, "Verifying the Safe Operation of Pressure Systems" (QUESTION 10f)
- 23: MN471000, Pressure Safety Manual, Chapter 8, "Servicing Pressure Vessels and Components" (QUESTION 10f)
- 24: MN471000, Pressure Safety Manual, Chapter 9, "Documenting the Operational Safety of Pressure Systems" (QUESTION 10e)

- 25:** MN471016, Radiological Protection Procedures Manual, Chapter 1, "Radiological Work Planning and Controls" (QUESTION 1)
- 26:** MN471016, Radiological Protection Procedures Manual, Chapter 3, "Radiological Training Program (QUESTION 1)
- 27:** MN471016, Radiological Protection Procedures Manual, Chapter 10, "Radiation Generating Devices" (QUESTION 1)
- 28:** Corporate Procedure: ESH100.2.ELC.1, "Manage Electrical Hazards" (general corporate business process)
- 29:** Corporate Procedure: ESH100.2.IH.12, "Control Food and Beverage Consumption in Hazardous Areas" (general corporate business process)
- 30:** Corporate Procedure: ESH100.2.IH.17, "Address Indoor Air Quality Concerns" (general corporate business process)
- 31:** Corporate Procedure: ESH100.2.IH.21, "Control Ergonomics Hazards" (general corporate business process)
- 32:** Corporate Procedure: ESH100.2.IS.11, "Implement Housekeeping Safety" (general corporate business process)
- 33:** Corporate Procedure: ESH100.2.IS.7, "Implement Traffic Safety" (general corporate business process)
- 34:** Corporate Procedure: ESH100.3.1, "Prepare for and Manage Emergencies" (general corporate business process)
- 35:** Corporate Procedure: ESH100.4.RPT.2, "Report Injuries and Illnesses" (general corporate business process)
- 36:** Corporate Procedure: ESH100.5.RPT.5, "Report Vehicle Accidents and Property Damage" (general corporate business process)
- 37:** MN471001 - ES&H Manual, Section 4B, "Electrical Safety Practices" (general corporate business process)
- 38:** MN471001 - ES&H Manual, Section 4K, "Traffic Safety" (general corporate business process)
- 39:** MN471001, ES&H Manual, Section 21, "Technical Work Documents (TWDs)" (general corporate business process)

VI. Related Documents

Permits

Document Title	Number	Type	End Date
CINT's Authority-to-Construct Permit No. 1725 Actual Date of Initial Start-up	No. 1725	Air	
City of Albuquerque - Wastewater Discharge Permit for CINT	2238A	Water	

NEPA Documents

Document Title	Number	Project End Date
CINT Integration Laboratories (1501, 1504, 1523, 1525, and 1527)	SNA07-0202	

Other Documents

Document Title	Number	Type	Published Date
Class 3b and Class 4 Laser Systems Operations in Research	SP471409 Issue F	SOP	
Standard Operating Procedure for Working with Hazardous and Particularly Hazardous Chemicals in Center 1100 Laboratories	SOP1100.001 Issue D	SOP	11/01/2010

VII. Primary Hazard Screening Worksheets

Version of Questions:J

Version of Questions:Facility or Lab

Interview Worksheet

Questions

Answers

- 1 **Radiation-Generating Devices (RGDs):** Is there a radiation-generating device (RGD)? Yes
(Answer this question "no" if the RGDs are registered in storage.)

RGDs								
Source Name	RGD #	RGD Class	RGD Type	Accl. Voltage	Com'l Available	Modified	Custodian	SNL/NM Owned
Dual Beam FIB/SIM	216	Exempt Shielded	Inherently Safe	30	Yes	No	HEARNE, SEAN J.	Yes
Location: Site: SSTP, Area: No Tech Area, Building: 518, Room: 1504 Location Details: Room = 1504; Area in Room = NE corner Comments: Alternate Custodian = AKHADOV, ELSHAN; RGD Status = Active								

