

List of guidelines that NJIT follows to ensure health and safety at work place

I. Helpful Links:

- a. NJ Worker and Community Right to Know Act (DOH-Public Employers)
  - i. <https://www.nj.gov/health/workplacehealthandsafety/documents/right-to-know/rtkact.pdf>
- b. NJ Worker and Community Right to Know Act (DEP-Private Employers)
  - i. <https://www.nj.gov/dep/enforcement/crtk.html>
- c. Federal OSHA Hazard Communication Standard (Private Employers)
  - i. <https://www.osha.gov/laws-regs/regulations/standardnumber/1910/1910.1200>
- d. NJ PEOSH Hazard Communication (Public Employers)
  - i. <https://www.state.nj.us/health/workplacehealthandsafety/documents/peosh/hcsguide.pdf>
- e. Federal OSHA Occupational Exposure to Hazardous Chemicals in Laboratories (Private Employers)
  - i. <https://www.osha.gov/laws-regs/regulations/standardnumber/1910/1910.1450>
- f. NJ PEOSH Occupational Exposure to Hazardous Chemicals in Laboratories (Public Employers)
  - i. <https://www.nj.gov/health/workplacehealthandsafety/peosh/peosh-health-standards/lab.shtml>
- g. Federal EPA Resource Conservation and Recovery Act
  - i. <https://www.ecfr.gov/current/title-40/chapter-I/subchapter-I/part-262>
  - ii. [https://www.epa.gov/sites/default/files/2019-10/documents/10008\\_managingyourhazwaste\\_508pdf\\_october\\_16\\_2019.pdf](https://www.epa.gov/sites/default/files/2019-10/documents/10008_managingyourhazwaste_508pdf_october_16_2019.pdf)
- h. NJ DEP Resource Conservation and Recovery Act
  - i. <https://www.nj.gov/dep/enforcement/hw.html>
- i. Federal OSHA Bloodborne Pathogens Standard
  - i. <https://www.osha.gov/laws-regs/regulations/standardnumber/1910/1910.1030>
- j. NJ PEOSH Bloodborne Pathogen Standard
  - i. <https://www.nj.gov/health/workplacehealthandsafety/peosh/peosh-health-standards/bbp.shtml>
- k. NJ DEP Regulated Medical Waste Management
  - i. <https://www.nj.gov/dep/dshw/rntp/rmw/generatorfact.pdf>
  - ii. [https://www.nj.gov/dep/dshw/resource/rules\\_docs/26%20CHAPTER%203A.pdf](https://www.nj.gov/dep/dshw/resource/rules_docs/26%20CHAPTER%203A.pdf)
- l. CDC/NIH Guidelines: Biosafety in Microbiological and Biomedical Laboratories (BMBL 6<sup>th</sup> Addition)
  - i. [https://www.cdc.gov/labs/pdf/SF\\_19\\_308133-A\\_BMBL6\\_00-BOOK-WEB-final-3.pdf](https://www.cdc.gov/labs/pdf/SF_19_308133-A_BMBL6_00-BOOK-WEB-final-3.pdf)
- m. NIH Guidelines for Research Involving Recombinant or Synthetic DNA Molecules (April, 2019)
  - i. [https://osp.od.nih.gov/wp-content/uploads/NIH\\_Guidelines.pdf](https://osp.od.nih.gov/wp-content/uploads/NIH_Guidelines.pdf)

- n. Hazardous Materials Transport (US DOT)
  - i. <https://www.fmcsa.dot.gov/regulations/hazardous-materials/how-comply-federal-hazardous-materials-regulations>
- o. Clean Air Act (US EPA and NJ DEP)
  - i. <https://www.epa.gov/clean-air-act-overview/clean-air-act-requirements-and-history>
  - ii. <https://www.nj.gov/dep/dag/>
- p. Clean Water Act (US EPA)
  - i. <https://www.epa.gov/laws-regulations/summary-clean-water-act>
- q. FIFRA – Federal Insecticide, Fungicide, and Rodenticide Act (US EPA)
  - i. [https://www.epa.gov/laws-regulations/summary-federal-insecticide-fungicide-and-rodenticide-act#:~:text=The%20Federal%20Insecticide%2C%20Fungicide%2C%20and%20Rodenticide%20Act%20\(FIFRA\),registered%20\(licensed\)%20by%20EPA](https://www.epa.gov/laws-regulations/summary-federal-insecticide-fungicide-and-rodenticide-act#:~:text=The%20Federal%20Insecticide%2C%20Fungicide%2C%20and%20Rodenticide%20Act%20(FIFRA),registered%20(licensed)%20by%20EPA)
- r. SARA, EPCRA, and CERCLA (US EPA)
  - i. <https://www.epa.gov/laws-regulations/summary-emergency-planning-community-right-know-act>
  - ii. <https://www.epa.gov/epcra>
- s. Biosecurity and Dual Use Research of Concern
  - i. <https://www.nih.gov/sites/default/files/research-training/usg-safety-factsheet-2014.pdf>
  - ii. <https://www.phe.gov/s3/dualuse/Documents/durc-policy.pdf>
- t. Select Agents and Toxins
  - i. <https://www.selectagents.gov/>
  - ii. <https://www.cdc.gov/cpr/dsat/index.htm>
- u. USDA Plant and Animal Cell Lines
  - i. [https://www.utmb.edu/ehs/biosafety/shipping-request/a-guide-to-biological-materials-permits/usda-animal-and-plant-health-inspection-service-\(aphis\)-permits](https://www.utmb.edu/ehs/biosafety/shipping-request/a-guide-to-biological-materials-permits/usda-animal-and-plant-health-inspection-service-(aphis)-permits)
- v. International Air Transport Association (IATA)
  - i. <https://www.iata.org/en/training/subject-areas/dangerous-goods-regulations-courses/>
  - ii. <https://about.citiprogram.org/course/shipping-and-transport-of-regulated-biological-materials/>
- w. Radiation Safety
  - i. <https://www.state.nj.us/dep/rpp/rms/rmsagree-1.htm>
  - ii. <https://www.state.nj.us/dep/rpp/xrm/index.htm>
  - iii. <https://www.state.nj.us/dep/rpp/njacdown.html>
- x. The NJ Department of Community Affairs, Division of Fire Safety, Bureau of Fire Code Enforcement
  - i. <https://www.nj.gov/dca/divisions/dfs/offices/>
  - ii. <https://up.codes/viewer/new-jersey/ifc-2015>
- y. Federal OSHA Occupational Noise Exposure (hearing conservation)

- i. <https://www.osha.gov/laws-regs/regulations/standardnumber/1910/1910.95>
- z. Federal OSHA Respiratory Protection Standard
  - i. <https://www.osha.gov/laws-regs/regulations/standardnumber/1910/1910.134>
- aa. Federal OSHA Personal Protective Equipment (PPE)
  - i. <https://www.osha.gov/laws-regs/regulations/standardnumber/1910/1910.132> (general)
  - ii. <https://www.osha.gov/laws-regs/regulations/standardnumber/1910/1910.133> (eye and face)
  - iii. <https://www.osha.gov/laws-regs/regulations/standardnumber/1910/1910.135> (head)
  - iv. <https://www.osha.gov/laws-regs/regulations/standardnumber/1910/1910.136> (foot)
  - v. <https://www.osha.gov/laws-regs/regulations/standardnumber/1910/1910.138> (hand)
- bb. Federal OSHA Safety and Health Standards (29 CFR 1910)
  - i. <https://www.ecfr.gov/current/title-29/subtitle-B/chapter-XVII/part-1910?toc=1>



## Standard Operating Procedures for Assessment, Prevention and Control of Occupational and Environmental Impacts

### 1.0 Purpose of the Standard Operating Procedures

- 1.1 The table below lists the Standard Operating Procedures (SOPs) for university operations. These SOPs describe the NJIT process for assessing operations, for preventing and controlling releases, for ensuring safe practices and environmental protection and for maintaining compliance with statutory and regulatory requirements. The SOPs are distinct from but are as equally important as the 13 USEMS Guidelines which deal more with the overall management process of the USEMS. The document control numbers for each SOP are shown below in the table.

<b>NJIT Standard Operating Procedures</b>	
	<b>ENVIRONMENT</b>
<b>SOP E 4 - 1</b>	Air Pollution Compliance
<b>SOP E 4- 2</b>	Wastewater / Storm water Discharge Compliance
<b>SOP E 4- 3</b>	Asbestos Management Compliance
<b>SOP E 4- 4</b>	Drinking Water Compliance
<b>SOP E 4- 5</b>	Pesticide Management Compliance
<b>SOP E 4- 6</b>	Spill Prevention Control and Countermeasure Compliance
<b>SOP E 4- 7</b>	Hazardous Waste Management Compliance
<b>SOP E 4- 8</b>	Satellite Accumulation Areas
<b>SOP E 4- 9</b>	Community Right-to-Know Compliance

<b>NJIT Standard Operating Procedures</b>	
<b>SOP E 4- 10</b>	Universal Waste Management Compliance
<b>SOP E 4- 11</b>	Infectious Waste Management Compliance
<b>SOP E 4-12</b>	Indoor Air Quality

<b>NJIT Standard Operating Procedures</b>	
	<b>OCCUPATIONAL SAFETY</b>
<b>SOP S 4- 1</b>	Emergency Action Plans
<b>SOP S 4- 2</b>	Employee Hazard Communication
<b>SOP S 4- 3</b>	Laboratory Chemical Hygiene Plan
<b>SOP S 4- 4</b>	Personal Protective Equipment
<b>SOP S 4- 5</b>	Confined Space Entry
<b>SOP S 4- 6</b>	Bloodborne Pathogens
<b>SOP S 4- 7</b>	Control of Hazardous Energy (Lockout / Tagout)
<b>SOP S 4- 8</b>	Respiratory Protection
<b>SOP S 4- 9</b>	Fire Prevention Plan and Alarm Systems
<b>SOP S 4-10</b>	Hearing Conservation (Noise)
<b>SOP S 4-11</b>	Control Plan for Toxic and Hazardous Substances
<b>SOP S 4-12</b>	Formaldehyde Exposure Control Plan
<b>SOP S 4-13</b>	Lead Control Plan
<b>SOP S 4-14</b>	Benzene Control Plan
<b>SOP S 4-15</b>	Methylene Chloride Control Plan
<b>SOP S 4-16</b>	Cadmium Control Plan
<b>SOP S 4-17</b>	Asbestos Control Plan
<b>SOP S 4-18</b>	Welding, Cutting and Burning Control Plan


<b>NJIT Standard Operating Procedures</b>	
<b>SOP S 4-19</b>	Portable Power Tools
<b>SOP S-4-20</b>	Industrial Powered Vehicles
<b>SOP S 4-21</b>	Laser Safety
<b>Sop S 4-22</b>	Radiation Safety
<b>Sop S 4-23</b>	Electricity Safety
<b>SOP C 4-1</b>	Onsite Vendor / Contractor Environmental Compliance

1.2 Each SOP focuses on a specific safety or environmental compliance area that is impacted or potentially is impacted by operations and activities on the campus based on the safety and environmental aspects and impacts analysis.. The SOPs will be reviewed and modified as necessary. The USEMS manager will be responsible to keep the SOPs current in concert with USEMS team members as an USEMS control document.

## 2.0 Format and Content of the SOPs

2.1 Each SOP includes the sections shown below. A separate USEMS document control number is assigned to each SOP. A space for the effective date of the SOP is also provided to ensure that all staff are using the latest version of the document.

<b>Format and Content of SOPs</b>	
	<b>Purpose and Scope</b> - Description of the safety or environmental compliance issues included in the SOP and the scope of the requirements addressed.
	<b>Responsibilities</b> - Specifies departments and functions on the campus responsible for complying with the SOP requirements.
	<b>Assessment, Prevention &amp; Control Procedures</b> - Documents specific action steps required by regulations and other requirements to maintain compliance with the applicable safety or environmental area.
	<b>Record &amp; Documentation Retention</b> - Lists the specific documents and records that must be maintained to demonstrate compliance with the applicable safety or environmental area.
	<b>Regulatory &amp; Statutory Requirements</b> - Lists the key PEOSHA USEPA, state and local regulatory citations applicable to the safety or environmental area.

