

**Sandia National Laboratories**

**Primary Hazard Screening (PHS)**

**PHS Number: SNL08A00071-005**

**Integration Lab Parts Clean Room 1511**

I. Signatures (Electronic signature dates shown)
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**Risk Management Determination**Hazard Classification: **Low**Required Documentation: **PHS with integral HA**Facility/Project Designator: **Non-nuclear Facility**Date Created: **07/06/2011**DOE Order References: **425.1D**Results as of: **07/13/2011**Submitted for Review by: **Davis, M. Wayne**

Org: 01100 Date: 07/11/2011

**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: **07/11/2011**

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

Industrial Facility Safety Basis SME:  
**Stirrup, Timothy Scott**Org: **04126**CONCUR: **07/13/2011****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: **07/13/2011****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: **07/13/2011**

### 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: **07/13/2011**

## 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: **07/13/2012**Responsible Organization: **01132**

#### Radiological Protection Level

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

#### Description

The integration lab parts clean room houses tools that act in support of the integration lab activities and is a class 10,000 cleanroom. Systems located in that room include a HEPA filtered bead blasting system attached to the house exhaust. The system is for cleaning of shielding of the e-beam evaporator systems, sputter system, atomic layer deposition (ALD) system, and chemical vapor deposition (CVD) systems. The ALD reactor components are typically coated with which are typically coated with oxides of aluminum, hafnium, and zirconium, in addition to titanium nitride and platinum. CVD components are typically coated with Au, Al, Cu, Ti, Cr, SiN, Si and SiO<sub>2</sub>. The room also contains a base and a solvent fume hood, which will be used for degreasing and etching of parts for use in the cleanroom. There are wafer dicing saws used for dicing of wafers from the integration lab, e.g. Si wafers, GaAs, SiC, and sapphire as well as lapping and chemical mechanical polishing equipment.

#### Notes

##### General Document Notes

#### Locations

Site	Area	Building	Room	Description
<b>Primary Location</b>				
SSTP	No Tech Area	518	1511	

### Responsible Organization History

Organization Number	Effective (Starting) Date	This Org. Submitted Document for Review
01132	02/19/2008	Y

### Planned Changes

<b>IV. Identified Hazards</b>		
<b>Hazard Name</b>	<b>Hazard Description</b>	<b>Source</b>
<b>Traffic</b>	Traffic related hazards for injury	general corporate business process
<b>SIH - Roving Personnel and Visitors</b>	Roving Personnel or Visitors entering work area	general corporate business process
<b>Common electrical hazards</b>	Common electrical hazards	general corporate business process
<b>Chemicals</b>	Potential personnel exposure to chemicals & fire protection regulatory requirements	QUESTION 5
<b>Unbound Engineering Nanoscale particles</b>	Unbound Engineered Nanoscale Particles(UNP); Potential inhalation and dermal exposure to UNP.	QUESTION 5c
<b>Corrosive chemical</b>	Corrosive chemical; Potential exposure to skin and eyes.	QUESTION 5e
<b>Noncompliant storage, dispensing, or use of flammable/combustible liquids</b>	Fire/Explosion Hazard	QUESTION 5g
<b>Exposed energized circuits</b>	Potential electrical shock or arc	QUESTION 6a
<b>Circuit breakers or disconnect switches</b>	Potential electrical arc from operating circuit breakers or disconnect switches	QUESTION 6b
<b>Electrical equipment (not approved by NRTL or Sandia)</b>	Unknown hazard potential since items have not gone through the standards, testing rigor, and hazard analysis associated with an NRTL-evaluation	QUESTION 6d(1)
<b>Mechanical hazards</b>	Potential injury from mechanical forces	QUESTION 7
<b>Portable power tools</b>	Potential injury from portable power tools	QUESTION 7b
<b>Pressure source</b>	Injury or damage	QUESTION 10
<b>Potential environmental concerns</b>	Potential for regulatory action	QUESTION 15
<b>Wastewater discharge</b>	Potential to exceed permitted quantities	QUESTION 15a
<b>General Wastewater discharge</b>	Potential to exceed permitted amounts	QUESTION 15a(1)
<b>Air discharge</b>	Potential to emit regulated contaminants	QUESTION 15b
<b>Hazardous waste</b>	Potential for regulatory action	QUESTION 15d
<b>Offsite Work</b>	Hazards associated with the site's other activities	QUESTION 21a
<b>Low - Offsite Work Condition - MOW</b>	Hazards encountered while conducting work offsite by members of the workforce	QUESTION 21b(1)a
<b>Offsite Work - Domestic Travel</b>	Hazards associated with domestic travel	QUESTION 21d
<b>Exposure to hazardous energy</b>	Potential injury to personnel from exposure to hazardous energy	QUESTION C3