Questions

Answers

- 1a Unless exempt, is the RGD *registered* with the Device Control Program? Yes
- 1b Are there any of the following radiation- generating devices (RGDs) / operations? Place a check mark to the right of all that apply.
- 1b(1) Inherently safe Yes
- 1b(2) Certified cabinet No
- 1b(3) X-ray Diffraction or fluorescence analysis equipment No
- 1b(4) Other exempt-shielded RGD No
- 1b(5) X-ray generator or particle accelerator (Do your activities include an Accelerator as defined in the Help Text; **Please read the help text, since this question has significantly changed.**) No
- 1b(6) Other shielded RGD No
- 1b(7) Portable or mobile radiography RGD not using a radioactive source No
- 1b(8) Fixed device with partial shielding No
- 1b(9) Portable analytical device with an open-beam configuration No
- 1b(10) Open Installation not in the preceding classes No
- 1b(11) Unattended Installations No
- 1b(12) Neutron Generator Operations No
- 1c Will anyone enter any of the following areas?
- 1c(1) Controlled Area (unescorted access to do radiological work) No
- 1c(2) Radiation Area No
- 1c(3) High Radiation Area No

	Questions	Answers
1c(4)	Very High Radiation Area	No
1d	Are routine exposures <i>above</i> 100 <i>mrem</i> per year likely?	No
1e	Could a member of the public be exposed by the operation? (This usually involves portable or mobile radiography operations).	No
1f	Will there be radiological work in a <i>foreign country</i> or territory?	No
1g	Will the activity involve an RGD owned or operated by a party other than Sandia or Sandia's subcontractors?	No
1h	Is there an RGD or a facility for an RGD acquired, built, or modified on or after January 1, 1996-excluding those RGDs classified as inherently safe or a certified cabinet?	No
1i	Will radiation <i>monitoring</i> instruments be used in this activity by MOW other than qualified Radiological Control Technicians?	No
1j	Will scrap metal generated from the project or activity come from a radiological area?	No
2	Radioactive Materials: Is radioactive material present?	No
3	Explosives and Ammunition: Are any explosives or ammunition (including explosive waste) managed, handled, processed, used, or stored?	No
4	Lasers: Do the activities covered by this PHS involve Regulated Laser Activities? Please review the definition of Regulated Laser Activities before answering this question.	No

Notes: The class 3B laser is enclosed and is intrinsically safe as operated. No operations, alignments or servicing involve openly accessible or exposure to the Class 3B beam.

5	Chemicals: (Review the Help text before answering this question.) Do the activities involve chemicals?	Yes
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Notes: Standard solvents will be used in small quantities (tens of ml per day) for cleaning of samples.

5a	Has the Industrial Hygiene Program performed an exposure assessment of current activities conducted on Sandia-controlled premises involving chemicals that are covered by this PHS?	Yes
5a(1)	Did the results of the exposure assessment determine that workers are exposed to chemicals above an occupational exposure limit (regardless of respiratory protection)?	No
5b	Do any of the activities include? <ul style="list-style-type: none"> - Hazardous waste cleanup operations (e.g., environmental restoration [ER] sites) - Treatment, storage, and disposal (TSD) facilities - Emergency response 	No
5c	Will activities have, use, synthesize, or liberate unbound engineered nanoscale particles (UNP)?	No
5d	(Review the help text before answering this question.) Do the activities involve storage or utilization of simple asphyxiants?	Yes

Notes: Inert gases (nitrogen, argon, carbon dioxide, oxygen and helium) are utilized for processes within the clean room. The use of excess flow valves and the large number of air exchanges within the clean room significantly lesson the likelihood of an asphyxiant hazard.