	UNIVERSITY SAFETY ENVIRONMENTAL MANAGEMENT SYSTEM University Heights Newark, New Jersey 07102	
		<b>Document Control No.</b> <b>USEMS SOP E - 4 - 1</b>
<b>Document Title: Air Pollution Compliance</b>		

## 1.0 Purpose and Scope

- 1.1 The purpose of this SOP is to establish the applicable regulatory requirements, accountabilities and responsibilities and procedures necessary to maintain compliance at NJIT with EPA and NJDEP regulations governing the control of air pollution.
- 1.2 The scope of this SOP includes the heating boilers and the diesel engine powered emergency generators on the NJIT campus listed on attachments 4-1-A and 4-1-B. It also includes the chillers and air conditioning systems on the campus that contain refrigerant (CFC's and HCFC'S) listed on Attachment 4-1-C.
- 1.3 NJIT's General Permits specify several conditions which require operational limitations, monitoring, testing, recordkeeping and reporting to NJDEP. This SOP provides procedural guidance to maintain compliance with the NJIT's General Permit conditions in NJAC 7:27-8.13. It also specifies procedures for management of refrigerant (CFC's and HCFC's) in the chillers and air conditioning systems on the campus regulated under EPA's regulations in 40CFR82

## 2.0 Responsibilities

- 2.1 The Director of Environmental Affairs in concert with the Director of Technical Services in the Physical Plant Department is responsible to keep this SOP current in light of new or changing regulatory requirements or changes in operations at NJIT that affect air pollution compliance.
- 2.2 The Director of Environmental Affairs is responsible to prepare any required reports of non-compliance as specified in the NJDEP General Permits and ensure that they are submitted to NJDEP Regional Enforcement Office.
- 2.3 The Executive Director of Technical Services is responsible to submit air permit registration renewal applications six months prior to the expiration of the current air permits. . He is responsible to submit in concert with the Manager Heating Ventilation Air Conditioning (HVAC), applications for permit modifications when operational changes at NJIT occur necessitating the air permit modifications.
- 2.4 The Manager HVAC is responsible to inform the Director of Environmental Affairs when any planned operational changes are expected to occur that may have an impact on the air emission sources at NJIT.
- 2.5 The Manager of HVAC is responsible to oversee the activities of the physical plant staff or any other contractor used for performance testing or maintenance of the heating boilers on the campus and to maintain the required records and documents specified in Section 4.0 of this SOP.
- 2.6 Associate Vice President for Facilities Management is responsible to certify and sign all General Permit applications as the NJIT responsible official as required by NJDEP regulation NJAC 7:27-1.4.

- 2.7 The Director of Environmental Affairs is responsible to provide competency training for all staff in the physical plant department on the NJIT General Permit conditions and the procedures to maintain compliance with the permit requirements.

### **3.0 Assessments, Prevention and Control Procedure**

- 3.1 NJIT operates natural gas fired boilers on the campus some of which are also designed to be oil fired. The boilers are used for heating in various buildings on the campus. There are also oil fired and gas fired emergency generators on the campus. All of these air emission sources will be accounted for with regard to NJDEP General Permit regulations as specified in NJAC7:27-8.3. The Manager HVAC will keep attachment 1-1 current with accurate information on the air emission sources on the NJIT campus.

Any changes to the size, location, fuel or operating heat input ratings to any of the emission units will be reported to NJDEP, Air Quality Regional Enforcement Office by the Executive Director of Technical Services.

- 3.2 The Director of Environmental Affairs will assist the Manager HVAC with any planned construction, alteration, retrofit or modification of any emission units on the campus. The Director of Environmental Affairs will consult with NJDEP Air Quality Management branch before submitting an application for the proposed modifications.

- 3.3 The Manager HVAC will maintain a written inventory of chillers or air conditioning systems on the campus and the amount of normal refrigerant charge in each system. For each system containing more than 50 pounds of CFCs, a record of refrigerant added during repair or servicing of the equipment will be maintained.

Annual leak rate records and servicing and repair records will be maintained by the Manager HVAC for a period of 3 years for each system having over 50 pounds of normal refrigerant charge.

- 3.4 NJIT will use the services of qualified HVAC contractors for servicing, repair and maintenance of refrigerant containing equipment and systems on the campus. The Manager HVAC will retain current documentation of the EPA certified training for the HVAC contractor technicians working on NJIT equipment and systems.

The Manager HVAC will verify that the equipment used during maintenance, service, repair or disposal is EPA certified recycling or recovery equipment by observing the label on the CFC recovery equipment.

- 3.5 CFC containing appliances that are disposed of at NJIT will be purged of CFCs prior to disposal. The Manager HVAC will maintain a record verifying that the CFCs have been properly recovered or recycled.

- 3.6 The Manager HVAC and other designated facilities management staff will comply with the boiler emission limitations, standards and/or operational limitations specified in the Compliance Plan in the Boiler General Permits including:

- Visible emissions from the boilers will not occur except for a period of no more than 3 minutes in any consecutive 30 minute period.
- Only fuel oil with a sulfur content no greater than .2 percent by weight will be used to fuel the boilers on the campus.
- During all periods of operation, the boilers will not combust non-commercial fuels including crankcase oil, used oil, landfill or refinery gas or any type of waste materials

- 3.7 The Plant Engineer responsible for operation of the emergency generators on the campus will be accountable for compliance with the limitations ,and requirements specified in the Compliance Plan in the Emergency Generator General Permit including:

- Visible emissions will not exceed 20% opacity for a period more than 10 seconds. The diesel engine stack will be observed once each month if the generator is used for more than 2 continuous hours during the month.



- Compliance with annual emission limits for each contaminant will be based on the maximum fuel use limit or the maximum hours of operation limit as specified in the individual emergency generator General Permit.
- On each generator either a totalizing fuel flow meter or an hour of operation meter will be installed and operated to verify compliance with annual emission limits.
- The sulfur content of the fuel oil burned in the diesel engines will not exceed .2% sulfur by weight. For each fuel delivery the certificate of analysis from the oil distributor for fuel oil sulfur content will be reviewed before accepting the fuel.

3.8 The Manager HVAC is responsible to take corrective actions if any boiler or diesel engine exceeds the opacity limits specified above. If these measures fail to correct the visible emissions the Director of Environmental Affairs will report the incident to the NJDEP Regional Enforcement Office within three working days.

3.9 The Director of Environmental Affairs will be responsible to report any other non compliance with limits on sulfur content of the fuel oil, annual quantity of fuel burned or hours of operation as specified in NJIT's General Permits to the NJDEP Regional Enforcement Office in writing within three working days.

#### **4.0 Record and Document Retention**

4.1 The Executive Director of Technical Services will retain copies of the following records and documentation for a period of 5 years.

- A. General Permits for all boilers and emergency generators
- B. Records of any reports of non compliance to NJDEP
- C. Applications for General Permit renewals or modifications to NJDEP
- D. Records verifying technicians who work on CFC containing equipment are EPA certified technicians
- E. Records of written notification to EPA that the refrigerant recovery equipment used at NJIT is in conformance with EPA technical specifications.


4.2 The Manager HVAC will retain copies of the following records and documents for a period of 5 years.

- A. Records of maintenance, repair and servicing of all refrigeration equipment having over 50 pounds of CFC and annual leak rate records for each system.
- B. Records verifying technicians who work on CFC containing equipment are EPA certified technicians.
- C. Records for each shipment of No. 2 fuel oil with supplier certification verifying sulfur content does not exceed .2 percent by weight and the fuel oil complies with ASTM specifications for No. 2 fuel oil.
- D. Records that all stacks were observed by a trained technician at least once per month for visible emissions .The date and time of each observation will be recorded in a permanent bound log book or in a readily accessible computer file.
- E. For all emergency generators records on the fuel type, fuel oil sulfur content for each delivery and monthly amount of fuel burned or the monthly hours of operation will be maintained in either a permanent bound log book or in readily accessible computer files.
- F. For all boilers records verifying that only No.2 fuel oil or diesel are the only grades of fuel burned ,monthly amount of fuel burned, and sulfur content for each delivery of fuel oil will be maintained in either a permanent bound log book or in a readily accessible computer file.

#### **5.0 Regulatory and Statutory Requirements**

5.1 The governing regulations for the air emissions from the boilers and diesel engines on the NJIT campus are found in NJAC 7:27-8.13 The Director of Environmental Affairs will maintain current copies of these regulations and will make applicable changes to this SOP to reflect new or revised regulations.

5.2 EPA regulations on Protection of Stratospheric Ozone in 40 CFR Part 82 is also applicable at NJIT for the chillers and air conditioning systems that contain refrigerant CFC/HCFC's. The Director of Environmental Affairs will maintain current copies of these EPA regulations and will make applicable changes to this SOP to reflect new or revised regulations.

	UNIVERSITY SAFETY ENVIRONMENTAL MANAGEMENT SYSTEM University Heights Newark, New Jersey 07102	
		<b>Document Control No.</b> <b>USEMS SOP E - 4 - 2</b>
<b>Document Title: Wastewater / Stormwater Discharge Compliance</b>		

## 1.0 Purpose and Scope

- 1.1 The purpose of this SOP is to establish the regulatory requirements, accountabilities and operating procedures related to sanitary and process wastewater and stormwater discharge at NJIT.
- 1.2 The scope of this SOP includes any laboratory, location or building at the university that has a wastewater discharge containing hazardous chemicals that could interfere with the operation of the local wastewater treatment plant.
- 1.3 The objective of this SOP is to provide operating procedures to meet the requirements of the Passaic Valley Sewerage Commission (PVSC) Industrial and Pollution Control Rules and Regulations, the New Jersey Department of Environmental Protection Freshwater Wetlands Protection Act Rules and the New Jersey Pollutant Discharge Elimination System Storm water Regulations for Underground Injection Control.

## 2.0 Responsibilities

- 2.1 The Director of Environmental Affairs is responsible to maintain current copies of this SOP and to ensure that any new sewer use requirements specified by Passaic Valley Sewerage Commission are incorporated into future revisions of the SOP.
- 2.2 The Director Technical Services is primarily responsible to implement the operational, inspection, notification and recordkeeping provisions of this SOP.

## 3.0 Assessment, Prevention and Control Procedure

- 3.1 NJIT discharges sanitary and other wastewaters from the numerous laboratories on the campus to the Passaic Valley Sewerage Commission (“PVSC”) wastewater treatment system. All laboratory wastewater drains into neutralization tanks located in the basement of Otto York Center, Microelectronics Center and Tiernan Hall. Wastewater is pH neutralized prior to discharge to the PVSC sewage system. **NJIT’s policy is that no hazardous chemicals are to be discharged into laboratory sink drains.** Signs are posted at laboratory sinks to remind staff and laboratory researchers about adhering to this policy.
- 3.2 Storm water on the campus discharges into the City of Newark combined sewer system. This system is designed to accept sanitary and storm water discharges. NJIT does not have a storm water NJPDES discharge permit and does not require a permit since there is no direct discharge of storm water to a surface water body, pursuant to the exemption provided under NJAC § 14A-24.2(f).
- 3.3 NJIT is not classified as a Significant Industrial User (“SIU”) and does not require a SIU New Jersey Pollution Discharge Elimination System (“NJPDES”) permit. NJIT discharges process and sanitary wastewaters to the municipal sanitary system as an indirect user. NJIT is currently not required to monitor or test wastewater for compliance with discharge limitations promulgated by the Passaic Valley Sewerage Commission.


- 3.4 NJIT will comply with the "Prohibited Discharges" standards as specified in PVSC Rules and Regulations, including no discharge from any sink, drain or sewer connection of any of the listed substances in PVSC Regulations, Section 312, "Prohibited Industrial Wastes". These standards are included in Exhibit 2-1 to this SOP.
- 3.5 The Director of Environmental Affairs will ensure that land disturbing activities as defined under the NJDEP Land Use Regulation Program (LURP) Regulations will not occur without an approved sediment and storm water management plan and permit from the NJDEP.
- 3.6 The Director Technical Services will inform the Director of Environmental Affairs when any land disturbing activity is anticipated to occur on the NJIT campus. The Director of Environmental Affairs will make contact with the NJDEP to discuss the need for a sediment and stormwater management plan (Plan). If required, the Director of Environmental Affairs will work with the facilities management staff to prepare the Plan and submit it to NJDEP for approval prior to commencing the land disturbing activity.
- 3.7 The Director Technical Services will implement Pollution Prevention procedures including a Best Management Practice ("BMP") plan for silver rich spent developer solutions that may be generated from Architecture Department dark room or other photographic processing locations at NJIT. Discharges of silver rich solutions must comply with Section 401.1 of PVSC Rules and Regulations that require submission of a BMP Plan to the PVSC for review and approval
- 3.8 The Director Technical Services will establish a procedure to document monthly grease trap cleaning by food service employees in bound maintenance log books.
- 3.9 The Director Technical Services will establish a procedure to document weekly inspections of the grease interceptor (including time, date and signature of person performing the inspection) in bound maintenance logbooks. Maintain such records in accessible files for five years.
- 3.10 The Director Technical Services will retain a contractor specializing in grease interceptor cleaning to inspect the grease interceptor once every two months. Records of such inspections and cleaning will be retained in accessible files for five years.
- 3.11 The Director Technical Services will submit product specifications of any commercial biological enzyme additive used in NJIT grease interceptors to PVSC for approval. Approval letters from PVSC will be retained by the Director Technical Services.
- 3.12 The Director, Technical Services may request an exemption from the PVSC to comply with the requirements in Section 3.7-3.11 above. Written approval authorizing exemption from any requirements from the PVSC will be retained by the Director, Technical Services. If written exemption is not obtained from PVSC, procedures to comply with all requirements in Section 3.7-3.11 will be implemented by the Director, Technical Services.

