

Sandia National Laboratories

Primary Hazard Screening (PHS)

PHS Number: SNL07A00125-006

**CINT Rms: 1524, 1525 & 1526 - Metal Deposition Lab and Associated
Chases**

I. Signatures (Electronic signature dates shown)
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Risk Management DeterminationHazard Classification: **Low**Required Documentation: **PHS with integral HA**Facility/Project Designator: **Radiological 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 ScottOrg: **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: **Hall, Christopher Armando**

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**

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: **K**

Status: **APPROVED**

Expiration Date: **01/10/2013**

Responsible Organization: **01132**

Radiological Protection Level

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

Description

Chase 1524's function is to provide space for the return air from room 1525, and to house the gas lines, DI water lines, electrical outlets, vacuum pumps, and exhaust handling system in support of equipment located in room 1525. No laboratory experiments will be performed in this area. This area also contains a dishwasher for labware cleaning, and will provide a means for the storage of labware and portable equipment such as hotplates and ultrasonic cleaners. Routine maintenance activities for certain equipment in 1525 will also be performed in this area.

Room 1525 bay contains deposition systems, wet processing benches and metrology equipment. The electron beam and sputter deposition systems (base pressure 10^{-7} torr) will provide a method for the deposition of high purity materials typically used in lift-off and subtractive etching processes. Additionally, the sputter deposition tool can be configured for sputter deposition of a variety of metals, dielectric materials or ternary compounds. Metrology equipment such as a profilometer will also utilized in the area for thin film step height measurements. The chemical benches will typically be used for standard processing of devices fabricated on variety of substrate materials including silicon. Typical wet processes may include removal of polymers, photoresist and degreasing using solvents, acid or base wet chemical etching of metals, semiconductors and dielectric materials. The rapid thermal annealer (RTA) uses a set of lamps to rapidly heat silicon wafers to temperatures in excess of 1000C in an argon environment. Additionally, forming gas (4% H₂ in nitrogen) can be used in place of argon to prevent oxide formation during annealing.

Chase 1526's function is to provide space for the return air from rooms 1525 and 1527, and to house the gas lines and tool specific gas cylinders, electrical outlets and disconnects, vacuum pumps, compressors, and exhaust handling system in support of equipment located in rooms 1525 and 1527.

Notes

General Document Notes

Locations

Site	Area	Building	Room	Description
Primary Location				
SSTP	No Tech Area	518	1525	

Responsible Organization History

Organization Number	Effective (Starting) Date	This Org. Submitted Document for Review
01132	06/11/2004	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
Asphyxiant gas	Asphyxiant gas is present	QUESTION 5d(1)
Corrosive chemical	Corrosive chemical; Potential exposure to skin and eyes.	QUESTION 5e
Hydrofluoric Acid	Potential exposure to skin and eyes	QUESTION 5e(1)
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
Circuit breakers or disconnect switches	Potential electrical arc from operating circuit breakers or disconnect switches	QUESTION 6b
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
Thermal hazard	Contact with hot or cold objects	QUESTION 9a
Pressure source	Injury or damage	QUESTION 10
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
Roving	Unexpected hazards encountered in the work area being entered that are not part of this work	QUESTION 22a(1)
Exposure to hazardous energy	Potential injury to personnel from exposure to hazardous energy	QUESTION C3

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)
2. All contractors performing servicing and maintenance on SNL-owned equipment shall perform LOTO when required in accordance with 29 CFR 1910.147 (OSHA Standards for General Industry) and comply with the following two additional requirements: (1) The contractor shall be briefed on SNL-specific LOTO devices and procedures applicable to the equipment under maintenance. (2) The contractor shall inform the SNL equipment owner and other authorized or affected workers of the contractor's energy control procedure/process, including any differences between that process and SNL-specific requirements. (QUESTION C3a(1)a)
3. Ensure periodic inspections are appropriately documented and retained by appropriate LOTO administrator or ES&H Coordinator. (QUESTION C3a(1)c)
4. 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)
5. All installers of the system must be qualified according to the requirements of the Pressure Safety Manual. The Pressure Operator Qualification Form (SF 2001-PIQ) 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 installers. (QUESTION 10b)
6. 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)
7. GN470108 requires establishing communications with the host facility about their hazards and required safeguards. Communications may need to be ongoing, since hazards may change over time. (QUESTION 22a(1))
8. Implement the required precautions before entering someone else's non-office work area, (e.g., required PPE, training, procedure review, briefing, escort, etc.). (QUESTION 22a(1))
9. 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)
10. **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)