5d(1)	(Review the help text before answering this question.) Has an exposure assessment for potential oxygen deficient atmospheres involving the use of simple asphyxiants been performed?	Yes
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Questions	Answers
5d(1)a Did the exposure assessment indicate that there is a potential for an oxygen deficient atmosphere?	No
5e Are the hazardous chemicals, hazardous substances, or hazardous waste involved in these activities considered injurious corrosive materials?	No
5e(1) Do these activities involve the use of hydrofluoric acid?	No
5f Do these activities involve working with new chemicals (a substance which has not been listed on the TSCA Inventory List)?	No
5g Do the activities involve the storage, dispensing, or use of flammable or combustible liquids?	Yes
5h Do activities involve any of the following? <ul style="list-style-type: none"> - Flammable chemicals in quantities greater than 5 liters of liquid, 1 kg of solid, or 500 cubic feet of gas (at STP) in any single container or manifolded series of containers - Equipment connected to a house system for flammable gases - Reactive chemicals in quantities greater than 1 liter of liquid, 100 g of solid, or 500 cubic feet of gas in any single container or manifolded series of containers - Oxidizers, other than nitric acid, in quantities greater than 5 liters of liquid, 1 kg of solid, or 500 cubic feet of gas in any single container or process - Pyrophoric chemicals in total quantities greater than 500g - Metal powders in quantities greater than 1 kg 	No
5i Do the activities include a process that involves highly hazardous chemicals at or above twenty-five percent of the Process Safety Management standard threshold quantities, or are there flammable liquids or gases involved in a process with a quantity of greater than 2,500 pounds?	No
5j Do activities use or store toxic gases in quantities greater than the de minimus quantities listed in the Help file?	No
5k (Refer to help file to determine if quantities have been exceeded.) Do the activities use or store hazardous chemicals in quantities equal to or greater than the Emergency Management screening threshold quantities?	No
6 Electrical: Do workers conduct any of the following tasks? <ul style="list-style-type: none"> - Work on or near (within the limited approach boundary - 3.5 feet) exposed and energized (greater than or equal to 50 volts) electrical circuits or contact energized electrical circuit parts with tools or test probes? - Operate circuit breakers or disconnect switches operating at or above 50 Volts and 5 mA or more? - Perform non electrical work, but might contact exposed and energized electrical circuits - <i>operating at 50 volts or greater</i> - with equipment or materials, such as ladders, cranes, paint roller extensions, or forklifts? - Use Equipment that operates at 50 Volts or more and is not listed by an OSHA approved Nationally Recognized Testing Laboratory (e.g., UL) and operating at over 50 Volts, including extension cords and power strips? 	Yes
6a Do workers work on or near (within the limited approach boundary - 3.5 feet) exposed and (greater than or equal to 50 volts) energized electrical circuits or contact energized electrical circuit parts with tools or test probes?	No
6b Do workers operate circuit breakers or disconnect switches operating at 50 Volts or more and 5 mA or more ?	Yes

	Questions	Answers
6c	Do workers perform non electrical work , but might contact exposed and energized electrical circuits - operating at 50 volts or more - with equipment or materials, such as ladders, cranes, paint-roller extensions, or forklifts?	No
6d	Do workers use equipment that operates at 50 Volts or more and is not listed by an OSHA-approved Nationally Recognized Testing Laboratory (e.g., UL), including extension cords and power strips?	No
7	<p>Mechanical: Does the facility or activity involve any of the following hazards or activities?</p> <ul style="list-style-type: none"> - machine shop equipment - portable power tools - powder-actuated tools - centrifuge operations - forklifts - motorized hand trucks - cranes/hoists, miscellaneous lifting devices, - industrial robots or industrial robotic systems - operate light or heavy earth-moving equipment - excavations - trenches - floor or wall penetrations - stored or kinetic mechanical energy that could cause an injury during normal working conditions 	Yes

Mechanical Hazards			
Source Name	Potential Hazard	Com'l Available	Modified
Portable power tools		Yes	No
Location: Site: SNLNM, Area: N/A, Building: AML			

	Questions	Answers
7a	Do workers operate machine shop equipment?	No
7b	Do workers operate portable power tools?	Yes
7c	Do workers operate powder-actuated tools (also known as explosive-actuated fastening tools)?	No
7d	Does this facility or project activity use centrifuges?	No
7e	Are forklifts used in any operations?	No
7f	Are motorized hand trucks used in any operations?	No
7g	Are overhead cranes/hoists, mobile cranes, miscellaneous lifting devices (shop or gantry crane), or rigging used in any operations?	No
7h	Are industrial robots or industrial robotic systems used in this project or activity?	No
7i	Do workers operate light or heavy earth moving equipment?	No