#### **4.0 Record and Document Retention**

- 4.1 The Director Technical Services will retain the following records and documents to verify compliance with this SOP:
  - A. Passaic Valley Sewerage Commission ("PVSC"), Industrial and Pollution Control Rules and Regulations
  - B. BMP plan for silver rich process discharges approved by PVS
  - C. Records of monthly grease interceptor cleaning by a contractor specializing in grease interceptor cleaning
  - D. PVSC written approval of commercial biological enzyme additive used in grease interceptor
  - E. Copy of contract with grease interceptor contractor.

## **5.0 Regulatory and Statutory Requirements**

- 5.1 The applicable regulatory and statutory requirements related to this SOP include:
- A. 40 CFR 403 General Pretreatment Regulations for Existing and New Sources of Pollution
  - B. New Jersey Administrative Code 7:14A-21 Requirements for Indirect Users
  - C. New Jersey Department of Environmental Protection, Land Use Management, Division of Watershed Management, New Jersey Administrative Code, Stormwater Management Rule (N.J.A.C. 7:8)
  - D. New Jersey Department of Environmental Protection, Freshwater Wetlands Protection Act Rules, New Jersey Administrative Code, (N.J.A.C. 7:7A)
  - E. New Jersey Pollutant Discharge Elimination System, Stormwater Regulation, Underground Injection Control, NJAC § 14A-24.2(f)
  - F. Passaic Valley Sewerage Commission (“PVSC”), Industrial and Pollution Control Rules and Regulations
  - G. International Plumbing Code, 1997 edition published by International Code Council
- 5.2 The Director of Environmental Affairs will maintain a current copy of each of these documents and regulations and is responsible to keep current versions available for review by NJIT staff as required.

	UNIVERSITY SAFETY ENVIRONMENTAL MANAGEMENT SYSTEM University Heights Newark, New Jersey 07102	
		<b>Document Control No.</b> <b>USEMS SOP E - 4 - 3</b>
<b>Document Title: Asbestos Management Compliance</b>		

## 1.0 Purpose and Scope

- 1.1 Asbestos-containing material (“ACM”) may be present at NJIT in the form of pipe and pipe fitting insulation and equipment insulation. Various abatement projects at NJIT over the last 15 years have removed most friable and accessible ACM but residual ACM may remain in some locations on the campus.
- 1.2 The purpose of this SOP is to establish the regulatory requirements, responsibilities, operating procedures and recordkeeping requirements for the management of asbestos at NJIT.
- 1.3 The scope of this SOP includes any building structure, facility, equipment or other location where asbestos containing materials (ACM) are present or may be present on the NJIT campus.
- 1.4 It is the policy of NJIT that internal Technical Services Department maintenance staff are prohibited from repairing, removing or otherwise handling asbestos containing materials (ACM). Any asbestos inspection or abatement work will be conducted by NJDEP licensed asbestos abatement contractors.

## 2.0 Responsibilities

- 2.1 The Director of Environmental Affairs is responsible to keep this SOP current in light of new or changing regulatory requirements or changes in operations that may affect the management of asbestos at NJIT.
- 2.2 The Director of Purchasing is responsible to ensure that valid contracts for asbestos inspections and abatement are established with qualified vendors who meet the certification standards contained in the New Jersey Department of Labor and Workforce Development’s Asbestos Control and Licensing Act.
- 2.3 The Director, Technical Services is primarily responsible to implement the operational, notification and recordkeeping provisions of this SOP. Specifically, he is responsible to ensure that:
  - A. When major construction projects are planned at NJIT, a licensed asbestos survey firm and abatement contractor is used to identify and remove any affected ACM prior to project commencement.
  - B. A project file for each asbestos abatement project is retained for 10 years.
  - C. NJIT maintenance or engineering staff do not engage in asbestos abatement projects on the campus.
- 2.4 The Director Technical Services is responsible to inform the Director of Environmental Affairs when any building, facility or equipment modifications, repair or construction activities are anticipated that may impact the ability of NJIT to comply with the provisions of this SOP or that have the potential for release of asbestos into the environment.

### **3.0 Assessment, Prevention & Control**

- 3.1 The Director of Purchasing will establish valid contracts to perform abatement of ACM prior to commencement of any activity that may disturb suspect ACM with certified Asbestos Abatement Contractors who employ certified Asbestos Abatement Supervisors and Workers. See Exhibit 4-1 for key components of this program.
- 3.2 The Director Technical Services, prior to any modification, construction, demolition or repair of any building, facility or equipment, will conduct an asbestos inspection or survey to determine if asbestos containing materials are present in the work area that have the potential to be disturbed by the proposed construction work.
- 3.3 The assessment for the presence of asbestos will follow the definitions of asbestos containing materials as defined below.
  - (a) Asbestos – any of a member of six fibrous silicate materials that occur naturally in the earth’s crust, including amphiboles and serpentines (chrysotile, amosite, crocidolite and fibrous tremolite, anthophyllite, and actinolite).
  - (b) NESHAP –National Emissions Standards for Hazardous Air Pollutants for asbestos are federal regulations designed to control the emission of asbestos fibers from construction and demolition activities.
  - (c) Suspect regulated asbestos containing material (RACM) - A material that is likely to be asbestos but has not been positively identified through analysis by a National Institute of Standards and Testing (NIST) or US Environmental Protection Agency accredited laboratory.
  - (d) Friable Asbestos - loose degraded material that will crumble, flake, or otherwise release dust when disturbed. Examples are sprayed acoustic material, flaking plaster, and water-damaged pipe insulation. According to NESHAP, friable asbestos is a material that contains more than 1% asbestos and when dry can be crumbled, pulverized or reduced to a powder by hand.
  - (e) Non-friable asbestos - includes solid asbestos-containing construction materials that are in good condition. Examples are intact floor tiles, transite (cement asbestos) board and encased pipe insulation.
- 3.4 Director Technical Services will retain qualified EPA-certified asbestos inspectors to perform sampling of suspect regulated asbestos containing materials (RACM) prior to commencement of any activity that may disturb suspect RACM.
- 3.5 Director Technical Services will obtain “Construction Permit for Asbestos Abatement” or retain a licensed contractor to obtain construction permit prior to the commencement of asbestos removal projects that involve greater than 10 linear feet or 25 square feet. The asbestos contractor may submit the notification on behalf of NJIT but a copy of the construction permit will be retained by the Director Technical Services.
- 3.6 Director Technical Services will submit written notification 10 days prior to commencement of all asbestos removal projects or retain a licensed contractor to submit to the NJ Department of Labor (for projects larger than 3 square feet or 3 linear feet) and EPA (for projects larger than 160 square feet or 260 linear feet) notification of asbestos removal projects performed on the campus.
- 3.7 Director Technical Services will post building occupant notification or retain a licensed asbestos contractor to post or otherwise provide written notification to occupants of the building 10 days prior to the commencement of asbestos removal project.
- 3.8 The Director of Environmental Affairs will notify NJIT housekeeping or custodial staff who could incidentally disturb asbestos during the course of their regular duties of the location of ACM in  
  
NJIT buildings through the "Worker Advisory: Asbestos Containing Materials" form shown as Exhibit 4-2. A completed copy of the Worker Advisory form, with printed worker name and title and worker signature, will be retained in accessible files.

- 3.9 The Director of Environmental Affairs will provide asbestos awareness training to NJIT housekeeping or custodial staff who could incidentally disturb asbestos during the course of their regular duties and maintain training records in the asbestos records file. Training will enable NJIT staff to identify and avoid in-place ACM, to be aware of the risks associated with occupational exposure to asbestos and to know their responsibilities when they identify in-place ACM in the workplace.
- 3.10 The Director of Environmental Affairs will notify other personnel, other than NJIT employees, who conduct custodial or maintenance activities in NJIT buildings such as outside contractors, telephone workers and other service providers who may be required to work in the campus buildings. These staff will be notified of the location of the ACM in the building through the "Contractor Advisory: Asbestos Containing Materials" form shown as Exhibit 4-3. A completed copy of the Contractor Advisory form, with Company name and address indicated and with printed name and title of authorized agent and authorized agent signature, will be retained in accessible files. The notification to outside workers will be made prior to commencement of any work by vendor or vendor employees that could potentially disturb ACM in the campus buildings.
- 3.11 Director Technical Services will retain only NJDEP licensed contractors employing workers with valid asbestos handling certificates to perform asbestos repair and removal work at the facility.
- 3.12 Director Technical Services will retain a certified Asbestos Safety Control Monitors to conduct thorough visual inspections within work areas and conduct post-abatement clearance and notification following asbestos repair and removal work at the facility.
- 3.13 Director Technical Services will ensure that asbestos containing material (ACM) waste is properly handled, stored and transported off-site for proper disposal or retain a licensed asbestos contractor employing workers with valid asbestos handling certificates to seal ACM waste in properly labeled, leak tight containers.
- 3.14 Director Technical Services will retain a licensed asbestos transporter to transport ACM waste in properly labeled and placarded vehicles to a licensed asbestos disposal facility. He will also retain asbestos waste manifests to verify the proper disposition of asbestos waste generated at NJIT.
- 3.15 The Director Technical Services will at the conclusion of every asbestos abatement project at NJIT document or have the asbestos abatement contractor document the relevant project information on the Asbestos Activity Log shown in Exhibit 4-4. This Log and the associated asbestos records will be retained in a separate project folder labeled with the date and building where the asbestos abatement occurred.

## **4.0 Records and Documents**

- 4.1 The Director Technical Services will retain the below listed records in accessible files. The records will be kept for 10 years.
- A. Asbestos building inspection reports including survey results, chain-of-custody forms, sampling diagrams and laboratory analysis results
  - B. Records of asbestos abatement projects
  - C. Records of asbestos abatement project notifications to EPA/NJDEP
  - D. Manifests/records of asbestos disposal
  - E. Asbestos management plan for ACM areas
  - F. Completed Contractor Advisory forms
  - G. Completed Worker Advisory forms



## **5.0 Regulatory and Statutory Requirements**

- 5.1 "Occupational Exposure to Asbestos", 29 CFR Part 1910.1101, Asbestos Standard, 29 CFR Part 1910.1001, Occupational Safety and Health Administration.
- 5.2 Demolition, abatement and renovation, 29 CFR Part 1926.58, Occupational Safety and Health Administration.
- 5.3 Respiratory Protection Standard, 29 CFR Part 1910.134, Occupational Safety and Health Administration.
- 5.4 National Emission Standard for Asbestos, 40 CFR Part 61, Subchapter M, US Environmental Protection Agency.
- 5.5 New Jersey Asbestos Hazard Abatement Subcode - N.J.A.C. 5:23-8, NJ Department of Community Affairs (NJDCA), Bureau of Code Services, Asbestos Abatement Program.
- 5.6 New Jersey Solid Waste Management Regulations - N.J.A.C. 7:26 - et seq. New Jersey Department of Environmental Protection, Division of Solid and Hazardous Waste, Bureau of Resource Recovery and Technical Programs, Asbestos Control Program.
- 5.7 New Jersey Asbestos Control and Licensing Act - N.J.S.A. 34:5A-32, et seq., NJ Department of Labor and Workforce Development (NJDOLWD), Division of Public Safety and Occupational Safety and Health.

## Exhibit E-4-3 A

### Procedures to be followed by Asbestos Inspectors and Abatement Contractors Working on the NJIT Campus

#### Inspection Procedures

External vendor NJ Department of Environmental Protection certified asbestos inspectors will conduct building and facility surveys for Regulated Asbestos Containing Material (RACM) as follows when contracted by NJIT.