11. 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)
12. 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. Develop equipment specific procedures for servicing and maintenance according to the requirements of Corporate Procedure: ESH100.2.IS.2, "Control Hazardous Energy (Lockout/Tagout)" (QUESTION C3a(1)b)
2. 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)
3. 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)
4. 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)
5. Contact Radiation Protection to conduct a radiation survey (QUESTION 1a)
6. 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)
7. Store, dispense and bond flammable and combustible liquids in accordance with the requirements in the SNL, "Record of Code Decision." (QUESTION 5g)
8. 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)
9. 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)

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

11. 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," as needed for requirements and guidance. (QUESTION 6b)

12. 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))

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)		3	No
	Required by: QUESTION 6a(2)			
ELC901	SAFE SWITCHING BRIEFING		--	Yes
	Required by: QUESTION 6b			
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			
LTO210	LOCKOUT/TAGOUT FOR AUTHORIZED WORKERS		3	No
	Required by: QUESTION C3a(1)b			
LTO220	ANNUAL LOCKOUT/TAGOUT (LOTO) ROLES & RESPONSIBILITIES FOR AUTHORIZED WORKERS		1	No
	Required by: QUESTION C3a(1)a, QUESTION C3a(1)b			
MCH200	HAND AND POWER TOOL SAFETY	unless OJT	--	Yes
	Required by: QUESTION 7b			
MED105 HF	HYDROFLUORIC ACID SAFETY		3	No
	Required by: QUESTION 5e(1)			
PRS150	PRESSURE SAFETY ORIENTATION	for all operators of the system	--	Yes
	Required by: QUESTION 10a, QUESTION 10b			
PRS150R	PRESSURE SAFETY ORIENTATION REFRESHER		3	No
	Required by: QUESTION 10a, QUESTION 10b			
PRS250	ADVANCED PRESSURE SAFETY	for all installers of the system	--	Yes
	Required by: QUESTION 10b			
PRS250R	ADVANCED PRESSURE SAFETY REFRESHER		3	No
	Required by: QUESTION 10b			
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			
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

- 1: Corporate Procedure: ESH100.1.EP.2, "Implement NEPA, Cultural Resources, and Historic Properties Requirements" (QUESTION 15)
- 2: Corporate Procedure: ESH100.2.ENV.12, "Obtain and Comply with Air Permits" (QUESTION 15b)
- 3: Corporate Procedure: ESH100.2.ENV.15, "Manage Hazardous Waste at SNL/CA" (QUESTION 15d)
- 4: Corporate Procedure: ESH100.2.ENV.20, "Manage Other Waste at SNL/CA" (QUESTION 15d)
- 5: Corporate Procedure: ESH100.2.ENV.22, "Manage Hazardous Waste at SNL/NM" (QUESTION 15d)
- 6: Corporate Procedure: ESH100.2.ENV.6, "Control Discharges to the Sanitary Sewer System" (QUESTION 15a)
- 7: Corporate Procedure: ESH100.2.FP.1, "Manage Fire Protection Requirements" (QUESTION 5g)
- 8: Corporate Procedure: ESH100.2.IH.13, "Work with Injurious Corrosive Materials and Manage Safety Shower and Eyewash Use" (QUESTION 5e)
- 9: Corporate Procedure: ESH100.2.IH.15, "Control Hazards Using Local Exhaust Ventilation and High Efficiency Particulate Air Filters" (QUESTION C1)
- 10: Corporate Procedure: ESH100.2.IH.19, "Evaluate and Control Asphyxiant Hazards" (QUESTION 5d(1))
- 11: Corporate Procedure: ESH100.2.IH.20, "Maintain an Accurate Chemical and Biological Material Inventory" (QUESTION 5)
- 12: Corporate Procedure: ESH100.2.IH.3, "Control Inhalation Hazards Using Respiratory Protection" (QUESTION C2a(1)b)
- 13: Corporate Procedure: ESH100.2.IH.4, "Evaluate and Control Chemical Hazards" (QUESTION 5)