	Questions	Answers
7j	Do workers perform or come into close proximity to any of these activities: - Excavations - Trenches - Floor or Wall Penetrations	No
7k	Do activities involve stored or kinetic mechanical energy that could cause an injury under normal working conditions?	No
8	Nonionizing Radiation: At any time, do activities produce nonionizing radiation (NIR) (excluding lasers)?	No
9	Thermal: Do thermal hazards or thermal stressors exist in the work area? Please review the definition of thermal stressors before answering this question.	No
10	Pressure: Are workers involved in the design, installation, operation, or maintenance of a pressure system (including pressure, vacuum, cryogenic fluid applications)?	Yes

Pressure Hazards	
Source Name	Description
Compressed argon gas	
	Location: Site: SSTP, Area: No Tech Area, Building: 518, Room: 1504
House Nitrogen	
	Location: Site: SSTP, Area: No Tech Area, Building: 518, Room: 1504
Liquid Nitrogen	
	Location: Site: SSTP, Area: No Tech Area, Building: 518, Room: 1504
vacuum system	
	Location: Site: SSTP, Area: No Tech Area, Building: 518, Room: 1504

	Questions	Answers
10a	Do personnel function as pressure system operators?	Yes
10b	Do personnel function as pressure installers?	No
10c	Do personnel handle cryogenic fluids, or design install or operate cryogenic fluid-handling systems?	No
10d	Do all systems meet the documentation requirements of the Pressure Safety Manual, Chapter 9? Note: Data packages on Pressure Safety Analysis Reports must reflect the current system configuration and personnel.	Yes
10e	Do supplier-established pressure ratings exist for all systems and system components?	Yes
10f	Are pressure system (or component) reevaluations being performed according to the requirements of the Pressure Safety Manual? (A common example would be the replacement or retesting of pressure relief valves.)	Yes
11	Noise: At any time, do sources of noise hazards exist during activities covered by this PHS?	No

	Questions	Answers
12	<p>Miscellaneous Hazards: Does the facility or activity involve any of the following hazards or activities?</p> <ul style="list-style-type: none"> - Ergonomic or musculoskeletal stressors - Construction-like activities - Work with and around asbestos - Elevated work - Underwater diving - Animals and Hazardous Plants - Aircraft - Airborne objects - Firearms - Use of human subjects - Use of Sealed Drum(s) 	No
13	<p>Outside of Manufacturer's Recommendations: Does this work involve the use of equipment, tools, or materials outside of their design specifications or outside of the manufacturer's recommendations? (See Help Text for examples). Please enter each item into the hazard table.</p>	No
14	<p>Non-Commercial Hazards: Does this work involve the use of noncommercial equipment or apparatus (excluding robots, robotics systems, and equipment where the only hazard is a pressure system that has a pressure safety data package)? Please enter each noncommercial piece of equipment into the hazard table.</p>	No
15	<p>Environmental Concerns: Are there any potential environmental concerns with this activity that align with the SNL Environmental Management System (EMS) aspects, such as chemical use, fuel or oil storage, waste generation (except sanitary trash), construction activities, disturbance to habitat or protected species, or discharges to the air, ground surface, ground water, or the sewer systems?</p>	Yes

Environmental Concerns Hazards		
Source Name	Type	Est. Quantity
Wipes and Swabs	Hazardous waste	< 100kg/mo
Location: Site: SSTP, Area: No Tech Area, Building: 518, Room: 1504		