- 9 Review existing inspection records and sampling results prior to performing an inspection to prevent unnecessary laboratory analysis. Existing information may only be utilized if the minimum number of sampling results are available per Asbestos Hazard Emergency Response Act (AHERA) sampling protocols.
- 9 Visually inspect the area to identify the location of all suspect RACM not previously sampled.
- 9 Identify all friable suspect Regulated Asbestos Containing Material (RACM) and all non-friable suspect RACM that was not previously identified.
- 9 Review original blueprints and specification of the facility (when available) and visually inspect all areas of the facility that may be affected by demolition or renovation operations, or which may contain asbestos and could be affected directly or indirectly by the operation.
- 9 Wear personal protective equipment appropriate to the hazard presented. For instance, when disturbing friable material or in a sampling situation that will generate airborne dust, wear gloves and half-face dual cartridge respirators with P100 HEPA cartridges.
- 9 Collect representative bulk samples. To avoid false negative results, collect multiple samples of thermal system insulation and miscellaneous materials. Collect random samples of surfacing materials using a grid system described in the EPA publication "Asbestos in Building – Simplified Sampling Scheme for Friable Surfacing Materials".
- 9 Collect three samples of each suspect RACM at a minimum.
- 9 If the area of the homogenous suspect RACM is less than 1,000 square feet but less than 5,000 square feet, collect at least five bulk samples from each area.
- 9 If the area of homogenous suspect RACM is at least 5,000 linear or 500 square feet, collect at least seven bulk samples from each area.
- 9 Core samples will be taken whenever feasible. If suspect RACM is believed to be present within or underneath a surface that is impenetrable by a hand-held coring device, use a drill or other physical means to obtain a representative sample.
- 9 Place sampled material into a sealed leak-tight container, numbered sequentially and with an identification number unique to the sampling area and the facility, dated and identified by the initials of the inspector who collected the sample.

#### Laboratory Analysis

- 9 Analyze bulk samples using a National Institute Standards and Technology (NIST) or a U.S. Environmental Protection Agency (EPA) accredited laboratory.
- 9 If the asbestos content is less than 1 percent as determined by polarized light microscopy (PLM) and the material will be treated as non-asbestos, verify such a result by using the PLM point counting method.

- 9 If one sample from a homogenous area shows more than 1% asbestos, remaining samples need not be analyzed if all material in the homogenous area is considered to be RACM.
- 9 If all samples required to be collected are found to contain less than 1% asbestos, the homogenous area should be treated as non-RACM.

#### **Inspection Report**

External vendor EPA certified asbestos inspectors will prepare an inspection report with the date of the inspection and signed by the person making the inspection. The report should contain the following elements at a minimum:

- 9 An inventory and graphic depiction of the demolition or renovation operations showing the locations of the area of homogenous material where samples are collected, the exact location where each bulk sample is collected, the dates when samples are collected, the areas of homogenous materials where friable suspect RACM was found.
- 9 A description of the manner used to determine sampling location, the name and signature of each asbestos inspector who collected the samples, and evidence of inspector qualifications.
- 9 A list of the type of materials that make up each area of homogenous materials (e.g., surfacing material, thermal system insulation, etc.)
- 9 Chain-of-custody forms identifying each sample taken.
- 9 Laboratory reports for each asbestos bulk sample of RACM and suspect RACM taken at the demolition or renovation operation.

#### **Asbestos Abatement**

All renovation and demolition work that includes removal of RACM will be performed by certified Asbestos Abatement Contractors using certified Asbestos Abatement Supervisors and Workers in conformance with this procedure.

#### **Waste Disposal**

- 9 **Friable Asbestos Waste.** Wet and package waste material containing friable asbestos in leak-proof containers (double bagged in six-millimeter (six mil) polyethylene disposal bags at a minimum). Asbestos waste must be labeled in accordance with NJDEP and DOT regulations and transported at all times in covered and leak-proof carts, roll-off containers or trucks.
- 9 **Non-Friable Asbestos Waste.** Manage non-friable asbestos containing material so as to minimize damage to the material. Segregate non-friable asbestos containing materials from other solid waste and remove and transport in covered dumpsters or trucks to an authorized asbestos landfill out-of-state or to an approved landfill.

**Exhibit E-4-3 B**

**Asbestos Containing Materials Employee Notification**

NJIT Employees are advised that various buildings and structures at NJIT contain (or may be presumed to contain), Asbestos Containing Materials (ACM) in the form of pipe and pipe fitting insulation and equipment insulation. Various abatement projects over the last 15 years have removed most friable and accessible ACM but residual ACM remains in some locations on the campus.

If ACM is known to be present in, or adjacent to your work area, you will be informed by your supervisor. However, NJIT may not have sufficient information to verify the presence or absence of ACM in all of the materials which may be disturbed by you during the course of your duties. NJIT will use reasonable efforts to notify you of known or suspected ACM located in or adjacent to your work area. Notwithstanding the foregoing, you have the affirmative duty of contacting the Director, Environmental Affairs and the Director of Engineering concerning the presence, location, and quantity of such newly discovered ACM.

**Employee is advised that he/she is prohibited from performing ACM repair or removal at NJIT. Failure to comply with this policy will result in disciplinary action up to and including termination pursuant to NJIT HR policy and collective bargaining agreements.**

<b>Received and Acknowledged</b>	
_____	_____
<b>(Print Name)</b>	<b>(Signature)</b>
_____	_____
<b>(Title)</b>	<b>(Department)</b>
_____	_____
<b>(Date)</b>	<b>(Extension)</b>

**Exhibit E-4-3 C**

**Asbestos Containing Materials Contractor Notification**

**Contractor is advised that** various buildings and structures at NJIT contain (or may be presumed to contain), asbestos containing materials (ACM) in the form of pipe and pipe fitting insulation and equipment insulation. Various abatement projects over the last 15 years have removed most friable and accessible ACM but residual ACM may remain in some locations on the campus.

If ACM is known to be present in, or adjacent to your work area, you will be informed by the NJIT project coordinator. Should the completion of this project require disturbance of ACM, this work will only be performed by the New Jersey Department of Labor and Workforce Development certified persons with NJIT approval. It is your responsibility to inform your employees and subcontractors you supervise of this information, once received.

NJIT may not have sufficient information to verify the presence or absence of ACM in all of the materials which may be disturbed by the contractor on this project. NJIT will use reasonable efforts to notify contractor of known or suspected ACM located in or adjacent to the work area. Notwithstanding the foregoing, contractor has the affirmative duty of contacting the Director, Environmental Affairs and the Director of Engineering concerning the presence, location, and quantity of such newly discovered ACM.

**Contractor is advised to** assume the presence of ACM in the work area and is advised of its responsibility to comply with applicable federal and state laws and regulation pertaining to asbestos including, but not limited to, National Emission Standard for Asbestos, 40 CFR Part 61, Subchapter M,.

**Contractor is advised of** its responsibilities for worker protection under 29 CFR Part 1910.1101, 29 CFR Part 1910.1001, 29 CFR Part 1926.58, and 29 CFR Part 1910.134 and is directed to take appropriate actions including, but not limited to, certification, training, personal protective equipment, respirators, and medical surveillance.

<b>Received and Acknowledged</b>	
_____	_____
<b>(Print Name)</b>	<b>(Signature)</b>
_____	_____
<b>(Contractor Name)</b>	<b>(Contractor Address)</b>
_____	<b>Date:</b> _____

Exhibit E-4-3 D

## Asbestos Activity Log



NEW JERSEY INSTITUTE OF TECHNOLOGY

**Name** \_\_\_\_\_ **Date** \_\_\_\_\_  
**Contact Person** \_\_\_\_\_ **Dept/ Ext** \_\_\_\_\_

**Description of Activity (removal, repair, other)**

**Location (Building, Room Number, Location)**

**Description of Asbestos Containing Material Disturbed**

Name of Worker	Company	Certification Number


**Personnel Protective Equipment worn**

**Approximate Quantity Asbestos Removed in** \_\_\_\_\_ **Linear feet or square feet**

**Disposal Location Information**

**Attach all asbestos project documents including:**

Notifications to EPA/NJDEP \_\_\_\_\_      Asbestos Contractor License \_\_\_\_\_  
 Post abatement air sampling \_\_\_\_\_      Lab analytical results \_\_\_\_\_  
 Asbestos disposal manifests \_\_\_\_\_      Asbestos Safety Control Monitor Report \_\_\_\_\_

	UNIVERSITY SAFETY ENVIRONMENTAL MANAGEMENT SYSTEM University Heights Newark, New Jersey 07102	
		<b>Document Control No.</b> <b>USEMS SOP E - 4 - 4</b>
<b>Document Title: Drinking Water Compliance</b>		

## 1.0 Purpose and Scope

- 1.1 The purpose of this SOP is to specify procedures and accountability for drinking water quality and drinking water supply protection at NJIT. It specifies the requirements to comply with NJDEP and City of Newark drinking water regulations.
- 1.2 The scope of this SOP is limited to requirements for installation and if required, annual testing and maintenance of backflow prevention equipment. The purpose of this requirement is protection from possible cross contamination from NJIT's water supply distribution system in to the City of Newark system.

## 2.0 Responsibilities

- 2.1 The Director of Environmental Affairs is responsible to retain a copy of the current City of Newark water supply regulations and ensure procedures are established to maintain compliance with applicable requirements.
- 2.2 The Director of Environmental Affairs will have overall responsibility to verify, through review of water quality documentation and communication with City of Newark Water Department that the quality of the water provided to the NJIT campus meets EPA's drinking water quality standards.
- 2.3 The Director Technical Services is responsible for proper installation of backflow prevention equipment on all incoming water supply lines and if required by the City of Newark, procuring the services of a "certified tester" for inspecting, testing and maintaining each backflow prevention device.

## 3.0 Assessment, Prevention and Control

- 3.1 Backflow water from a contaminated source of non potable water from a NJIT building could potentially contaminate the public water supply. Backflow prevention devices prevent contaminated water from siphoning back into the water supply line. The Director Technical Services will install and maintain backflow prevention equipment in accordance with the NJDEP Bureau of Water Supply regulations in NJAC 7:10-10.6 and the City of Newark Municipal Code 33:5-49.
- 3.2 The Director Technical Services will contact the City of Newark Bureau of Water Supply to clarify the need for installation of service check valves on water service connections at NJIT as specified below:
  - A. A proper check valve will be placed in all water service connections where the following conditions exist:
  - B. Where a building is supplied by services connected to different sections of the mains.
  - C. Where there is any possibility of back-flow from tanks, siamese connections or other apparatus or fixtures within the building.

- D. Such check valves will be installed on the outlet side of the meter setting, as near thereto as practicable, and clear of the meter by-pass connection, on meters two (2) inches and larger.
  - E. Check valves will be of a type approved by the Division and will be equipped with suitable auxiliary valves so as to permit periodic inspection of the check valve.
  - F. Water supply lines to hot water boilers, steam boilers or similar fixtures or apparatus through which there might occur a back-flow of hot water or steam, will be equipped with a suitable check valve, and with a relief valve installed between boiler or fixture or apparatus and the check valve.
- 3.3 Director Technical Services will ensure that each backflow prevention device is inspected and tested quarterly by a certified tester to ensure proper operation of the equipment. Results of the annual backflow prevention tests will be documented on the NJDEP form “Quarterly Physical Connection Test and Maintenance Report” signed and dated by the certified tester.
- 3.4 Since local water supply authorities may choose to implement the NJDEP drinking water regulations in a different manner, the Director Technical Services will contact the City of Newark Water Supply Department to verify if it requires any additional or different actions with respect to testing the backflow prevention devices on the NJIT campus.
- 3.5 The Quarterly Physical Connection Test and Maintenance Reports when completed and signed will be submitted to the local water supplier within 5 days of the test. This may be done directly by the certified tester but the Director Technical Services is responsible to ensure that the quarterly reports are submitted on time.


#### **4.0 Records and Documents**

- 4.1 The Director Technical Services will retain the records noted below for 3 years.
- A. Records of locations of all backflow prevention equipment installations on NJIT water supply lines.
  - B. Quarterly Physical Connection Test and Maintenance Reports for each backflow prevention device.(if required)
  - C. Records of correspondence with City of Newark Water Supply Department regarding the requirement for quarterly testing of backflow prevention equipment.

#### **5.0 Regulatory and Statutory Requirements**

- 5.1 National Primary and Secondary Drinking Water Regulations, Clean Water Act (CWA) Section 304(a), 40 CFR Part 141-2, US Environmental Protection Agency.
- 5.2 NJDEP Bureau of Safe Drinking Water Regulations on Physical Connections in NJAC 7: 10-10.6.
- 5.3 City of Newark Municipal Code 33:5-49



	<b>UNIVERSITY SAFETY ENVIRONMENTAL MANAGEMENT SYSTEM</b> University Heights Newark, New Jersey 07102	
		<b>Document Control No. USEMS SOP E - 4 - 5</b>
<b>Document Title: Pesticide Management Compliance</b>		

## 1.0 Purpose and Scope

- 1.1 The purpose of this SOP is to protect NJIT students and staff from unnecessary exposure to pesticides, and to ensure handling, storage, transportation, use and disposal of pesticides (including fungicides, herbicides, insecticides, and rodenticides) at NJIT complies with applicable NJDEP regulations.
- 1.2 This SOP establishes procedures, accountabilities and responsibilities, recordkeeping and reporting requirements for restricted use pesticide (RUP) application on the NJIT campus for the control of pests, including cockroaches, ants, termites, mice, rats, bees, wasps and hornets or other pests.
- 1.3 NJIT has established a policy that all pesticides will be applied by commercial pesticide applicators licensed by NJDEP. NJIT staff are prohibited from applying pesticides on the NJIT campus.