## V. Required Actions

### Warning Messages

1. 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)
2. Ensure that activity meets the requirements for the cord and plug exemption Corporate Procedure: ESH100.2.IS.2, "Control Hazardous Energy (Lockout/Tagout)," also see information at [loto.sandia.gov](http://loto.sandia.gov). (QUESTION C3a(1)b)
3. 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)
4. 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)
5. 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)
6. 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)
7. Flammable and combustible liquids must be bonded in accordance with the requirements in: The Sandia, "Record of Code Decision." (QUESTION 5g)
8. 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)
9. 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. 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.** Where eyes or body of any person may be exposed to injurious corrosive materials, suitable facilities for emergency quick drenching or flushing of the eyes and body shall be provided within the work area for immediate emergency use. See Corporate Procedures ESH100.2.IH.13, Work with Injurious Corrosive Materials and Manage Safety Shower and Eyewash Use, for requirements. (QUESTION 5e)

**Response:** Suitable facilities for emergency quick drenching or flushing of the eyes and body are provided within the work area for immediate emergency use.

**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.** 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)

**Response:** The department manager will determine each employee's electrical qualifications.

**5.** 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 homepage. 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. A 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-SF2005-EWP (10-2005). (QUESTION 6a)

**Response:** A TWD is in place in the lab.

**6.** The energized work decision tool shall be used to determine PPE and hazard analysis requirements. 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. See MN471004, Electrical Safety Manual, Section 2.10, "Electrical Personal Protective Equipment" for requirements. (QUESTION 6a)

**Response:** The energized work decision tool will be used to determine PPE and hazard analysis requirements. Prior to PPE use, workers will receive site-specific PPE training.

7. 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.

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

**Response:** As needed, personnel will contact the ES&H Coordinator for additional information on equipment inspections or to identify an authorized equipment inspector.

## 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 C2a(1), 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			
LTO220	ANNUAL LOCKOUT/TAGOUT (LOTO) ROLES & RESPONSIBILITIES FOR AUTHORIZED WORKERS		1	No
	Required by: QUESTION C3a(1)a			
MCH200	HAND AND POWER TOOL SAFETY	unless OJT	--	Yes
	Required by: QUESTION 7b			
NANO101	NANOTECHNOLOGY SAFETY AWARENESS TRAINING		3	No
	Required by: QUESTION 5c			
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			

### 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.ENV.6, "Control Discharges to the Sanitary Sewer System" (QUESTION 15a(1))
- 15:** Corporate Procedure: ESH100.2.FP.1, "Manage Fire Protection Requirements" (QUESTION 5g)
- 16:** Corporate Procedure: ESH100.2.IH.13, "Work with Injurious Corrosive Materials and Manage Safety Shower and Eyewash Use" (QUESTION 5e)
- 17:** Corporate Procedure: ESH100.2.IH.15, "Control Hazards Using Local Exhaust Ventilation and High Efficiency Particulate Air Filters" (QUESTION C1)
- 18:** Corporate Procedure: ESH100.2.IH.16, "Evaluate and Control Unbound Engineered Nanoscale Particles" (QUESTION 5c)
- 19:** Corporate Procedure: ESH100.2.IH.20, "Maintain an Accurate Chemical and Biological Material Inventory" (QUESTION 5)
- 20:** Corporate Procedure: ESH100.2.IH.4, "Evaluate and Control Chemical Hazards" (QUESTION 5)
- 21:** Corporate Procedure: ESH100.2.IS.10, "Manage Industrial Machine and Portable Power Tool Safety" (QUESTION 7b)
- 22:** Corporate Procedure: ESH100.2.IS.2, "Control Hazardous Energy (Lockout/Tagout)" (QUESTION C3a(1)a)
- 23:** Corporate Procedure: ESH100.2.IS.8, "Assess Workplace Hazards and Provide and Maintain Personal Protective Equipment" (QUESTION C2a(1))
- 24:** MN471000, Pressure Safety Manual, Chapter 2, "The Pressure Safety Program" (QUESTION 10a)
- 25:** MN471000, Pressure Safety Manual, Chapter 6, "Testing and Evaluating Pressure Systems" (QUESTION 10f)
- 26:** MN471000, Pressure Safety Manual, Chapter 7, "Verifying the Safe Operation of Pressure Systems" (QUESTION 10f)