- 14:** Corporate Procedure: ESH100.2.IH.9, "Enter Confined Spaces Safely" (QUESTION 5d(1))
- 15:** Corporate Procedure: ESH100.2.IS.10, "Manage Industrial Machine and Portable Power Tool Safety" (QUESTION 7b)
- 16:** Corporate Procedure: ESH100.2.IS.2, "Control Hazardous Energy (Lockout/Tagout)" (QUESTION C3a(1)b)
- 17:** Corporate Procedure: ESH100.2.IS.8, "Assess Workplace Hazards and Provide and Maintain Personal Protective Equipment" (QUESTION C2)
- 18:** Corporate Procedure: ESH100.2.PS.1, "Control Pressure Safety Hazards" (QUESTION 5d(1))
- 19:** MN471000, Pressure Safety Manual, Chapter 2, "The Pressure Safety Program" (QUESTION 10a)
- 20:** MN471000, Pressure Safety Manual, Chapter 6, "Testing and Evaluating Pressure Systems" (QUESTION 10f)
- 21:** MN471000, Pressure Safety Manual, Chapter 7, "Verifying the Safe Operation of Pressure Systems" (QUESTION 10f)
- 22:** MN471000, Pressure Safety Manual, Chapter 8, "Servicing Pressure Vessels and Components" (QUESTION 10f)
- 23:** MN471000, Pressure Safety Manual, Chapter 9, "Documenting the Operational Safety of Pressure Systems" (QUESTION 10e)
- 24:** MN471004, Electrical Safety Manual, Section 2.10, "Electrical Personal Protective Equipment" (QUESTION 6a)
- 25:** MN471004, Electrical Safety Manual, Section 2.2, "Qualifications and Training" (QUESTION 6a(2))
- 26:** MN471004, Electrical Safety Manual, Section 4.3, "Safe Work Practices" (QUESTION 6d(1))
- 27:** MN471016, Radiological Protection Procedures Manual, Chapter 1, "Radiological Work Planning and Controls" (QUESTION 1)
- 28:** MN471016, Radiological Protection Procedures Manual, Chapter 3, "Radiological Training Program" (QUESTION 1)
- 29:** MN471016, Radiological Protection Procedures Manual, Chapter 10, "Radiation Generating Devices" (QUESTION 1)
- 30:** Corporate Procedure: ESH100.2.ELC.1, "Manage Electrical Hazards" (general corporate business process)
- 31:** Corporate Procedure: ESH100.2.IH.12, "Control Food and Beverage Consumption in Hazardous Areas" (general corporate business process)
- 32:** Corporate Procedure: ESH100.2.IH.17, "Address Indoor Air Quality Concerns" (general corporate business process)
- 33:** Corporate Procedure: ESH100.2.IH.21, "Control Ergonomics Hazards" (general corporate business process)
- 34:** Corporate Procedure: ESH100.2.IS.11, "Implement Housekeeping Safety" (general corporate business process)

35: Corporate Procedure: ESH100.2.IS.7, "Implement Traffic Safety" (general corporate business process)

36: Corporate Procedure: ESH100.3.1, "Prepare for and Manage Emergencies" (general corporate business process)

37: Corporate Procedure: ESH100.4.RPT.2, "Report Injuries and Illnesses" (general corporate business process)

38: Corporate Procedure: ESH100.5.RPT.5, "Report Vehicle Accidents and Property Damage" (general corporate business process)

39: MN471001 - ES&H Manual, Section 4B, "Electrical Safety Practices" (general corporate business process)

40: MN471001 - ES&H Manual, Section 4K, "Traffic Safety" (general corporate business process)

41: 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
Standard Operating Procedure for Working with Hazardous and Particularly Hazardous Chemicals in Center 1100 Laboratories	SOP1100.001 Issue E	SOP	11/01/2010

VII. Primary Hazard Screening Worksheets

Version of Questions:K

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
E-beam Evaporator EG2	403	Exempt Shielded	Inherently Safe	10	Yes	No	Nogan,John	Yes
Location: Site: SSTP, Area: N/A, Building: N/A, Room: N/A Location Details: SE corner								

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
- 1c(4) Very High Radiation Area No

	Questions	Answers
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 SNL or SNL 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 Members of the Workforce 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
5	Chemicals: (Review the Help text before answering this question.) Do the activities involve chemicals?	Yes
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? - 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
5d(1)	Do any activities require an exposure assessment for asphyxiants? (i.e., do NOT meet the exemption criteria stated in the Help Text)	No
5e	Are the hazardous chemicals, hazardous substances, or hazardous waste involved in these activities considered injurious corrosive materials?	Yes
5e(1)	Do these activities involve the use of hydrofluoric acid?	Yes
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

Questions	Answers
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 	Yes
5h(1) Is a flammable gas used for purposes OTHER THAN comfort heating or non-process hot water (e.g., restroom use)?	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"> - Perform energized work activities (defined as any activity, including work, trouble-shooting, diagnostic measurements, and zero-energy verification) within the limited approach boundary (within 3.5 feet) of exposed and energized electrical conductors and circuit parts? - 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 perform energized work activities (defined as any activity, including work, trouble-shooting, diagnostic measurements, and zero-energy verification) within the limited approach boundary (within 3.5 feet) of exposed and energized electrical conductors and circuit parts?	Yes
6a(1) Are circuit parts storing 10 Joules or more, associated with Marx generators or pulsed power circuits ?	No
6a(2) Are circuit parts associated with facility type electrical distribution systems ?	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?	Yes
6d(1) Have all of the non-NRTL approved electrical equipment or appliances been approved and documented using the SNL non-NRTL-evaluation process?	No
7 Mechanical: Does the facility or activity involve the use of any of the following tools, equipment or activities? <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	Com'l Available	Modified
Portable power tools	Yes	No
Location: Site: SSTP, Area: No Tech Area, Building: 518 Location Details: Bay 1525		