	Questions	Answers
15a	<p>Wastewater: Are there any wastewater discharges from this activity?</p>	No
15b	<p>Air: Are there any air discharges or emissions at this activity?</p>	Yes
15b(1)	<p>Ozone Depleting Substance (ODS): Are there any ODSs at this activity?</p>	No
15b(2)	<p>Will this activity include the installation and or use of combustion equipment? Combustion equipment includes boilers and internal combustion engines, such as generators.</p>	No
15b(3)	<p>Will this activity involve open-burn activities?</p>	No
15b(4)	<p>Will this activity involve soil disturbance, building demolition, or construction that disturbs soil, including access roads and staging areas?</p>	No
15b(5)	<p>Radionuclide NESHAP: Are there any radionuclide air discharges or use of radionuclides in gaseous form or at elevated temperatures from this activity?</p>	No
15c	<p>Radioactive Waste: Will this activity generate any radioactive waste, or will Members of the Workforce be required to handle radioactive waste?</p>	No

Questions	Answers
15d Hazardous Waste: Will this activity generate any hazardous waste, or will Members of the Workforce be required to handle hazardous waste?	Yes
15d(1) Less-Than-90-Day Accumulation Area: Will this activity store any hazardous waste in a less-than-90-day accumulation area ?	No
15d(2) Acutely Hazardous Waste: Will this activity generate any acutely hazardous waste ?	No
15d(3) Waste Containing Mercury: Will this activity generate any waste containing mercury (e.g., switches, thermometers, manometers, elemental mercury (Hg), or mercury compounds [e.g., mercuric oxide (HgO)], etc.)?	No
15e Mixed Waste: Will this activity generate any mixed waste , or will Members of the Workforce be required to manage mixed waste?	No
15f Infectious / Biohazardous Waste: Will this activity generate any infectious or biohazardous waste, or will Members of the Workforce be required to handle infectious or biohazardous waste?	No
15g Radioactive Contamination: Will this activity be conducted in an area for which a reasonable potential exists for introducing radioactive contamination or causing activation of material that may become waste?	No
15h Material or Waste of Unknown Origin: Will this activity require handling material or waste of unknown origin?	No
15i Fuels and Oil Storage: Does this activity use a fuel or oil storage container capable of containing 55 gallons or more?	No
15j Discharges to Ground Surface: Does this activity have a potential for any discharges to the ground surface ?	No
15k Improvements/modifications to structure/building exteriors and landscaping: Will this project involve activities that require modifications to the exteriors of structures and buildings or modification to existing landscape, including removal of vegetation?	No
15l Disturbance to habitat or protected species: Will this project involve activities that will disturb habitat or protected species, including wildlife management and outdoor projects or testing activities?	No
16 Packaging and Transportation of Hazardous Materials: Will any activities covered by this PHS involve the packaging and transportation of hazardous material (including explosives or radioactive material)?	No
17 Fire Protection Concerns: Will the activity include any of the following? <ul style="list-style-type: none"> - Members of the Workforce modifying in any way any fire suppression or life safety system (fire rated walls, fire doors, fire sprinklers, fire alarm devices, fire extinguishers, or means of egress). - Members of the Workforce performing hot work in association with this facility or project activity. 	No
18 Biological Agents: (see Help text before answering this question.) Do activities involve the use of or potential exposure to biological agents?	No
19 Confined Spaces: Are confined spaces present in the work area?	No