- 27:** MN471000, Pressure Safety Manual, Chapter 8, "Servicing Pressure Vessels and Components" (QUESTION 10f)
  
- 28:** MN471000, Pressure Safety Manual, Chapter 9, "Documenting the Operational Safety of Pressure Systems" (QUESTION 10d)
  
- 29:** MN471004, Electrical Safety Manual, Section 2.10, "Electrical Personal Protective Equipment" (QUESTION 6a)
  
- 30:** MN471004, Electrical Safety Manual, Section 2.2, "Qualifications and Training" (QUESTION 6a(2))
  
- 31:** MN471004, Electrical Safety Manual, Section 4.3, "Safe Work Practices" (QUESTION 6d(1))
  
- 32:** Corporate Procedure: ESH100.2.ELC.1, "Manage Electrical Hazards" (general corporate business process)
  
- 33:** Corporate Procedure: ESH100.2.IH.12, "Control Food and Beverage Consumption in Hazardous Areas" (general corporate business process)
  
- 34:** Corporate Procedure: ESH100.2.IH.17, "Address Indoor Air Quality Concerns" (general corporate business process)
  
- 35:** Corporate Procedure: ESH100.2.IH.21, "Control Ergonomics Hazards" (general corporate business process)
  
- 36:** Corporate Procedure: ESH100.2.IS.11, "Implement Housekeeping Safety" (general corporate business process)
  
- 37:** Corporate Procedure: ESH100.2.IS.7, "Implement Traffic Safety" (general corporate business process)
  
- 38:** Corporate Procedure: ESH100.3.1, "Prepare for and Manage Emergencies" (general corporate business process)
  
- 39:** Corporate Procedure: ESH100.4.RPT.2, "Report Injuries and Illnesses" (general corporate business process)
  
- 40:** Corporate Procedure: ESH100.5.RPT.5, "Report Vehicle Accidents and Property Damage" (general corporate business process)
  
- 41:** MN471001 - ES&H Manual, Section 4B, "Electrical Safety Practices" (general corporate business process)
  
- 42:** MN471001 - ES&H Manual, Section 4K, "Traffic Safety" (general corporate business process)
  
- 43:** MN471001, ES&H Manual, Section 21, "Technical Work Documents (TWDs)" (general corporate business process)

VI. Related Documents
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Permits
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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
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Document Title	Number	Project End Date
CINT room 1511 - Integration Lab Parts Clean room	SNA08-0179	
CINT Bldg. 518/1527 Installation and Operation of Atomic Layer Deposition (ALD) Reactor	SNA10-0098	03/15/2015

Other Documents
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Document Title	Number	Type	Published Date
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	<b>Radiation-Generating Devices (RGDs):</b> Is there a radiation-generating device (RGD)? (Answer this question "no" if the RGDs are registered in storage.)	No
2	<b>Radioactive Materials:</b> Is radioactive material present?	No
3	<b>Explosives and Ammunition:</b> Are any explosives or ammunition (including explosive waste) managed, handled, processed, used, or stored?	No
4	<b>Lasers:</b> 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	<b>Chemicals: (Review the Help text before answering this question.)</b> 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
Notes: ER2007-2689		
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"> <li>- Hazardous waste cleanup operations (e.g., environmental restoration [ER] sites)</li> <li>- Treatment, storage, and disposal (TSD) facilities</li> <li>- Emergency response</li> </ul>	No
5c	Will activities have, use, synthesize, or liberate unbound engineered nanoscale particles (UNP)?	Yes
5d	<b>(Review the help text before answering this question.)</b> Do the activities involve storage or utilization of simple asphyxiants?	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?	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