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
7j Do workers perform or come into close proximity to any of these activities: <ul style="list-style-type: none"> - Excavations/Trenches - Floor or Wall Penetrations 	No

	Questions	Answers
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 and the low-power emitters specifically exempted in the help text)?	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.	Yes
9a	Do thermal hazards exist in the work area in such a manner that Members of the Workforce may be exposed under normal conditions or in a foreseeable emergency?	Yes
9b	Do thermal stressors exist in the work area?	No
10	Pressure: Are workers involved in the design, installation, operation, or maintenance of a pressure system (including pressure, vacuum, cryogenic fluid applications)?	Yes
10a	Do personnel function as pressure system operators?	Yes
10b	Do personnel function as pressure installers?	Yes
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
12	Miscellaneous Hazards: Does the facility or activity involve any of the following hazards or activities? <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	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.	No
14	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.	No

Questions

Answers

- 15 **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? Yes

Environmental Concerns Hazards		
Source Name	Type	Est. Quantity
Acid Waste (Liquid)	Hazardous Waste	8 gal/yr
	Location: Site: SSTP, Area: No Tech Area, Building: 518, Room: 1525 Location Details: Metal Deposition Lab - Acid Bench Comments: Acid waste which includes certain oxidizers generated in 1525 will be introduced in small (<200 ml) quantities to the facility's AWN (Acid Waste Neutralization) System for treatment. The AWN system is designed to process both acid and base waste streams.	
Acid Waste (Solids)	Hazardous Waste	15 kg/yr
	Location: Site: SSTP, Area: No Tech Area, Building: 518, Room: 1525 Location Details: Metal Deposition Lab - Acid Bench Comments: Solid waste with acidic residues from processing operations. This waste may consist of cleanroom wipes, cleaning pads and other base contaminated materials. Waste material is collected in a single properly marked waste can and subsequently processed through Sandia's hazardous waste handling system.	
Base Waste (Liquids)	Hazardous Waste	8 gal/yr
	Location: Site: SSTP, Area: No Tech Area, Building: 518, Room: 1523 Location Details: Metal Deposition Lab - Base Bench Comments: Base waste generated in 1525 will be introduced in small (<200 ml) or moderate (up to 3 Liters) quantities to the facility's AWN (Acid Waste Neutralization) System for treatment. The AWN system is designed to process both acid and base waste streams.	
Base Waste (Solids)	Hazardous Waste	15 kg/yr
	Location: Site: SSTP, Area: No Tech Area, Building: 518, Room: 1525 Location Details: Metal Deposition Lab - Base Bench Comments: Solid waste with basic residues from processing operations. This waste may consist of cleanroom wipes, cleaning pads and other base contaminated materials. Waste material is collected in a single properly marked waste can and subsequently processed through Sandia's hazardous waste handling system.	
Solvent Waste (Liquids)	Hazardous Waste	45 gal/yr
	Location: Site: SSTP, Area: No Tech Area, Building: 518, Room: 1525 Location Details: Metal Deposition Lab - Solvent Bench Comments: All solvent waste generated in 1525 will be collected in a single (4.5) gallon carboy that is integrated into the solvent bench. Once the carboy becomes full, the waste product will be transferred to a disposable (5) gallon container for processing through Sandia's hazardous waste handling system.	
Solvent Waste (Solids)	Hazardous Waste	25 kg/yr
	Location: Site: SSTP, Area: No Tech Area, Building: 518, Room: 1525 Location Details: Metal Deposition Lab - Solvent Bench Comments: Solid waste with solvent residue from processing operations. This waste will mostly consist of cleanroom wipes, however pipette syringes, small containers and other solvent contaminated materials may also be introduced to this waste stream. Waste material will be collected in a single properly marked waste cans waste and processed through Sandia's hazardous waste handling system.	

	Questions	Answers
15a	Wastewater: Are there any wastewater discharges from this activity?	Yes
15b	Air: Are there any air discharges or emissions at this activity?	Yes
15b(1)	Ozone Depleting Substance (ODS): Are there any ODSs at this activity?	No
15b(2)	Will this activity include the installation and or use of combustion equipment ? Combustion equipment includes boilers and internal combustion engines, such as generators.	No
15b(3)	Will this activity involve open-burn activities?	No
15b(4)	Will this activity involve soil disturbance, building demolition, or construction that disturbs soil , including access roads and staging areas?	No
15b(5)	Radionuclide NESHAP: Are there any radionuclide air discharges or use of radionuclides in gaseous form or at elevated temperatures from this activity?	No
15c	Radioactive Waste: Will this activity generate any radioactive waste, or will Members of the Workforce be required to handle radioactive waste?	No
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)	Hazardous Waste Accumulation Area: Will this activity have the potential to accumulate greater than 55-gallons of any hazardous waste at any one given time?	No
15d(2)	Acutely Hazardous Waste: Will this activity generate any acutely hazardous waste ?	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	Material or Waste of Unknown Origin: Will this activity require handling material or waste of unknown origin?	No
15h	Fuels and Oil Storage: Does this activity use a fuel or oil storage container capable of containing 55 gallons or more?	No
15i	Discharges to Ground Surface: Does this activity have discharges (liquid or solid) to the ground surface ? Note: Discharges are commonly associated with outdoor testing and maintenance activities.	No
15j	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
15k	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	Transportation of Non-Waste 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? - 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