## 2.0 Responsibilities

- 2.1 The Director of Environmental Affairs is responsible to maintain current copies of federal, state and local pesticide regulations.
- 2.2 The Director Technical Services is responsible to properly label, apply, store, transport and dispose of fungicides, herbicides, insecticides, and rodenticides in accordance with applicable regulations and this SOP.
- 2.3 The Director of Purchasing in concert with the Director Technical Services will establish contracts with external commercial pesticide applicators for animal, insect and rodent control. They are responsible to ensure that only trained, and certified pesticide applicators apply, handle, store and dispose of pesticides on the NJIT campus.
- 2.4 The Director of Environmental Affairs is responsible to ensure that any pesticide containers that are old, outdated or surplus are disposed as described in SOP E-5-7 “Hazardous Waste Management Compliance” or SOP E-4-11 “Universal Waste Management Compliance”.

## 3.0 Assessment, Prevention and Control Procedure

- 3.1 Application of Restricted Use Pesticides (RUPs) will be performed only by applicators certified and licensed by the NJDEP.

- 3.2 External applicators will, upon request, provide NJIT with copies of all applicable training, certifications and insurance. The outside pesticide applicators will follow all applicable local, state and federal regulations, as well as the provisions of this SOP.
- 3.3 Floor or storm sewer drains in the immediate area of pesticide application will be covered or otherwise protected to prevent discharge to the sewer system.
- 3.4 NJ DEP certified applicators whose job descriptions include supervision of non-certified applicators must demonstrate written and practical knowledge of applicable regulations and this SOP.
- 3.5 Only individuals who hold a certification for commercial application or those non-certified applicators operating under the direction of a certified applicator will be allowed to apply fungicides, herbicides, insecticides, pesticides and rodenticides on the NJIT campus.

**NOTE: Sections 3.6-3.11 below only apply to NJIT if any commercial pesticide applicators engage in storage, mixing or disposal of pesticides on the NJIT campus.**

- 3.6 Pesticides will be stored in a manner to prevent and control releases of pesticides to the environment:
  - A. In the original container with appropriate label and hazard type, or
  - B. In a container designed for the material it is to contain, provided the exact (full name) of the pesticide is identified on the label along with the appropriate hazard category (e.g., corrosive, ignitable, reactive, toxic).
  - C. Off the ground to prevent water infiltration and cross-contamination.
  - D. Away from fertilizers, food, potable water supplies, seeds, emergency response equipment and personal protective equipment.
  - E. For not longer than two (2) years.
  - F. In cabinets, in storage containers or on impermeable shelves (painted wood or steel).
  - G. In adequate secondary containment in cases of discharge, leak, rupture or spill.
  - H. In areas or buildings that are clearly identified as being used for the storage and mixing of pesticides.
- 3.7 Areas used for the storage and mixing of pesticides will be located such that accidental discharges, leaks, ruptures and spills will not impact nearby surface or ground waters. In accordance with EPA requirements, pesticide storage will be located:
  - A. At least 400' away from a private or public drinking water supply.
  - B. At least 200' away from surface water.
  - C. Away from direct sunlight.
  - D. Within the temperature range 40 – 100 deg. F.
  - E. Compatibly such that fungicides, herbicides, insecticides, and rodenticides are separated by a minimum 10 foot distance.
- 3.8 Any pesticide storage area at NJIT will be equipped with:
  - A. An NFPA 704 Hazard Identification System diamond symbol affixed to the exterior door.
  - B. First Aid Kit and Emergency Shower / Eyewash units
  - C. At least one (1) 10 lb. ABC Fire Extinguisher
  - D. Material Safety Data Sheets (MSDS) for all chemicals stored at that location
- 3.9 Mixing of pesticides and other associated chemicals will be performed under the direction of a certified applicator in a facility with
  - A. Appropriate, fitted personal protective equipment (PPE), including eye protection.
  - B. Adequate ventilation to minimize airborne chemical concentrations.
  - C. Accurate calculation of the pesticides, before mixing them into a solution for proper application.
  - D. Adequate lighting sufficient to perform associated work.
  - E. A water spray capability for mixing that is protected by a backflow prevention device. Water hoses used mixing will be removed from sinks to prevent cross-contamination of the public water supply.

- 3.10 Any NJIT employees who handle apply and dispose of pesticides will receive training provided by a certified trainer. The trainer will have completed a pesticide safety train-the-trainer program that has been approved by the NJ DEP or EPA. Training will include the following elements at a minimum:
- A. Reading Pesticide Labels
  - B. Health effects of exposure to pesticides
  - C. Routes of exposure
  - D. Signs and symptoms of pesticide exposure
  - E. Emergency First Aid procedures
  - F. How to obtain emergency medical care
  - G. Use of Personal Protective Equipment (PPE)
  - H. Safety Requirements for handling, storing, using and disposing of pesticides
  - I. Environmental concerns
  - J. Warnings about improper use of pesticides and pesticide containers
- Any discharge, leak or spill involving a pesticide of a quantity that reaches or has the potential to reach a stream, watercourse, storm water system or sanitary sewer line will be reported immediately to Public Safety ext. 3111.

If the incident or condition represents an imminent threat to human health or the environment, the observer should immediately notify Public Safety. The Director, Environmental Affairs and the Director for Environmental Health and Safety will prepare the written report of the pesticide spill to be mailed to the New Jersey Department of Environmental Protection.


#### **4.0 Record and Document Retention**

- 4.1 The Director of Technical Services will retain accurate and complete pesticide documentation for a period of 3 years including the following records:
- A. NJDEP pesticide application permits for vendors approved by NJIT.
  - B. Pesticides applicators license for vendors approved by NJIT.
  - C. Pesticide waste disposal records if disposed of on NJIT's campus.
  - D. Records of application of restricted use pesticides (RUP) including:
    - Pesticide name and formulation
    - EPA registration number
    - Dilution rate and amount applied
    - Date and area treated
    - Pest Controlled
    - Name of applicator
    - Name of certified applicator
    - Weather conditions if label advises precautions against drift: wind velocity and direction, temperature and relative humidity

#### **5.0 Regulatory and Statutory Requirements**

The regulations that apply to pesticide storage and handling at NJIT are:

- 5.1 N.J.A.C. 7:30-1, Pesticide Control Regulations
- 5.2 Federal Insecticide, Fungicide and Rodenticide Act (FIFRA), 40 CFR 150 to 189, US Environmental Protection Agency.
- 5.3 General Industry Standard: Toxic and Hazardous Substances, 29 CFR Part 1910 Subpart Z, Occupational Safety and Health Administration.
- 5.4 The Director of Environmental Affairs will maintain a current copy of each of these regulations and is responsible to keep current versions available at NJIT.

	<b>UNIVERSITY SAFETY ENVIRONMENTAL MANAGEMENT SYSTEM</b> University Heights Newark, New Jersey 07102	<b>Document Control No. USEMS SOP E - 4 - 6</b>
	<b>Document Title: Spill Prevention Control and Countermeasure Compliance</b>	

## 1.0 Purpose and Scope

1.1 The purpose of this SOP is to establish a procedure to prevent and control spills or releases of petroleum products in storage on the NJIT campus. As of July 2005, the primary sources of petroleum products at NJIT include the aboveground storage tanks (AST) shown below:

- 2000 gallon No.2 fuel AST at Micro Electronics Center
- 2000 gallon No.2 fuel AST at Colton Hall
- 250 gallon diesel fuel AST at Council for Higher Education in Newark Bldg.
- 250 gallon diesel fuel AST at Parking Deck
- 250 gallon diesel fuel AST at East Building
- 250 gallon diesel fuel AST at Guttenberg Information Technology Building
- 250 gallon diesel fuel AST at Laurel Hall
- 250 gallon diesel fuel AST at Oak Hall
- 290 gallon diesel fuel AST and 200 gallon diesel day tank at Weston Hall

In addition there are hydraulic oil AST's each 100 gallon capacity located around the campus used for the elevators throughout the campus buildings.

1.2 This SOP establishes procedures, accountabilities and responsibilities, recordkeeping and reporting requirements related to spill prevention countermeasures and control (SPCC) at NJIT. This SOP includes the requirements of EPA regulations in 40 CFR 112 for control of oil spills to navigable waterways or to watercourses leading to navigable waterways.

## 2.0 Responsibilities

2.1 The Director of Environmental Affairs is responsible for ensuring that current copies of the SPCC Plan are made available to persons having responsibilities for implementing oil spill prevention and control at NJIT.

2.2 The Director of Environmental Affairs is responsible for providing required spill response and control competency training for all designated staff at NJIT.

2.3 The Director of Environmental Affairs is responsible for making verbal and written reports to the City of Newark and NJDEP and the National Response Center (NRC) when oil spills occur that have the potential to impact waterways, sanitary or stormwater collection systems.

2.4 The Director of Environmental Affairs is responsible for conducting an annual review of the SPCC Plan for necessary revisions or changes. At least ever 5 years the SPCC Plan will be reviewed and recertified by a registered professional engineer.

2.5 The Director of Technical Services or his designated staff is responsible for conducting inspections of the aboveground storage tanks (AST's) as specified in the SPCC Plan. In addition all hydraulic oil elevator reservoir tanks in the campus buildings will be inspected monthly.

2.6 The Director of Technical Services or his designated staff is responsible to maintain adequate supplies of spill control equipment, absorbents and materials necessary to respond to petroleum products spills or releases.

- 2.7 The Director of Technical Services or his designated staff is responsible to observe that proper fuel loading procedures are followed as specified in the SPCC Plan.
- 2.8 The Director of Technical Services or his designated staff is responsible to conduct any maintenance, repair or replacement of any petroleum products storage tanks that may exhibit signs of rust, damage or loss of integrity.

### **3.0 Assessment, Prevention and Control Procedure**

- 3.1 A Spill Prevention Control & Countermeasures Plan (SPCC Plan) has been prepared by NJIT and will be the guiding procedural document to implement this SOP. The NJIT SPCC Plan is USEMS Control Document No. The Director of Environmental Affairs will be responsible to have a registered professional engineer review and revise the SPCC Plan to address any changes in oil storage and handling operations and recertify the Plan every 5 years.
- 3.2 Petroleum delivery procedures are detailed in the SPCC Plan and will be followed for all tank truck deliveries on campus. In general, the delivery procedures require physical plant services staff to:
  - A. Verify the appropriate product is being delivered before proceeding further.
  - B. Determine that the tank has adequate available capacity for the delivery.
  - C. Direct the truck driver to the unloading location and show the driver the location of emergency communications and spill response equipment.
  - D. Ensure the truck engine is off prior to unloading.
  - E. Ensure fuel delivery is stopped if alarms are triggered.
  - F. Ensure the driver cleans up any minor spills and spill residues that may have occurred.
  - G. Observe the entire fuel loading operation.
- 3.3 Only containers and tanks that are in good condition (no rusting, damage or holes) and that are clearly labeled will be used to store petroleum products.
- 3.4 All containers of petroleum will be stored in areas that will minimize the potential for spills or releases to the environment away from catch basins and stormwater runoff areas.
- 3.5 A monthly inspection of all AST's containing petroleum products will be conducted and documented on the AST Inspection Log as specified in the SPCC Plan.
- 3.6 Any evidence of leaks, spills or discharge of petroleum products from the AST's, valves, flanges or other locations will be immediately reported to and repaired by Director, Technical Services or his designated staff.
- 3.7 Oil Spill Response Contractors have been designated to respond to oil spills or releases at NJIT including:
- 3.8 Oil Spills that are less than 25 gallons and do not reach any water course, stream, storm sewer system or sanitary sewer line do not have to be reported to EPA or NJDEP as long as they are promptly cleaned up and do not cause any further contamination.
- 3.9 Oil spills over 25 gallons and any oil spill of any quantity that reach or have the potential to reach a stream, watercourse, stormwater system or sanitary sewer line must be reported immediately to: Public Safety at ext. 3111
- 3.10 Annually SPCC training will be conducted for all staff at NJIT that have any duties related to storage and handling of petroleum products on the campus. Completion of the training will be documented on the SPCC Training Log as specified in the SPCC Plan.