Questions	Answers
5h Do activities involve any of the following? <ul style="list-style-type: none"> <li>- 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</li> <li>- Equipment connected to a house system for flammable gases</li> <li>- 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</li> <li>- 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</li> <li>- Pyrophoric chemicals in total quantities greater than 500g</li> <li>- Metal powders in quantities greater than 1 kg</li> </ul>	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 <b>(Refer to help file to determine if quantities have been exceeded.)</b> Do the activities use or store hazardous chemicals in quantities equal to or greater than the <b>Emergency Management screening threshold</b> quantities?	No
6 <b>Electrical:</b> Do workers conduct any of the following tasks? <ul style="list-style-type: none"> <li>- 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?</li> <li>- Operate circuit breakers or disconnect switches operating at or above 50 Volts and 5 mA or more?</li> <li>- 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?</li> <li>- Use Equipment that <b>operates at 50 Volts or more</b> and is <b>not listed</b> by an OSHA approved Nationally Recognized Testing Laboratory (e.g., UL) and operating at over 50 Volts, including extension cords and power strips?</li> </ul>	Yes
6a Do workers work on or near <b>(within the limited approach boundary - 3.5 feet)</b> exposed and <b>(greater than or equal to 50 volts)</b> energized electrical circuits or contact energized electrical circuit parts with tools or test probes?	Yes
6a(1) Are <b>circuit parts</b> storing 10 Joules or more, associated with <b>Marx generators or pulsed power circuits</b> ?	No
6a(2) Are <b>circuit parts</b> associated with <b>facility type electrical distribution systems</b> ?	No
6b Do workers operate <b>circuit breakers</b> or <b>disconnect switches</b> operating at <b>50 Volts or more</b> and <b>5 mA or more</b> ?	Yes
6c Do workers <b>perform non electrical work</b> , but <b>might contact exposed and energized electrical circuits - operating at 50 volts or more</b> - with equipment or materials, such as ladders, cranes, paint-roller extensions, or forklifts?	No
6d Do workers <b>use equipment</b> that operates at 50 Volts or more and is <b>not listed</b> by an OSHA-approved Nationally Recognized Testing Laboratory (e.g., UL), including extension cords and power strips?	Yes

Questions	Answers
6d(1) Have all of the non-NRTL approved electrical equipment or appliances been approved and documented using the Sandia non-NRTL-evaluation process?	No
7 <b>Mechanical:</b> Does the facility or activity involve any of the following hazards or activities?	Yes
<ul style="list-style-type: none"> <li>- machine shop equipment</li> <li>- portable power tools</li> <li>- powder-actuated tools</li> <li>- centrifuge operations</li> <li>- forklifts</li> <li>- motorized hand trucks</li> <li>- cranes/hoists, miscellaneous lifting devices,</li> <li>- industrial robots or industrial robotic systems</li> <li>- operate light or heavy earth-moving equipment</li> <li>- excavations</li> <li>- trenches</li> <li>- floor or wall penetrations</li> <li>- stored or kinetic mechanical energy that could cause an injury during normal working conditions</li> </ul>	
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:	No
<ul style="list-style-type: none"> <li>- Excavations</li> </ul>	
<ul style="list-style-type: none"> <li>- Trenches</li> </ul>	
<ul style="list-style-type: none"> <li>- Floor or Wall Penetrations</li> </ul>	
7k Do activities involve stored or kinetic mechanical energy that could cause an injury under normal working conditions?	No
8 <b>Nonionizing Radiation:</b> At any time, do activities produce nonionizing radiation (NIR) (excluding lasers)?	No
9 <b>Thermal:</b> Do thermal hazards or thermal stressors exist in the work area? Please review the definition of thermal stressors before answering this question.	No