Questions	Answers
18 Biological Agents: (<i>see Help text before answering this question.</i>) 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
20 Beryllium: Do operations include any activities that? (<i>Review the Help text before answering this question</i>)	No
<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? 	
21 Offsite Locations: Does this PHS include work at locations other than KAFB, SNL/CA, NTS, or TTR regardless of whether or not the worksite is on Sandia-controlled Premises?	Yes
Notes: CINT is not considered to be located on KAFB.	
21a Does work performed by Members of the Workforce at locations other than KAFB, SNL/CA, or TTR involve any of the following (as defined in the listed PHS questions)? In the question notes, please identify which of the hazards drive a "yes" answer to this question and include approximately a sentence for each identified hazard, describing how it is used or produced.	Yes
<ul style="list-style-type: none"> - Radiation generating devices (see question 1) - Radioactive materials (see question 2) - Explosives (see question 3) - Lasers in navigable air space or affecting other operations (see question 4b) - HAZWOPER operations (see question 5b) - Unbound engineered nanoparticles (see question 5c) - Newly developed chemical substance (see question 5f) - Chemical physical hazards (see question 5h) - >25% PSM quantities (see question 5i) - Toxic gases (see question 5j) - >Emergency Management screening quantities (see question 5k) - Personnel overexposure to nonionizing radiation (see question 8a(1)) - Public overexposure to nonionizing radiation (see question 8b(1)) - Non-routine aircraft (see question 12g(1)) - Airborne objects other than aircraft (e.g., projectiles, fragments) (see question 12h) - Firearms (see question 12i) - Equipment used outside of manufacturer's recommendations with the potential to cause injury to co-located workers or public (see 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 	
Notes: An inherently safe RGD is used in the Integration Laboratory.	
21a(1) Has the SNL Safety Basis Department determined a hazard classification for these activities?	Yes

	Questions	Answers
21a(1)a	What hazard classification was determined by the SNL Safety Basis Department?	Low
21b	Do these activities involve foreign travel?	No
22	Roving: Will workers enter into non-office work areas with operations controlled by others? Include all work activities meeting these criteria, including research. Do not include personnel from other organizations, whose work is not covered by this PHS, who enter your workspace (e.g., custodial personnel)?	Yes
22a	Do the entries include non-office work areas on Sandia-controlled premises?	Yes
22a(1)	Are there hazards associated with these entries that are not identified by this PHS or other PHSs that are applicable to these activities?	Yes
22b	Do the entries include work areas on non-Sandia-controlled premises?	No
23	Emergency Response: Do activities include emergency response operations (e.g., confined space rescue, hazardous materials response, emergency medical services, natural disaster, Radiological Assistance Program, Accident Response Group, Joint Tactical Operations Team, Nuclear Emergency Search Team)?	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 (PPE): 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 these activities?	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 that PPE is required for hazards other than chemical?	No
C2a(1)b	Has the workplace hazard assessment determined respiratory protection is required?	Yes
Notes: Yes, for application specific toxic gas cylinder replacement. This was assessed by IH.		
C2a(2)	Does the workplace hazard assessment allow voluntary use of respiratory protection?	No

Questions	Answers
C3 Control of Hazardous Energy (LOTO): Do you have any equipment in your operations that requires any of the following service and maintenance activities?	Yes
<ul style="list-style-type: none"> - Construction - Installation - Setup - Adjustment - Inspection - Modification - Maintenance - Service - Lubrication - Cleaning - Un-jamming - Making adjustments or tool changes 	
C3a While performing any of the servicing and maintenance activities listed above, is there potential for injury from the unexpected energization or start up of the machines, equipment, or process, or from a release of stored energy?	Yes
C3a(1) Will service or maintenance be done on a machine, equipment, or a process by Members of the Workforce within your organization?	Yes
C3a(1)a Will ALL service or maintenance be done on a machine, equipment, or a process by Members of the Workforce within your organization ?	No
C3a(1)b During the service or maintenance can all the equipment be controlled by cord and plug ?	No
C3a(1)c Have periodic inspections of hazardous energy control (lockout/tagout) procedures and LOTO authorized workers been completed for all workers and procedures as required?	Yes
C3b Are there any activities where control of hazardous energy sources is only necessary for protection of configuration, equipment, or property (i.e., not for personnel protection)?	No
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

Source Name or Question: Question 6d(1)
--

Source Reason: Electrical equipment operating at 50V or greater that is not NRTL-approved
--

Hazardous Condition: Electrocution/Arcs/Fires
--

PHS Identified 'Low' Hazard.