## **4.0 Record and Document Retention**

- 4.1 The Director of Environmental Affairs will maintain the following records for 5 years:
  - A. Original copies of the SPCC Plan
  - B. Copies of completed SPCC Training Log for designated staff
  - C. Copies of oil spill reports made to EPA and NJDEP
  
- 4.2 The Director Technical Services will maintain the following records for 5 years:
  - A. Copy of the current SPCC Plan
  - B. Copies of AST monthly inspection records
  - C. Copies of elevator oil reservoir tank inspection records
  - D. Records of any repair and maintenance of petroleum AST's.

## **5.0 Regulatory and Statutory Requirements and Controlled Documents**

- 5.1 The applicable regulatory and statutory requirements related to this SOP include:
  - A. EPA regulations 40 CFR 112.7 – Regulations on Preparation and Implementation of SPCC Plans.

The Director of Environmental Affairs will maintain a current copy of these regulations on the campus and will distribute current versions of the SPCC Plan as a controlled document to designated NJIT staff.

	<b>UNIVERSITY SAFETY ENVIRONMENTAL MANAGEMENT SYSTEM</b> University Heights Newark, New Jersey 07102	<b>Document Control No. USEMS SOP E - 4 - 7</b>
	<b>Document Title: Hazardous Waste Management Compliance</b>	

## 1.0 Purpose and Scope

- 1.1 The purpose of this SOP is to establish the regulatory requirements, staff accountabilities and procedures for assessment prevention and control of hazardous waste at NJIT and to establish a centralized management control system.
- 1.2 The scope of this SOP includes any hazardous waste generated by any operation, procedure or activity in all departments at NJIT. The scope includes any hazardous waste generated on the NJIT campus including laboratories in the Chemistry/ Environmental Science, Chemical Engineering, Civil Engineering, Electrical Engineering, Mechanical Engineering, Otto York Center and Physics Departments and the Microelectronics Fabrication Center as well as by Technical Services, Building Services and Dining Services. The Tiernan Loading Dock 90-day Hazardous Waste Storage Area and the York Basement 90- day Hazardous Waste Storage Area are also included in the scope of this SOP.
- 1.3 The scope of this SOP does not include: Used Oil, Waste Fluorescent Lamps, Waste Batteries, Waste Mercury Thermostats, Waste Pesticides or Waste Consumer Electronic Equipment. These hazardous materials are included in other SOPs within the NJIT USEMS.

## 2.0 Responsibilities

- 2.1 The Director of Environmental Affairs and the Director of Environmental Health and Safety are accountable to keep this SOP current and to ensure that the procedures are implemented and the required competency training is provided for designated staff handling hazardous waste.
- 2.2 The Director of Environmental Affairs is primarily responsible to implement the operational, notification and recordkeeping provisions of this SOP.
- 2.3 The Director of Environmental Affairs is responsible to inform the University Safety and Environmental Management System Director and the Director of Environmental Health and Safety when any building, facility or equipment modifications or changes to operational procedures are anticipated that may impact the potential for generation of hazardous waste.
- 2.4 Department Environmental Safety and Health Officers are responsible to ensure that:
  - A. These procedures are implemented in their respective departments,
  - B. Completed Department Generator Forms are submitted to the Director of Environmental Affairs monthly, and that the required records listed in Section 4.0.
  - C. Assist with implementation of collection, packaging, labeling and use of hazardous waste manifests for all shipments of hazardous waste.

- D. Maintain the satellite accumulation areas in their respective departments in accordance with the SAA procedures specified in USEMS SOP 4-8.
- 2.5 The Director of Purchasing is responsible for assisting departments in the procurement and negotiation of contracts between NJIT qualified vendors for environmental services.

### **3.0 Assessment, Prevention and Control Procedure**

- 3.1 NJIT currently operates as a Large Quantity Generator (LQG) of RCRA hazardous waste. Hazardous wastes are generated in academic and plant operations departments throughout NJIT. Hazardous wastes generated by academic operations include laboratory wastes and outdated laboratory chemicals and hazardous wastes generated by plant operations include waste oil-based paints, mineral spirits, flooring adhesive, and other waste chemicals.
- 3.2 The Director of Environmental Affairs is responsible to document quantities of hazardous waste generated on a monthly basis. The Director of Environmental Affairs will maintain a current Hazardous Waste Generator Log that tracks the total amount of hazardous waste generated on a monthly basis from all generation points at NJIT. The Hazardous Waste Generation Log includes totals from Monthly Hazardous Waste Reports submitted by Department Environmental Safety and Health Officers as described in 3.4 herein
- 3.3 All solid waste generated at NJIT will be evaluated to determine if the waste is a hazardous waste. This will be done by following the sequence of steps below.
- A. Determine if the waste is excluded from regulations under 40 CFR 261.4.
  - B. Determine if the waste is listed as a hazardous waste in Subpart D of 40 CFR 261.
  - C. If not listed, determine if the waste exhibits any characteristics of corrosivity, ignitability, reactivity or toxicity. This can be done either by applying knowledge of the hazard characteristics of the waste in light of materials or the processes used or by testing the waste with methods set forth in 40 CFR 261, Subpart C.
- A record of all solid waste determinations will be retained by the University Safety and Environmental Management System Director.
- 3.4 The Director of Environmental Affairs will establish and maintain Satellite Accumulation Areas (SAAs) in Departments that generate hazardous waste in accordance with the SAA procedures specified in USEMS SOP 4-8.
- 3.5 The Director of Environmental Affairs will complete a Monthly Hazardous Waste Report (attached) and will record the total amount of waste generated at the end of each calendar month at their respective hazardous waste accumulation points. Copies of completed Monthly Hazardous Waste Report will be submitted to the Director of Environmental Affairs on or about the first of every month.
- 3.6 Aerosol spray cans containing any propellant and substance that is hazardous will not be disposed of in dumpsters, trash or other solid waste containers unless they are rendered empty and free of hazardous substances.
- A. The Physical Plant Operations will provide an aerosol can collection container at designated locations at the university. The containers will be rendered free of contents in the aerosol cans. Once the can is free of hazardous substances, they will be disposed of in solid waste trash containers.



- B. The Director of Environmental Affairs will inventory the various department at the university to document aerosol spray can use and disposal practices.
  - C. The University Safety and Environmental Management System Director will prepare written guidance to departments on NJIT aerosol can use and disposal procedures that comply with this SOP.
- 3.7 Director of Environmental Affairs will ensure that once hazardous waste containers generated in laboratories or other locations are full they are transferred within 3 days to the Tiernan Loading Dock 90- day Hazardous Waste Storage Area or the York Basement 90-day Hazardous Waste Storage Area by an individual trained in hazardous waste and spill response as described in the USEMS Manual Section 7, Environmental Training, Awareness and Competency.
- 3.8 The Tiernan Loading Dock 90-day Hazardous Waste Storage Area and the York Basement 90-day Hazardous Waste Storage Area will be managed by the Director of Environmental Affairs according to the following procedures:
- A. All hazardous waste containers regardless of size will be labeled “Hazardous Wastes” along with words that identify the contents (e.g., "Waste Acrylonitrile").
  - B. The date the containers were first placed in the Hazardous Waste Storage Area will be marked on each container.
  - C. Hazardous waste containers will not remain on site for more than 180 days.
  - D. Arrangements for pickup of hazardous wastes will be initiated at least 30 days prior to the 180 day limit is reached.
  - E. All containers will be kept closed except when adding or removing waste.
- 3.9 The Department of Environmental Health and Safety will conduct weekly inspections of the Hazardous Waste Storage Area and documented on the Hazardous Waste Storage Area Weekly Inspection Log (included as Exhibit 7-1).
- 3.10 The following information will be posted next to a telephone near the Hazardous Waste Storage Area.

NEW JERSEY INSTITUTE OF TECHNOLOGY	
<b>EMERGENCY INFORMATION</b>	
<b>In the event of an emergency such as a fire or spill:</b>	
Call Public Safety at:	<b>973-596-3111</b>
Fire Department telephone number is:	<b>973-596-3111</b>

- 3.11 The Department of Public Safety and the Director of Environmental Affairs are responsible for coordinating any emergency response measures for spills and releases. Exhibit 7-2 specifies the emergency response measures, the Emergency Coordinator or other responders will follow.
- The Director of Environmental Affairs will inform the local fire department and police department about the type and quantities and locations of hazardous waste at the university and the potential need for services in the event of an emergency. Written arrangements for emergency response will be established between NJIT and local emergency support providers.

- 3.12 The Director of Environmental Affairs is responsible to properly complete the Hazardous Waste Manifests for all shipments of hazardous waste from NJIT. If NJIT ships hazardous waste to a state other than New Jersey, the manifest form of that state receiving the wastes will be used.
- 3.13 The Director of Environmental Affairs or his/her designated representative who observes the hazardous waste pickup will sign the manifest certification by hand and obtain the handwritten signature of the initial transporter and date of acceptance on the manifest. Copy 1 of the manifest will be retained in the hazardous waste manifest file for 3 years.
- 3.14 If a copy of the manifest with the handwritten signature of the owner or operator of the designated facility is not received within thirty-five (35) days of the date the waste was accepted by the initial transporter, the Director of Environmental Affairs will contact the transporter and/or the owner or operator of the designated facility to determine the status of the hazardous waste, and if it has not been delivered, the generator must identify the shipment and report it to the State in which the shipment originated.
- A. The Director of Environmental Affairs must submit an Exception Report to the NJDEP if she has not received a copy of the manifest/shipping paper with the handwritten signature of the owner or operator or the designated facility within 45 days of the date the waste was accepted by the initial transporter. NJIT must also notify the State in which the manifest designated facility is located and the State to which the shipment may have been delivered. The Exception Report must include:
    - B. A legible copy of the manifest for which NJIT does not have confirmation or delivery;
    - C. A cover letter signed by the Director of Environmental Affairs explaining the efforts taken to locate the hazardous waste and the results of those efforts.

#### **4.0 Record and Document Retention**

- 4.1 This document USEMS SOP 4-7 will be kept current by the University Safety and Environmental Management System Director in consultation with the Director of Environmental Affairs. A copy of this SOP will be kept in all generating departments.
- 4.2 The Director of Environmental Affairs will maintain a file containing the following records for a period of 3 years.
- A. Signed copies of all completed manifests from the disposal facility receiving the wastes shipped from NJIT.
  - B. Records of any waste analyses, test results and land disposal restriction (LDR) forms for any wastes generated and shipped off site.
  - C. Weekly Inspection Log for the Tiernan Loading Dock 90-day Hazardous Waste Storage Area and the York Basement 90-day Hazardous Waste Storage Area.
  - D. Monthly Hazardous Waste Reports listing hazardous wastes generated in each department at the university and Hazardous Waste Generator Log that includes monthly totals of hazardous waste generated from all generation points at NJIT.
- 4.3 The University Safety and Environmental Management System Director will retain the following records:
- A. Copy of valid contract between NJIT and hazardous waste transporter and disposal facility.
  - B. Signed copies of all completed manifests from the disposal facility receiving the hazardous wastes from NJIT.
  - C. Hazardous Waste Generator Log that includes monthly totals of hazardous waste generated from all generation points at NJIT.
  - D. Copy of any Exception Reports to NJDEP for hazardous wastes manifests not signed or returned within 45 days.
  - E. Copies of Emergency Response Notifications for hazardous waste spills or discharges or other emergencies to NJDEP and the National Response Center.

- F. Records of completed satisfactory hazardous waste training for all designated NJIT staff that handle hazardous waste.
- G. Copy of completed EPA Form 8700-12 “Notification of Regulated Waste Activity” form for NJIT.

## **5.0 Regulatory and Statutory Requirements**

Hazardous waste management is regulated by NJDEP in New Jersey Hazardous Waste Regulations - N.J.A.C. 7:26G. A copy of these regulations will be kept by the Director of Environmental Affairs and the University Safety and Environmental Management System Director and kept in the USEMS Regulatory Document file.