Questions	Answers
10 <b>Pressure:</b> 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?	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? <b>Note:</b> 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 <b>Noise:</b> At any time, do sources of noise hazards exist during activities covered by this PHS?	No
12 <b>Miscellaneous Hazards:</b> Does the facility or activity involve any of the following hazards or activities?	No
<ul style="list-style-type: none"> <li>- Ergonomic or musculoskeletal stressors</li> <li>- Construction-like activities</li> <li>- Work with and around asbestos</li> <li>- Elevated work</li> <li>- Underwater diving</li> <li>- Animals and Hazardous Plants</li> <li>- Aircraft</li> <li>- Airborne objects</li> <li>- Firearms</li> <li>- Use of human subjects</li> <li>- Use of Sealed Drum(s)</li> </ul>	
13 <b>Outside of Manufacturer's Recommendations:</b> Does this work involve the use of <b>equipment, tools, or materials</b> 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 <b>Non-Commercial Hazards:</b> 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 <b>enter each</b> noncommercial piece of equipment into the hazard table.	No
15 <b>Environmental Concerns:</b> Are there any potential <b>environmental concerns</b> 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
Base Waste (Liquids)	Hazardous Waste	4 gal/yr
	Location: Site: SSTP, Area: No Tech Area, Building: 518, Room: 1511 Location Details: Base Bench Comments: Comments: Base waste generated in 1511 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 (Solid)	Hazardous Waste	10 kg/yr
	Location: Site: SSTP, Area: No Tech Area, Building: 518, Room: 1511 Location Details: 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	10 gal/yr
	Location: Site: SSTP, Area: No Tech Area, Building: 518, Room: 1511 Location Details: Solvent Bench Comments: All solvent waste generated in 1511 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	10 kg/yr
	Location: Site: SSTP, Area: No Tech Area, Building: 518, Room: 1511 Location Details: 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	<b>Wastewater:</b> Are there any wastewater discharges from this activity?	Yes
15a(1)	<b>General Discharges:</b> Are the wastewater discharges of a general nature, such as the washing and rinsing of laboratory glassware and/or process components?	Yes
15a(2)	<b>Categorical Processes:</b> Are the wastewater discharges from a categorical process or does the activity contain a zero discharge categorical process?	No
15a(3)	Will this activity use more than 1,000 gallons of water per day?	No
15b	<b>Air:</b> Are there any air discharges or emissions at this activity?	Yes
15b(1)	<b>Ozone Depleting Substance (ODS):</b> Are there any <b>ODSs</b> at this activity?	No
15b(2)	Will this activity include the installation and or use of <b>combustion equipment</b> ? 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 <b>soil disturbance, building demolition, or construction</b> that <b>disturbs soil</b> , including access roads and staging areas?	No
15b(5)	<b>Radionuclide NESHAP:</b> Are there any <b>radionuclide air discharges</b> or use of radionuclides in gaseous form or at elevated temperatures from this activity?	No
15c	<b>Radioactive Waste:</b> Will this activity generate any radioactive waste, or will Members of the Workforce be required to handle radioactive waste?	No

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

Questions	Answers
<p>20 <b>Beryllium:</b> Do operations include any activities that? <i>(Review the Help text before answering this question)</i></p> <ul style="list-style-type: none"> <li>- Use or handle beryllium, beryllium-containing alloys or beryllium oxides?</li> <li>- Create or work with <b>beryllium ceramics</b>?</li> <li>- Handle waste potentially-contaminated with beryllium or waste containing beryllium?</li> <li>- Perform <b>decontamination</b> of beryllium contamination?</li> <li>- Entail work in a beryllium contaminated building or area?</li> <li>- Apply abrasive or destructive methods to metal objects, articles, weapon components or bar stock, potentially containing beryllium?</li> <li>- Use non sparking tools containing beryllium?</li> </ul>	No
<p>21 <b>Offsite Work:</b> Does this PHS involve any of the following?</p> <ul style="list-style-type: none"> <li>- Work at <b>non</b>-Sandia-controlled premises</li> <li>- Work locations <b>other than</b> KAFB, SNL/CA, or TTR</li> <li>- Sandia supplying non-commercial equipment or hazardous material for use by <b>non</b>-Members of the Workforce at <b>non</b>-Sandia-controlled premises <b>or</b> locations <b>other than</b> KAFB, SNL/CA, or TTR.</li> </ul>	Yes
<p>21a Are there any activities at the facility that are <b>not</b> 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 <b>non</b>-Sandia-controlled premises <b>or</b> locations <b>other than</b> 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"> <li>- radiation generating devices (question 1)</li> <li>- radioactive materials (question 2)</li> <li>- explosives (question 3)</li> <li>- lasers in navigable air space or affecting other operations (question 4b)</li> <li>- HAZWOPER operations (question 5b)</li> <li>- unbound engineered nanoparticles (question 5c)</li> <li>- newly developed chemical substance (question 5f)</li> <li>- chemical physical hazards (question 5h)</li> <li>- &gt;25% PSM quantities (question 5i)</li> <li>- toxic gases (question 5j)</li> <li>- &gt;Emergency Management screening quantities (question 5k)</li> <li>- personnel overexposure to nonionizing radiation (question 8a(1))</li> <li>- public overexposure to nonionizing radiation (question 8b(1))</li> <li>- non-routine aircraft (question 12g(1))</li> <li>- airborne objects other than aircraft (e.g., projectiles, fragments) (question 12h)</li> <li>- firearms (question 12i)</li> <li>- 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"> <li>- non-commercial equipment with the potential to cause injury to co-located workers or public (see question 14b)</li> <li>- biological agents BSL-2 or higher</li> </ul> </li> </ul>	Yes
<p>21b(1) Has the SNL Safety Basis Department determined a hazard classification for these activities?</p>	Yes