Author's Comment:

Cause: System/Component/Equipment Failure

Short circuit to neutral or ground.

Consequence: Minor Mission Disruption/Delay

Loss of power to tool and subsequent shut down.

Mitigation: Active Engineering Control-Other

Properly sized circuit breaker or fuse to open circuit in the event of an overcurrent situation.

Mitigation: Passive Engineering Control-Other

Components and wiring appropriately sized to operate well above the trip point of the overcurrent protection devices.

Author Assessment of Adequacy: Applied Mitigation and Prevention are sufficient.

Adequacy Explanation: Preventions/mitigations follow typical NEC guidelines and industry standards.

Consequence: Death [Worker]

Electrocution if the worker should provide a low impedance path through the central nervous system or heart to ground.

Mitigation: Active Engineering Control-Other

Incorporation of UL approved ground fault interrupt circuit protection to outlets within 6' of water sources.

Mitigation: Passive Engineering Control-Access Prevention Barrier (locked door/gate)

Panels with exposed terminals are not easily accessible and require a tool for removal.

Mitigation: Procedural (Monitoring etc.)-Other

Ground fault interrupters are tested for proper operation on a routine basis.

Author Assessment of Adequacy: Applied Mitigation and Prevention are sufficient.

Adequacy Explanation: Preventions and mitigations described above follow guidelines established by the NEC and are considered to be normal measures to protect against accidental electrocution.

Consequence: Minor Property Damage

Bench or work station fire.

Mitigation: Passive Engineering Control-Other

Work surfaces and immediate areas surrounding the work surfaces are constructed of metal or in the case of the wet sinks UL 94V-0 rated materials. If a fire were to start, the flame would slowly propagate or completely extinguish. However some of the older benches have areas surrounding the work surface that is constructed of UL 94V-2 materials. A fire extinguishers is located in the general vicinity of the UL 94V-2 constructed bench for added protection.

Mitigation: Passive Engineering Control-Fire Barrier (fire wall/door/coating)

Electrical components and power distribution circuits in the newer wet benches are enclosed in an all metal enclosure. In the older bench, the electrical componenets are mounted on an aluminum back plate to prevent the spread of fire. Wiring that travels outside of the electrical enclosure is contained within UL approved PVC liquid tight flexible conduits and components.

Mitigation: Passive Engineering Control-Other

Explosion proof hot plates are used on the work surfaces where flammable materials may be present to prevent sources of ignition in the presents of flammable vapors.

Author Assessment of Adequacy: Applied Mitigation and Prevention are sufficient.

Adequacy Explanation: Components and materials of construction follow industry standards that prevent the spread of fire.

Source Name or Question: Question 21a(1)a
Source Reason: Low-Level Offsite Hazardous Work Condition
Hazardous Condition: Potential for worker exposure

PHS Identified 'Low' Hazard.

Author's Comment:

Cause: Human Error

Removal of protective sheilding surrounding an inherently safe RGD

Consequence: Minor Illness/Injury

Small exposure to low level non-ionizing radiation.

Mitigation: Signage-Other

Label affixed to tool instrument indicating that a hazard exists when panel is removed.

Mitigation: Training-Other

Course Id: RAD102, **Title:** GENERAL EMPLOYEE RADIOLOGICAL TRAINING

RAD102 provides a heightened awareness to the hazards presented within the work place where RGDs are present.

Author Assessment of Adequacy: Applied Mitigation and Prevention are sufficient.

Adequacy Explanation: There are several primary and secondary systems in place to protect a worker from the direct exposure to a RGD hazard. Tools are required to access hazardous areas and only properly trained maintenance personnel is allowed to service the equipment.

Cause: System/Component/Equipment Failure

Loose connection on transmission line between RF generator and plasma chamber.

Consequence: Minor Mission Disruption/Delay

RF generator designed to fold back power reducing hazard when a load mismatch is detected. Plasma fails to ignite.

Mitigation: Active Engineering Control-Other

System automatically shuts down due to high reflected power.

Author Assessment of Adequacy: Applied Mitigation and Prevention are sufficient.

Adequacy Explanation: Not only are engineering controls in place to detect the problem, enclosures surrounding the high RF potentials provide a secondary level to protection in order to prevent direct exposure to the hazards.