## **Exhibit 4—7B**

### **Hazardous Waste Emergency Response Procedures**

- A** In the event of a fire, call Public Safety. Use of a portable fire extinguisher is permitted only if you have received training.
- 
- B** In the event of a spill, contain the flow of hazardous waste to the extent possible, and as soon as is practicable.
- 
- C** In the event of a fire, explosion or other release which could threaten human health outside the facility or when a spill has reached surface water, Public Safety will immediately notify the National Response Center and the NJDEP immediately. The report must include the following information:
- (1) Name, address, and USEPA Identification Number of NJIT;
  - (2) Date, time, and type of incident (e.g., spill or fire);
  - (3) Quantity and type of hazardous waste involved in the incident;
  - (4) Extent of injuries, if any; and
  - (5) Estimated quantity and disposition of recovered materials, if any.
-

## Exhibit 4-7C

<b>Hazardous Waste Generator Requirements</b>			
<b>REQUIREMENTS</b>	<b>LQG Conditionally Exempt Small Quantity Generator</b>	<b>SQG Small Quantity Generator</b>	<b>LQG Large Quantity Generator</b>
Monthly Generation Limits	< 220 lbs. Hazardous Waste &/or < 2.2 lbs Acute Hazardous Waste	> 220 lbs but < 2200 lbs Hazardous Waste &/or < 2.2 lbs Acute Hazardous Waste	> 2200 lbs Hazardous Waste or >2.2 lbs Acute Hazardous Waste
Accumulation Quantity Limits	<2200 lbs. Hazardous Waste &/or < 2.2 lbs Acute Hazardous Waste onsite	< 13,200 lbs Hazardous Waste &/or < 2.2 lbs Acute Hazardous Waste onsite	No Limit
Accumulation Time Limits	Unlimited	180 days	90 days
EPA ID Number required	No - voluntary - (see NJX program information)	Yes - Contact: Region II USEPA (212) 637-4106	Yes - Contact: Region II USEPA (212) 637-4106
Hazardous Waste Manifest Required.	No - voluntary (see NJX program information)	Yes	Yes
Manifest Copy Retention	None - voluntary	3 years	3 years
Exception Reporting (failing to receive a copy of the manifest with TSDf operator signature)	None	Within 60 days Generator must submit copy of the manifest with a note that signed TSDf copy is missing.	(1) Generator must contact initial transporter or TSDf and NJDEP within 35 days of shipping date. (2) Generator must submit a written exception report within 45 days of shipping date to NJDEP
Land Disposal Restriction notification/certification accompanying shipments	None	Required for certain Hazardous Wastes. Keep your copy for 5 years	Required for certain hazards Keep your copy for 5 years
Biennial Report	None	None	Submitted on each even year to report on manifest activity for previous odd year
Inspections	None	Weekly	Weekly
Hazardous Waste Training	None	Basic - waste handling familiarization & emergency procedures	Full training
Preparedness & Prevention	None	Familiarize fire, police, university emergency response contractor agreement	Familiarize fire, police, university Develop emergency response contractor agreement
Contingency Plan	None	Basic plan - By the phone Emergency Coordinator Name & Tel. Fire Dept. Tel. Location of fire extinguishers, Fire Alarm & Spill Equipment	Complete Plan

	UNIVERSITY SAFETY ENVIRONMENTAL MANAGEMENT SYSTEM University Heights Newark, New Jersey 07102	<b>Document Control No.</b> <b>USEMS SOP E - 4- 8</b>
	<b>Document Title: Hazardous Waste Satellite Accumulation Site Compliance</b>	

## 1.0 Purpose and Scope

- 1.1 A Hazardous Waste Satellite Accumulation Area (SAA) is an area in an individual laboratory or shop designated by NJIT for the accumulation of waste, not to exceed 55 gallons of hazardous waste or 1 quart of extremely or acutely hazardous waste. The area must be at or near the point of waste generation and must be under the direct supervision of the person(s) generating the waste.
- 1.2 The purpose of this SOP is to establish the regulatory requirements, staff accountabilities and procedures for assessment prevention and control of hazardous waste at NJIT SAAs.
- 1.3 The scope of this SOP includes any hazardous waste generated by any operation, procedure or activity in all departments at NJIT. The scope includes any hazardous waste generated in the laboratories in the Chemical and Environmental Engineering Departments, the Microelectronics Fabrication Center as well as the physical plant shops on the NJIT campus.

## 2.0 Responsibilities

- 2.1 The USEMS Director is accountable to keep this SOP current and to ensure that the procedures are implemented and the required competency training is provided for designated staff handling hazardous waste.
- 2.2 Principal Investigators (PI) whose activities generate hazardous waste are primarily responsible to implement the operational provisions of this SOP.
- 2.3 The Department Environmental Safety and Health Officers (DESHOs) are primarily responsible to implement the oversight, notification and recordkeeping provisions of this SOP.
- 2.4 The DESHO is responsible to inform the USEMS Director when any equipment modifications or changes to laboratory or operational procedures are anticipated that could impact the ability to comply with any aspects of this SOP.
- 2.5 DESHOs are responsible to ensure that:
  - A. These procedures are implemented in their respective departments,
  - B. Assist the USEMS Director with implementation of collection, packaging, labeling and use of hazardous waste manifests for all shipments of hazardous waste.

## 3.0 Assessment, Prevention and Control Procedure

- 3.1 The DESHO will establish at least one SAA in each laboratory where hazardous waste is generated (e.g., laboratories in Chemical and Environmental Engineering Departments, the Microelectronics Fabrication Center, Engineering, etc.).

- 3.2 The DESHO will make a hazardous waste determination for all solid and liquid waste generated in his or her Department. This will be done by following the sequence of steps below.
- A. Determine if the waste is excluded from regulations under 40 CFR 261.4.
  - B. Determine if the waste is listed as a hazardous waste in Subpart D of 40 CFR 261.
  - C. If not listed, determine if the waste exhibits any characteristics of corrosivity, ignitability, reactivity or toxicity. This can be done either by applying knowledge of the hazard characteristics of the waste in light of materials or the processes used or by testing the waste with methods set forth in 40 CFR 261, Subpart C.

Questions concerning hazardous waste determination should be directed to the Director of Environmental Affairs in the Department of Health and Safety

- 3.3 A record of all hazardous waste determinations will be retained by the DESHO with a copy provided to the USEMS Director.
- 3.4 The Principal Investigator will be primarily responsible for managing his or her SAA(s) in accordance with this SOP. Specifically, the Principal Investigator will ensure that:
- A. All SAAs are located at or near the point of generation of the waste being stored, and will be under the control of the Principal Investigator and the Department Chairperson who have had hazardous waste training as described in the USEMS Manual Section 7, Environmental Training, Awareness and Competency.
  - B. Stored chemicals are segregated to ensure compatibility in accordance with EPA Chemical Compatibility Chart (attached). Certain hazardous chemical wastes are not compatible with other chemicals, and severe reactions or releases of toxic products may occur if incompatible wastes are mixed. In general, hazardous waste containers should be segregated by hazard class.
  - C. Containers used to store hazardous waste are of an appropriate size, in sound condition, sturdy and durable, leak-resistant, and constructed of a material that is compatible with the waste stored. Containers that previously held materials that might be incompatible with the waste to be stored (including, but not limited to, food, beverage and detergent containers) will not be used to store hazardous waste.
  - D. Containers have tight-fitting caps and are sealed at all times, except when waste is being added.
  - E. Hazardous waste containers stored in SAAs are clearly identified with proper labeling. Labels must include:
    - 1. The words "Hazardous Waste" along with words that identify the contents (e.g., "Waste Acrylonitrile")
    - 2. List all chemical components and their relative quantities (relative quantities of all chemicals should total 100%). If a waste log is used with the waste container, the relative quantities may be filled in when the container is full.
    - 3. Primary hazards presented by the waste substance (i.e. ignitable/flammable, explosive, toxic, corrosive, concentrated acid, concentrated base, reactive with air, reactive with water, oxidizer, or reducer)
    - 4. Principal Investigator name, department and room number.
    - 5. Previous labels on reused containers must be removed.
  - F. Containers of liquid wastes are provided with secondary containment (such as a lab pack) equal to 10% of the capacity of the container.
  - G. Hazardous waste containers are not stored on the floor, as they may pose a slip, trip, and fall hazard.



- H. No more than one container of each type of waste generated is present in the SAA.
- I. The total volume of waste stored is limited to 55 gallons (110 pounds) of hazardous waste or one (1) quart of acutely hazardous waste (P-listed waste) in any SAA.
- J. Flammable waste is stored in National Fire Prevention Act (NFPA)-rated containers and storage cabinets.
- K. Ignitable/flammable liquids will not to be stored near heat source or a source of electrical spark.

3.5 The DESHO will ensure that SAAs are managed in accordance with all aspects of this SOP. Specifically, the DESHO will ensure that:

- A. The USEMS Director is provided with a list of room numbers and locations of all designated SAAs in his or her Department.
- B. Monthly SAA inspections are conducted and inspection results collected on the SAA Monthly Inspection Log (included as Exhibit 4-9).
- C. The following sign in large print is posted at each designated SAA:

**NEW JERSEY INSTITUTE OF TECHNOLOGY  
HAZARDOUS WASTE SATELLITE ACCUMULATION AREA**

- Only waste generated in this laboratory can be stored in this area
- All containers must be kept closed at all times
- All containers must be labeled as hazardous waste
- No more than 10 gallons total of hazardous waste can be stored in this area
- Call the **Department Environmental Safety and Health Officer** when waste containers need to be picked up for disposal at:  
EXTENTION \_\_\_\_\_

**Questions:** *Contact NJIT Director of Environmental Affairs*

- D. Once a hazardous waste container in a SAA is full it will be removed and transferred within 3 days to the Tiernan Loading Dock 90-day Hazardous Waste Storage Area or the York Basement 90-day Hazardous Waste Storage Area by an individual trained in hazardous waste and spill response as described in the USEMS Manual Section 7, Environmental Training, Awareness and Competency.
- E. A monthly check of each SAA is performed to ensure compliance with the SAA provisions contained herein and to ensure that there are no leaks, spills, or releases and document inspection results on the SAA Monthly Inspection Log (included as Attachment 5-8-1).

#### **4.0 Record and Document Retention**

4.1 This document (USEMS SOP E-5-8) will be kept current by the USEMS Director. A copy of this SOP will be kept in all generating departments.

4.2 The USEMS Director will maintain a file containing the following records for a period of 3 years.

- A. Records of any waste analyses, test results and land disposal restriction (LDR) forms for any wastes generated in his or her Department.
- B. SAA Monthly Inspection Log
- C. Monthly Hazardous Waste Report for all hazardous wastes generated in the Department.
- D. List of room numbers and locations of all designated SAAs in his or her Department.

## **5.0 Regulatory and Statutory Requirements**

- 5.1 Hazardous waste management is regulated by NJDEP in New Jersey Hazardous Waste Regulations- N.J.A.C. 7:26G. A copy of these regulations will be kept by the USEMS Director in the USEMS Regulatory Document file.

# Hazardous Waste Generator Log

*in compliance with Resource Conservation and Recovery Act (RCRA) 40 CFR 261.5(e)  
and New Jersey Hazardous Waste Regulations NJAC 7:26G-7*

Contact Person \_\_\_\_\_

Year

Month	Hazardous Waste Shipped (lbs)	Hazardous Waste Generated (lbs)	RCRA Generator Status ( 5 check one)		
			CESQG	SQG	LQG
			<220 lbs	<2200 lbs	>2200 lbs
<b>JAN</b>					
<b>FEB</b>					
<b>MAR</b>					
<b>APR</b>					
<b>MAY</b>					
<b>JUN</b>					
<b>JUL</b>					
<b>AUG</b>					
<b>SEP</b>					
<b>OCT</b>					
<b>NOV</b>					
<b>DEC</b>					

**Use this form to track your Hazardous Waste Generator Status:**

Enter the total quantity of hazardous waste (in pounds) that are **generated** in all departments at the university each month:

**: Conditionally Exempt Small Quantity Generator (CESQG)**

- University generates less than **220 lbs** of hazardous and less than 2.2 lbs of acute hazardous waste **per month**
- University accumulates less than 2200 pounds of hazardous and less than 2.2 pounds of acute hazardous waste

**: Small Quantity Generator (SQG)**

- University generates **between 220 and 2200 lbs** of hazardous waste and less than 2.2 lbs of acute hazardous waste **per month**
- University accumulates less than 13,200 pounds of hazardous waste and less than 2.2 pounds acute hazardous waste
- Waste must be off-site within 180 days

**: Large Quantity Generator (LQG)**

- University generates **more than 2200 lbs** of hazardous waste or more than 2.2 pounds of acute hazardous waste **per month.**
- Waste must be off-site within 90 days

**Additional rules to keep in mind:**

- Universal wastes (waste fluorescent lamps, waste electronics, waste batteries) do not count in monthly totals.
- Used oil is not hazardous unless it is contaminated with a hazardous waste



Exhibit E-4-8C

**Hazardous Waste Emergency Response Procedures**

**A In the event of a fire, call the fire department or attempt to extinguish it using a fire extinguisher.**

**B In the event of a spill, contain the flow of hazardous waste to the extent possible, and as soon as is practicable, clean up the hazardous waste and any contaminated materials or soil.**

**C In the event of a fire, explosion or other release which could threaten human health outside the facility or when a spill has reached surface water, immediately notify the National Response Center (using their 24-hour toll free number: (800) 424-8802) and the NJDEP 24-Hour Environmental Incident Hotline 1-877-WARNDEP (1-877-927-6337). The report must include the following information:**

- (1) Name, address, and EPA Identification Number of NJIT;**
- (2) Date, time, and type of incident (e.g., spill or fire);**
- (3) Quantity and type of hazardous waste involved in the incident;**
- (4) Extent of injuries, if any; and**
- (5) Estimated quantity and disposition of recovered materials, if any.**

## Exhibit E-4-8D



### *Frequently Asked Questions*

# Satellite Accumulation Areas (SAAs)

## **What is an SAA?**

This is an area in your lab that is set aside to use as a storage area for hazardous waste. It is usually in a chemical fume hood but can be anywhere safe as long as everyone in the lab knows where it is. The SAAs must be located at or near the point of generation of the waste being stored and must be under the control of the person generating the waste.