	Questions	Answers
21b(1)a	What hazard classification was determined by the SNL Safety Basis Department?	Low
21c	Does Sandia supply any of the following for use by <b>non</b> -Members of the Workforce on <b>non</b> -Sandia-controlled premises <b>or</b> locations <b>other than</b> 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"> <li>- radiation generating devices</li> <li>- radioactive material</li> <li>- explosives</li> <li>- Class 3b or Class 4 lasers where beam will be used outside</li> <li>- chemicals</li> <li>- aircraft</li> <li>- projectiles or objects that could become airborne as a result of the work</li> <li>- nonionizing radiation transmitters other than hand-held radios or Local Area Network (LAN) equipment.</li> <li>- equipment used outside of manufacturer recommendations, including modified equipment</li> <li>- non-commercial equipment, including custom-built equipment</li> <li>- biological agents BSL-2 or higher</li> </ul>	No
21d	Do these activities involve foreign travel?	No
22	<b>Roving Personnel:</b> 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	<b>Emergency Response:</b> Do activities include ES&H emergency response operations, (e.g., NEST, ARG, Hazmat, Medical)?	No
24	<b>Other Hazards:</b> Do the activities have important hazards not specifically identified elsewhere in this PHS?	No

## Controls Worksheet

	Questions	Answers
C1	<b>Local Exhaust Ventilation:</b> 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	<b>Personal Protective Equipment:</b> 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
C2a(2)	Does the workplace hazard assessment allow voluntary use of respiratory protection?	No

Questions	Answers
C3 <b>Control of Hazardous Energy (LOTO):</b> Do you have <b>any equipment</b> in your operations that requires any of the following activities?	Yes
<ul style="list-style-type: none"> <li>- Construction</li> <li>- Installation</li> <li>- Setup</li> <li>- Adjustment</li> <li>- Inspection</li> <li>- Modification</li> <li>- Maintenance</li> <li>- Service</li> <li>- Lubrication</li> <li>- Cleaning</li> <li>- Unjamming</li> <li>- Making adjustments or tool changes</li> </ul>	
C3a While performing the servicing and maintenance activities identified above, is there potential for injury from the unexpected energization or start up of the machines, equipment, or process from a release of stored energy?	Yes
C3a(1) Will service or maintenance be done on a machine, equipment, or a process by the Members of the Workforce <b>within your organization</b> ?	Yes
C3a(1)a Will <b>ALL</b> service or maintenance be done on a machine, equipment, or a process by the Members of the Workforce <b>within your organization</b> ?	No
C3a(1)b During the service or maintenance can all the equipment be <b>controlled by cord and plug</b> ?	Yes
C3b Are there <b>any</b> activities where <b>control</b> of hazardous energy sources is <b>only necessary</b> for <b>protection of configuration, equipment, or property</b> (i.e., not for personnel protection)?	No
C4 <b>NEPA Compliance:</b> 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 <b>Activity-Level PHS:</b> 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
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Hazard Analysis
Source Name or Question: <b>Question 6d(1)</b>
Source Reason: <b>Electrical equipment operating at 50V or greater that is not NRTL-approved</b>
Hazardous Condition: <b>Electrocution/Arcs/Fires</b>

**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: <b>Question 21b(1)a</b>
Source Reason: <b>Low-Level Offsite Hazardous Work Condition</b>
Hazardous Condition: <b>Potential for worker and co-located worker exposure</b>

**PHS Identified 'Low' Hazard.**

**Author's Comment:**

**Cause:** System/Component/Equipment Failure

Short circuit to neutral or ground.