Questions	Answers
<p>20 Beryllium: Do operations include any activities that? <i>(Review the Help text before answering this question)</i></p> <ul style="list-style-type: none"> - Use or handle beryllium, beryllium-containing alloys or beryllium oxides? - Create or work with beryllium ceramics? - Handle waste potentially-contaminated with beryllium or waste containing beryllium? - Perform decontamination of beryllium contamination? - Entail work in a beryllium contaminated building or area? - Apply abrasive or destructive methods to metal objects, articles, weapon components or bar stock, potentially containing beryllium? - Use non sparking tools containing beryllium? 	No
<p>21 Offsite Work: Does this PHS involve any of the following?</p> <ul style="list-style-type: none"> - Work at non-Sandia-controlled premises - Work locations other than KAFB, SNL/CA, or TTR - Sandia supplying non-commercial equipment or hazardous material for use by non-Members of the Workforce at non-Sandia-controlled premises or locations other than KAFB, SNL/CA, or TTR. 	Yes
<p>21a Are there any activities at the facility that are not conducted on Sandia-controlled premises? This includes work done by others, such as host-site personnel</p>	No
<p>21b Does work performed by Members of the Workforce on non-Sandia-controlled premises or locations other than KAFB, SNL/CA, or TTR involve any of the following (as defined in the listed PHS questions)? Please include in the question notes a brief description of all hazards driving a "yes" answer to this question, including information about the activities associated with each hazard.</p> <ul style="list-style-type: none"> - radiation generating devices (question 1) - radioactive materials (question 2) - explosives (question 3) - lasers in navigable air space or affecting other operations (question 4b) - HAZWOPER operations (question 5b) - unbound engineered nanoparticles (question 5c) - newly developed chemical substance (question 5f) - chemical physical hazards (question 5h) - >25% PSM quantities (question 5i) - toxic gases (question 5j) - >Emergency Management screening quantities (question 5k) - personnel overexposure to nonionizing radiation (question 8a(1)) - public overexposure to nonionizing radiation (question 8b(1)) - non-routine aircraft (question 12g(1)) - airborne objects other than aircraft (e.g., projectiles, fragments) (question 12h) - firearms (question 12i) - equipment used outside of manufacturer's recommendations with the potential to cause injury to co-located workers or public (question 13b) <ul style="list-style-type: none"> - non-commercial equipment with the potential to cause injury to co-located workers or public (see question 14b) - biological agents BSL-2 or higher 	Yes

Notes: The activity involves the use of a SEM/FIB, which is a radiation generating device. This device is listed as an exempt shielded, inherently safe instrument.

	Questions	Answers
21b(1)	Has the SNL Safety Basis Department determined a hazard classification for these activities?	Yes
21b(1)a	What hazard classification was determined by the SNL Safety Basis Department?	SIH
21c	Does Sandia supply any of the following for use by non -Members of the Workforce on non -Sandia-controlled premises or locations other than KAFB, SNL/CA, and TTR? Please include in the question notes a brief description of all hazards driving a "yes" answer to this question, including information about the activities associated with each hazard. <ul style="list-style-type: none"> - radiation generating devices - radioactive material - explosives - Class 3b or Class 4 lasers where beam will be used outside - chemicals - aircraft - projectiles or objects that could become airborne as a result of the work - nonionizing radiation transmitters other than hand-held radios or Local Area Network (LAN) equipment. <ul style="list-style-type: none"> - equipment used outside of manufacturer recommendations, including modified equipment - non-commercial equipment, including custom-built equipment - biological agents BSL-2 or higher 	No
21d	Do these activities involve foreign travel?	No
22	Roving Personnel: Will any work covered by this PHS be conducted by Roving Personnel in a Sandia, non-office area (e.g. working in another organization's space)?	No
23	Emergency Response: Do activities include ES&H emergency response operations, (e.g., NEST, ARG, Hazmat, Medical)?	No
24	Other Hazards: Do the activities have important hazards not specifically identified elsewhere in this PHS?	No

Controls Worksheet

	Questions	Answers
C1	Local Exhaust Ventilation: Do the activities covered by this PHS use local exhaust ventilation (LEV) on Sandia-controlled premises (e.g., laboratory hoods, glove boxes, downdraft tables, "elephant trunks," canopy hoods, paint booths, slot ventilation, portable welding ventilation, etc.)?	Yes
C2	Personal Protective Equipment: Are hazards (e.g., chemicals radiological, electrical, mechanical, thermal, flying particles and/or falling or rolling objects) encountered that are capable of causing injury or impairment in the function of any part of the body through absorption, inhalation, or physical contact?	Yes
C2a	Has a workplace hazard assessment been performed for the activities on Sandia-controlled Premises?	Yes
C2a(1)	Did the workplace hazard assessment determine that personal protective equipment will be required?	Yes
C2a(1)a	Has the workplace hazard assessment determined respiratory protection is required?	No