Note: 23 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 21 - CINT is not considered to be located on KAFB.

Q 21a - An inherently safe RGD is used in the Integration Laboratory.

Notes from Controls Questions

Q C2a(1)b - Yes, for application specific toxic gas cylinder replacement. This was assessed by IH.

User Entered Hazard Tables

Environmental Concerns Hazards		
Source Name	Type	Est. Quantity
Acid Waste (Liquid)	Hazardous Waste	8 gal/yr
	Location: Site: SSTP, Area: No Tech Area, Building: 518, Room: 1525 Location Details: Metal Deposition Lab - Acid Bench Comments: Acid waste which includes certain oxidizers generated in 1525 will be introduced in small (<200 ml) quantities to the facility's AWN (Acid Waste Neutralization) System for treatment. The AWN system is designed to process both acid and base waste streams.	
Acid Waste (Solids)	Hazardous Waste	15 kg/yr
	Location: Site: SSTP, Area: No Tech Area, Building: 518, Room: 1525 Location Details: Metal Deposition Lab - Acid Bench Comments: Solid waste with acidic residues from processing operations. This waste may consist of cleanroom wipes, cleaning pads and other base contaminated materials. Waste material is collected in a single properly marked waste can and subsequently processed through Sandia's hazardous waste handling system.	
Base Waste (Liquids)	Hazardous Waste	8 gal/yr
	Location: Site: SSTP, Area: No Tech Area, Building: 518, Room: 1523 Location Details: Metal Deposition Lab - Base Bench Comments: Base waste generated in 1525 will be introduced in small (<200 ml) or moderate (up to 3 Liters) quantities to the facility's AWN (Acid Waste Neutralization) System for treatment. The AWN system is designed to process both acid and base waste streams.	
Base Waste (Solids)	Hazardous Waste	15 kg/yr
	Location: Site: SSTP, Area: No Tech Area, Building: 518, Room: 1525 Location Details: Metal Deposition Lab - Base Bench Comments: Solid waste with basic residues from processing operations. This waste may consist of cleanroom wipes, cleaning pads and other base contaminated materials. Waste material is collected in a single properly marked waste can and subsequently processed through Sandia's hazardous waste handling system.	

Environmental Concerns Hazards		
Source Name	Type	Est. Quantity
Solvent Waste (Liquids)	Hazardous Waste	45 gal/yr
	Location: Site: SSTP, Area: No Tech Area, Building: 518, Room: 1525 Location Details: Metal Deposition Lab - Solvent Bench Comments: All solvent waste generated in 1525 will be collected in a single (4.5) gallon carboy that is integrated into the solvent bench. Once the carboy becomes full, the waste product will be transferred to a disposable (5) gallon container for processing through Sandia's hazardous waste handling system.	
Solvent Waste (Solids)	Hazardous Waste	25 kg/yr
	Location: Site: SSTP, Area: No Tech Area, Building: 518, Room: 1525 Location Details: Metal Deposition Lab - Solvent Bench Comments: Solid waste with solvent residue from processing perations. This waste will mostly consist of cleanroom wipes, however pipet syringes, small containers and other solvent contaminated materials may also be introduced to this waste stream. Waste material will be collected in a single properly marked waste cans waste and processed through Sandia's hazardous waste handling system.	

Mechanical Hazards		
Source Name	Com'l Available	Modified
Portable power tools	Yes	No
	Location: Site: SSTP, Area: No Tech Area, Building: 518 Location Details: Bay 1525	

RGDs								
Source Name	RGD #	RGD Class	RGD Type	Accl. Voltage	Com'l Available	Modified	Custodian	SNL/NM Owned
E-beam Evaporator EG2	403	Exempt Shielded	Inherently Safe	10	Yes	No	Nogan,John	Yes
	Location: Site: SSTP, Area: N/A, Building: N/A, Room: N/A Location Details: SE corner							

Assigned Reviewers			
Review Type	Role	Person	Required/Requested
Technical SME	ISMS_IFSBReviewer	Stirrup,Timothy Scott	Required Review, due to: QUESTION 21a(1)
	Required Assignment: Review Question 21 and hazard-specific question sets that relate to the user-specified hazards identified in Question 21		
	Comment: [tss 12212011] IFSB review PHS Q21a(1) for MOW performing hazardous activities at non-Sandia controlled locations listed as inherently safe RGD located in integration laboratory (e.g., CINT cleanroom). PHS addresses Rm 1524, 1525, & 1526 for CINT Bldg 518. Recommend updating locations table to include Rm 1524 and 1526 during next update to PHS.		
ES&H Coordinator	ISMS_ESH_Coordinator	Burkhart,Robert	Required Review by business rule.
Safety Basis	ISMS_RiskManagerA	Hall,Christopher Armando	Required Review by business rule.
	Comment: Hazards are well documented!		
Manager	ISMS_Manager	Hearne,Sean J.	Required Review by business rule.