**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.

**Note:** 20 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 5a - ER2007-2689

### Notes from Controls Questions

### User Entered Hazard Tables

Environmental Concerns Hazards		
Source Name	Type	Est. Quantity
Base Waste (Liquids)	Hazardous Waste	4 gal/yr
	Location: Site: SSTP, Area: No Tech Area, Building: 518, Room: 1511 Location Details: Base Bench Comments: Comments: Base waste generated in 1511 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 (Solid)	Hazardous Waste	10 kg/yr
	Location: Site: SSTP, Area: No Tech Area, Building: 518, Room: 1511 Location Details: 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	10 gal/yr
	Location: Site: SSTP, Area: No Tech Area, Building: 518, Room: 1511 Location Details: Solvent Bench Comments: All solvent waste generated in 1511 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	10 kg/yr
	Location: Site: SSTP, Area: No Tech Area, Building: 518, Room: 1511 Location Details: 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.	

## Assigned Reviewers

Review Type	Role	Person	Required/Requested
Author	ISMS_AUTHOR	Nogan,John	Required Review, due to: QUESTION 0
	Comment: Annual review. Information added to the description is based on the approval of NEPA SNA10-0459 allowing GaAs (Gallium Arsenide) processing on the dicing saw and lapping tool. Other than that no significant changes were made to this document.		
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 07132011] IFSB review Q#21b for MOW activities performed at locations other than "KAFB, SNL/CA, or TTR" for offsite CINT location with activities involving nanoparticles identified as low risk per IH. Author should provided more detail on nanoparticle hazard in Q#5c notes and nanoparticle hazard in Q#21b notes.		
ES&H Coordinator	ISMS_ESH_Coordinator	Davis,M. Wayne	Required Review by business rule.
Safety Basis Manager	ISMS_RiskManagerA	Costanzo,Jessica Amoret	Required Review by business rule.
	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 21b(1)a) Hazards encountered while conducting work 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 5) Potential personnel exposure to chemicals & fire protection regulatory requirements

(QUESTION 5c) Unbound Engineered Nanoscale Particles(UNP); Potential inhalation and dermal exposure to UNP.

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

(QUESTION 5g) Fire/Explosion Hazard

(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 10) Injury or damage

(QUESTION 15) Potential for regulatory action

(QUESTION 15a) Potential to exceed permitted quantities

(QUESTION 15a(1)) Potential to exceed permitted amounts

(QUESTION 15b) Potential to emit regulated contaminants

(QUESTION 15d) Potential for regulatory action

(QUESTION 21a) Hazards associated with the site's other activities

(QUESTION 21d) Hazards associated with domestic travel

(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)

CHM103: SITE-SPECIFIC CHEMICAL SAFETY TRAINING (QUESTION C2a(1))

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)

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

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

NANO101: NANOTECHNOLOGY SAFETY AWARENESS TRAINING (QUESTION 5c)

PPE106: PERSONAL PROTECTIVE EQUIPMENT TRAINING (QUESTION C2a(1))

PRS150: PRESSURE SAFETY ORIENTATION (QUESTION 10a)

PRS150R: PRESSURE SAFETY ORIENTATION REFRESHER (QUESTION 10a)

## 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 5 answered: Y; Q 5c answered: Y; Q 5e answered: Y; Q 5g 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 10 answered: Y; Q 10a answered: Y; Q 10d answered: Y; Q 10e answered: Y;  
Q 10f answered: Y; Q 15 answered: Y; Q 15a answered: Y; Q 15a(1) answered: Y; Q 15b answered: Y;  
Q 15d answered: Y; Q 21a answered: N; Q 21b(1) answered: Y; Q 21b(1)a answered: Low; Q 21d answered: N;  
Q C1 answered: Y; Q C2 answered: Y; Q C2a(1) answered: Y; Q C3 answered: Y; Q C3a(1)a answered: N;  
Q C3a(1)b answered: Y; Q C4 answered: Y;

## X. Emergency Operations Concerns

Pressure

Environmental Concerns

Chemical

Energized Electrical

Energized Mechanical