Questions	Answers
C2a(2) Does the workplace hazard assessment allow voluntary use of respiratory protection?	No
C3 Control of Hazardous Energy (LOTO): Do you have any equipment in your operations that requires any of the following activities?	No
<ul style="list-style-type: none"> - Construction - Installation - Setup - Adjustment - Inspection - Modification - Maintenance - Service - Lubrication - Cleaning - Unjamming - Making adjustments or tool changes 	
C4 NEPA Compliance: Has this project or activity been reviewed for National Environmental Policy Act (NEPA) compliance in the ISMS NEPA Module?	Yes
C4a Are all relevant NEPA documents listed in the Documents section of this PHS?	Yes
C5 Activity-Level PHS: Will this PHS be used as an Activity-level PHS, in lieu of a Job Safety Analysis (JSA), for low rigor work?	No

VIII. Hazard Analysis (HA) Section

Hazard Analysis

Note: 17 hazard analysis(es) were not reported, because no (optional) hazard analysis was performed for them.

IX. Supplemental Information

PHS Input

Notes from Interview Questions

Q 4 - The class 3B laser is enclosed and is intrinsically safe as operated. No operations, alignments or servicing involve openly accessible or exposure to the Class 3B beam.

Q 5 - Standard solvents will be used in small quantities (tens of ml per day) for cleaning of samples.

Q 5d - Inert gases (nitrogen, argon, carbon dioxide, oxygen and helium) are utilized for processes within the clean room. The use of excess flow valves and the large number of air exchanges within the clean room significantly lessens the likelihood of an asphyxiant hazard.

Q 21b - The activity involves the use of a SEM/FIB, which is a radiation generating device. This device is listed as an exempt shielded, inherently safe instrument.

Notes from Controls Questions

User Entered Hazard Tables

Environmental Concerns Hazards		
Source Name	Type	Est. Quantity
Wipes and Swabs	Hazardous waste	< 100kg/mo
	Location: Site: SSTP, Area: No Tech Area, Building: 518, Room: 1504	

Mechanical Hazards			
Source Name	Potential Hazard	Com'I Available	Modified
Portable power tools		Yes	No
	Location: Site: SNLNM, Area: N/A, Building: AML		

Pressure Hazards	
Source Name	Description
Compressed argon gas	
	Location: Site: SSTP, Area: No Tech Area, Building: 518, Room: 1504
House Nitrogen	
	Location: Site: SSTP, Area: No Tech Area, Building: 518, Room: 1504
Liquid Nitrogen	
	Location: Site: SSTP, Area: No Tech Area, Building: 518, Room: 1504
vacuum system	
	Location: Site: SSTP, Area: No Tech Area, Building: 518, Room: 1504

RGDs								
Source Name	RGD #	RGD Class	RGD Type	Accl. Voltage	Com'l Available	Modified	Custodian	SNL/NM Owned
Dual Beam FIB/SIM	216	Exempt Shielded	Inherently Safe	30	Yes	No	HEARNE, SEAN J.	Yes
Location: Site: SSTP, Area: No Tech Area, Building: 518, Room: 1504 Location Details: Room = 1504; Area in Room = NE corner Comments: Alternate Custodian = AKHADOV, ELSHAN; RGD Status = Active								

Assigned Reviewers

Review Type	Role	Person	Required/Requested
Author	ISMS_AUTHOR	Nogan,John	Required Review, due to: QUESTION 0
Comment: Annual review, no changes in the affected area.			
Technical SME	ISMS_IFSBReviewer	Stirrup,Timothy Scott	Required Review, due to: QUESTION 21b(1)
Required Assignment: Review Question 21 and hazard-specific question sets that relate to the user-specified hazards identified in Question 21			
Comment: [tss 03012011] IFSB review PHS Q21b for MOW performing hazardous activities at non-Sandia controlled locations listed as exempt shielded RGD (SEM) at CINT Bldg 518.			
ES&H Coordinator	ISMS_ESH_Coordinator	Davis,M. Wayne	Required Review by business rule.
Safety Basis	ISMS_RiskManagerA	Costanzo,Jessica Amoret	Required Review by business rule.
Manager	ISMS_Manager	Hearne,Sean J.	Required Review by business rule.