PHS Output

Major Safety Concerns

The hazard classification is: Low

The required documentation is: PHS with integral HA

Safety Concerns at this Low level include:

(QUESTION 6d(1)) Unknown hazard potential since items have not gone through the standards, testing rigor, and hazard analysis associated with an NRTL-evaluation

(QUESTION 21a(1)a) Hazards from work conducted offsite by Members of the Workforce

Other Safety Concerns

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

(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 5d(1)) Asphyxiant gas is present

(QUESTION 5e) Corrosive chemical; Potential exposure to skin and eyes.

(QUESTION 5e(1)) Potential exposure to skin and eyes

(QUESTION 5g) Fire/Explosion Hazard

(QUESTION 5h) Hazards from fires, reactions, and explosions

(QUESTION 6a) Potential electrical shock or arc

(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 9a) Contact with hot or cold objects

(QUESTION 10) Injury or damage

(QUESTION 15) Potential for regulatory action

(QUESTION 15a) Potential to exceed permitted quantities

(QUESTION 15b) Potential to emit regulated contaminants

(QUESTION 15d) Potential for regulatory action

(QUESTION 22a(1)) Unexpected hazards encountered in the work area being entered that are not part of this work

(QUESTION C3) Potential injury to personnel from exposure to hazardous energy

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 5)

ELC106: R&D ELECTRICAL SAFETY (> 50 VOLTS) (QUESTION 6a(2))

ELC106R: R&D ELECTRICAL SAFETY REFRESHER (> 50 VOLTS) (QUESTION 6a(2))

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)

LTO210: LOCKOUT/TAGOUT FOR AUTHORIZED WORKERS (QUESTION C3a(1)b)

LTO220: ANNUAL LOCKOUT/TAGOUT (LOTO) ROLES & RESPONSIBILITIES FOR AUTHORIZED WORKERS (QUESTION C3a(1)b)

LTO220: ANNUAL LOCKOUT/TAGOUT (LOTO) ROLES & RESPONSIBILITIES FOR AUTHORIZED WORKERS (QUESTION C3a(1)a)

MCH200: HAND AND POWER TOOL SAFETY (QUESTION 7b)

MED105HF: HYDROFLUORIC ACID SAFETY (QUESTION 5e(1))

PRS150: PRESSURE SAFETY ORIENTATION (QUESTION 10a)

PRS150: PRESSURE SAFETY ORIENTATION (QUESTION 10b)

PRS150R: PRESSURE SAFETY ORIENTATION REFRESHER (QUESTION 10a)

PRS150R: PRESSURE SAFETY ORIENTATION REFRESHER (QUESTION 10b)

PRS250: ADVANCED PRESSURE SAFETY (QUESTION 10b)

PRS250R: ADVANCED PRESSURE SAFETY REFRESHER (QUESTION 10b)

RAD102: GENERAL EMPLOYEE RADIOLOGICAL TRAINING (QUESTION 1b(1))

RAD219: RADIATION-GENERATING DEVICE CUSTODIAN TRAINING (QUESTION 1)

RAD250: MANAGEMENT OF RADIOLOGICAL OPERATIONS (QUESTION 1)

RSP215: AIR-PURIFYING RESPIRATORY PROTECTION (QUESTION C2a(1)b)

RSP217: COMPREHENSIVE RESPIRATORY PROTECTION (QUESTION C2a(1)b)

RSP230: RESPIRATORY PROTECTION FOR SUPERVISORS (QUESTION C2a(1)b)

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 5d(1) answered: N; Q 5e answered: Y; Q 5e(1) answered: Y; Q 5g answered: Y; Q 5h answered: Y;
Q 6a answered: Y; Q 6a(2) answered: N; Q 6b answered: Y; Q 6d(1) answered: N; Q 7 answered: Y;
Q 7b answered: Y; Q 9a answered: Y; Q 10 answered: Y; Q 10a answered: Y; Q 10b answered: Y;
Q 10d answered: Y; Q 10e answered: Y; Q 10f answered: Y; Q 15 answered: Y; Q 15a answered: Y;
Q 15b answered: Y; Q 15d answered: Y; Q 21a(1) answered: Y; Q 21a(1)a answered: Low; Q 22a(1) answered:
Y;
Q C1 answered: Y; Q C2 answered: Y; Q C2a(1)b answered: Y; Q C3 answered: Y; Q C3a(1)a answered: N;
Q C3a(1)b answered: N; Q C3a(1)c answered: Y; Q C4 answered: Y;

X. Emergency Operations Concerns

Energized Systems - RGD

Pressure

Environmental Concerns

Chemical

Energized Electrical

Energized Mechanical

Other Hazard