PHS Output

Major Safety Concerns

The hazard classification is: SIH

The required documentation is: PHS

Safety Concerns at this SIH level include:

- (general corporate business process) Traffic related hazards for injury
- (general corporate business process) Roving Personnel or Visitors entering work area
- (general corporate business process) Common electrical hazards
- (QUESTION 1) Potential for minor injury or illness
- (QUESTION 1b(1)) Potential for minor injury or illness
- (QUESTION 5) Potential personnel exposure to chemicals & fire protection regulatory requirements
- (QUESTION 5g) Fire/Explosion Hazard
- (QUESTION 6b) Potential electrical arc from operating circuit breakers or disconnect switches

- (QUESTION 7) Potential injury from mechanical forces
- (QUESTION 7b) Potential injury from portable power tools
- (QUESTION 10) Injury or damage
- (QUESTION 15) Potential for regulatory action
- (QUESTION 15b) Potential to emit regulated contaminants
- (QUESTION 15d) Potential for regulatory action
- (QUESTION 21a) Hazards associated with the site's other activities
- (QUESTION 21b(1)a) Hazards encountered while conducting work offsite by members of the workforce
- (QUESTION 21d) Hazards associated with domestic travel

Other Safety Concerns

Other Safety Concerns (potential hazard sources) for this: Facility or Lab

no identified hazards

PHS Identified Training, by Source

[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.]

- CHM100: CHEMICAL SAFETY TRAINING (QUESTION 5)
- CHM103: SITE-SPECIFIC CHEMICAL SAFETY TRAINING (QUESTION C2a(1))
- CHM103: SITE-SPECIFIC CHEMICAL SAFETY TRAINING (QUESTION 5)
- ELC901: SAFE SWITCHING BRIEFING (QUESTION 6b)
- ENV112: HAZARDOUS WASTE & ENVIRONMENTAL MANAGEMENT TRAINING (QUESTION 15d)
- ESH100: ES&H AWARENESS (general corporate business process)
- ESH200: SAFETY MANAGEMENT (general corporate business process)
- MCH200: HAND AND POWER TOOL SAFETY (QUESTION 7b)
- PPE106: PERSONAL PROTECTIVE EQUIPMENT TRAINING (QUESTION C2a(1))
- PRS150: PRESSURE SAFETY ORIENTATION (QUESTION 10a)
- PRS150R: PRESSURE SAFETY ORIENTATION REFRESHER (QUESTION 10a)
- RAD102: GENERAL EMPLOYEE RADIOLOGICAL TRAINING (QUESTION 1b(1))
- RAD219: RADIATION-GENERATING DEVICE CUSTODIAN TRAINING (QUESTION 1)
- RAD250: MANAGEMENT OF RADIOLOGICAL OPERATIONS (QUESTION 1)

Results Based on Answers and User-Entered Hazards

The results in this PHS were based on the following answers to interview questions and user-entered hazards:

Q 0 answered: Y; Q 1 answered: Y; Q 1a answered: Y; Q 1b(1) answered: Y; Q 5 answered: Y;
Q 5g answered: Y; Q 6b answered: Y; Q 7 answered: Y; Q 7b answered: Y; Q 10 answered: Y;
Q 10a answered: Y; Q 10d answered: Y; Q 10e answered: Y; Q 10f answered: Y; Q 15 answered: Y;
Q 15b answered: Y; Q 15d answered: Y; Q 21a answered: N; Q 21b(1) answered: Y; Q 21b(1)a answered: SIH;
Q 21d answered: N; Q C1 answered: Y; Q C2 answered: Y; Q C2a(1) answered: Y; Q C4 answered: Y;

X. Emergency Operations Concerns

Energized Systems - RGD

Pressure

Environmental Concerns

Chemical

Energized Electrical

Energized Mechanical