## **Who is responsible for the SAA in my laboratory?**

Federal and New Jersey hazardous waste regulations require SAAs to be under the direct supervision of the person generating the waste. Since the activities of Principal Investigators (PI) generate hazardous wastes, the PI is responsible for ensuring that the SAA in his or her lab is managed correctly.

## **What are the requirements for SAAs?**

Hazardous waste in SAAs must be stored correctly. This means that waste containers are of the correct type, that they are properly labeled and that they are kept closed at all times. Specific requirements include the following:

- Containers used to store hazardous waste must be sturdy and durable, leak-resistant, and constructed of a material that is compatible with the waste stored. **Your department environmental staff can provide you with appropriate containers.**
- Containers must be sealed with tight-fitting caps at all times except when waste is being added.
- Hazardous waste containers stored in SAAs must be clearly identified with proper labeling. **The DESHO can provide you with appropriate hazardous waste labels.** The PI is responsible to ensure that the labels contain the following information:
  - The words "Hazardous Waste" along with words that identify the contents (e.g., "Waste Acrylonitrile")
  - All chemical components and their relative quantities (relative quantities of all chemicals should total 100%).
  - Primary hazards presented by the waste (i.e. ignitable/flammable, explosive, toxic, corrosive, reactive, etc.)
  - PI name and laboratory location
- No more than one container of each type of waste can be present in the SAA.
- The total volume of waste stored is limited to 55 gallons (110 pounds) of hazardous waste or one (1) quart of acutely hazardous waste (P-listed waste) in any SAA.

## **Should containers in the satellite accumulation areas be segregated?**

Yes! Certain hazardous chemical wastes are not compatible with other chemicals, and severe reactions or releases of toxic products may occur if incompatible wastes are mixed. Follow the compatibility information on the EPA compatibility chart posted in your lab. Basic compatibility guidelines include the following:

- Store corrosive (acids and alkalines) separately from flammables (including alcohol and solvent wastes)
- Store acids and alkalines separately. Store within the same SAA with physical separation and secondary containment

- Store inorganic and organic acid wastes in the same SAA with physical separation and secondary containment
- Store oxidizers (e.g., nitrates, nitrites and compounds containing the prefix “per”, such as ammonium persulfate) separately or within the same SAA with physical separation and secondary containment
- Do not store oxidizing acid wastes in the same cabinet with organic material
- Solid wastes should be stored in separate SAAs from liquids or stored within the same SAA with physical separation and secondary containment if the chemicals are non-reactive.


**What is secondary containment and why does the hazardous waste need to be in secondary containment?**

Secondary containment means placing a chemical container into another container. This prevents incompatibles from contacting in case of a spill, as well as containing spread in the event of a spill. If incompatibles must be stored in a SAA, the containers must be in separate secondary containment.

**Anything else I should know?**

As always, faculty, staff and students should be mindful of general laboratory safety procedures, such as:

- Do not store hazardous waste on the floor. Containers on the floor pose a trip hazard to faculty, staff and students and are more likely to be spilled.
- Flammable waste must be stored in National Fire Prevention Act (NFPA)-rated containers and storage cabinets.
- Do not store ignitable/flammable wastes near a source of heat or electrical spark.

	<b>UNIVERSITY SAFETY ENVIRONMENTAL MANAGEMENT SYSTEM</b> University Heights Newark, New Jersey 07102	
		<b>Document Control No. USEMS E - 4- 9</b>
<b>Document Title: Community Right To Know Compliance</b>		

## 1.0 Purpose and Scope

- 1.1 This procedure establishes the regulatory requirements, responsibilities for recordkeeping, reporting and emergency notification related to hazardous chemical storage at NJIT.
- 1.2 The Emergency Planning and Community Right-to-Know Act (EPCRA), also known as SARA Title III, and the related New Jersey Emergency Planning and Community Right-to-Know Act requires facilities that use and store hazardous chemicals above certain amounts (called the Threshold Planning Quantities, or TPQ's) to report the presence of such chemicals to state and local authorities. The purpose is to provide the public and local emergency planning agencies in Passaic County and the City of Newark with information concerning potential chemical hazards.
- 1.3 This SOP applies to any hazardous chemical stored in any building on the NJIT campus. Fuel oil that is located throughout the NJIT campus is a hazardous chemical and will also be inventoried and reported as part of this SOP.
- 1.4 The scope of this SOP does not currently include toxic chemical release reporting under Section 313 of EPCRA. Assessment of the chemicals at NJIT indicates that the campus does not currently have any Section 313 chemicals above the reporting TPQ's and thus is not required to submit annual toxic chemical release (FORM R) reports to EPA or the SERC.
- 1.5 NJIT is not required to comply with the NJDEP Community Right-to-Know laws for storage, handling and reporting of toxic and hazardous materials because it is classified as a public employer in New Jersey. However NJIT is required to comply with the NJDHSS Right to Know regulations .The only EPA regulation that NJIT is required to comply with is EPCRA Section 302 which requires reporting of any extremely hazardous substances (EHS) above their TPQ. Compliance with EPCRA Section 311 and 312 that requires submission of Tier 2 chemical inventory report is not required at NJIT.

## 2.0 Responsibilities

- 2.1 The Director of Environmental Affairs is responsible for implementing all federal, state and local Community Right-to-Know requirements and preparing accurate and complete documentation to support submission of annual chemical inventory reports.
- 2.2 The Department Environmental Health Safety Officers (DESHO's) are responsible for implementing the provisions of this procedure pertinent to their areas of responsibility and for complying with the hazardous chemical inventory provisions of this procedure.

## 3.0 Assessment, Prevention and Control

- 3.1 Annually as directed by the Director of Environmental Affairs, the DESHO's will provide an inventory of all hazardous chemicals used or stored within their area of operations.



- 3.2 The NJIT Hazardous Chemical Inventory Form will be used by all DESHO's so that the chemical inventory can be aggregated across the entire campus.

The Director of Environmental Affairs will maintain a comprehensive campus-wide inventory of all hazardous chemicals stored on the NJIT campus and will update the chemical inventory annually in January.

- 3.3 The Director of Environmental Affairs will complete annual reporting of hazardous chemicals on the Annual Right to Know Survey as required by NJDHSS. Forms and instructions for completion are attached at the end of this SOP. By July 15th annually the EMS Manager will submit the Forms to the (1) NJDHSS, (2) Passaic County LEPC and (3) the Newark police and fire department. The Forms will be submitted with return receipt requested to the NJIT Director of Environmental Affairs to verify the Survey Forms were received.

- 3.4 The Director of Environmental Affairs will determine if any extremely hazardous substances (EHS's) are present at or in excess of TPQ's at NJIT. If EHS's are present above the specified TPQ's, the Director of Environmental Affairs will notify the LEPC and the SERC by letter of the EHS's presence on the campus. The designated Facility Emergency Coordinator who will participate in the Local Emergency Planning Committee (LEPC) planning process will also be provided in the letter notification

- 3.5 The Director of Purchasing will establish a purchasing control procedure for hazardous chemicals to verify the type and quantities of chemicals brought on-site annually. In particular any extremely hazardous substances (EHS) will be identified prior to procurement and review with the Director of Environmental Affairs.

- 3.6 The Department of Environment, Health and safety will work with Principal investigators to ensure safety protocols and equipment are in place prior to the order being placed and any material is delivered to the campus.

- 3.7 The Director of Environmental Affairs will notify NJDEP's Environmental Action Hotline (609-292-7172) immediately when there is an off-site release of a reportable quantity (RQ) of any extremely hazardous substance or CERCLA hazardous substance. Releases of CERCLA hazardous substances also require notification to the National Response Center (800-424-8802).

- 3.8 The Director of Environmental Affairs will, during the Annual Compliance Inspection, verify through a representative spot check that the types and quantities of hazardous chemicals present on the NJIT campus as reported on department chemical inventories are accurate.

#### **4.0 Records and Documents**

- 4.1 The Director of Environmental Affairs will maintain hard and electronic copies of the NJIT hazardous chemical inventory for the entire campus.

- 4.2 The Director of Environmental Affairs will maintain copies of the completed Annual Right to Know Survey for a period of 3 years.

- 4.3 The Director of Environmental Affairs will retain copies of any hazardous chemical release notification reports to NJDEP, LEPC and NRC

#### **5.0 Regulatory and Statutory Requirements and Controlled Documents**

- 5.1 The applicable regulatory and statutory requirements related to this SOP include:

- A. Title III, Superfund Amendments and Reauthorization Act (SARA), Section 302, 40 CFR 355-372.
- B. New Jersey Administrative Code Title 8, Chapter 59
- C. NJIT Emergency Response Plan.

5.2 The Director of Environmental Affairs will retain a current copy of each of these documents or regulations and is responsible to keep current versions available on campus.

	UNIVERSITY SAFETY ENVIRONMENTAL MANAGEMENT SYSTEM University Heights Newark, New Jersey 07102	
		<b>Document Control No.</b> <b>USEMS SOP E - 4- 10</b>
<b>Document Title: Universal Waste Management Compliance</b>		

## 1.0 Purpose and Scope

- 1.1 The purpose of this SOP is to establish the regulatory requirements, procedures and accountabilities for assessment, prevention and control of universal wastes generated at NJIT.
- 1.2 The scope of this SOP includes the following waste materials: (1) batteries, (2) unused pesticides, (3) mercury containing thermostats, (4) fluorescent lamps, (5) consumer electronics. These waste materials are classified as “Universal Wastes” as defined in NJAC 7:26A-7 and 40 CFR 279, Standards for Universal Waste Management.

## 2.0 Responsibilities

- 2.1 The Director, Technical Services is responsible to establish designated collection centers on the NJIT campus for accumulation of universal wastes and to ensure that the storage and labeling of universal waste containers meets the requirements in this SOP.
- 2.2 The Director of Environmental Affairs in concert with the Manager, Computer Maintenance Facility is responsible for identifying suitable vendors or other recycling entities to recycle NJIT’s universal wastes and to ensure shipment of the wastes is done in accordance with the procedures in this SOP.
- 2.3 Manager, Computer Maintenance Facility will establish appropriate contracts or arrangements with qualified recycling firms who are approved to disassemble consumer electronics and with firms who are qualified to refurbish consumer electronics for resale or donation to third parties.
- 2.4 The Director of Environmental Affairs in concert with the Director Technical Services is responsible to keep this SOP current in light of new or changing regulatory requirements or changes in operations related to universal wastes generated on the NJIT campus.

## 3.0 Assessment, Prevention and Control Procedure

- 3.1 The universal wastes defined as follows will be collected for recycling. None of these wastes will be discarded in dumpsters, trash bins or other solid waste containers.
  - A. Any batteries used or unused that are no longer intended to be used for any purpose on the campus. Spent lead acid batteries are to be returned to the supplier and are not classified as universal wastes.
  - B. Pesticides are not normally stored at NJIT. However, any stocks of suspended or cancelled pesticides or stocks of any unused pesticide products at NJIT will be managed as universal wastes.
  - C. Thermostat means any temperature control device that contains metallic mercury in an ampoule.
  - D. Lamps are defined as the bulb or tube portion of an electric lighting device. These might include fluorescent, high intensity discharge, neon mercury vapor, high pressure sodium and metal halide lamps.
  - E. Consumer electronics are defined as any components or subassemblies that collectively make up electronic products that may include batteries, mercury switches, small PCB capacitors, cadmium

plated parts and lead or cadmium containing plastics. Examples of consumer electronics that may be present at NJIT include computer monitors, processors, printers, copiers, facsimile, VCR's, stereos, TV's and telecommunication devices.

- 3.2 All universal wastes generated at NJIT will be managed to prevent releases of any hazardous substances to the environment by establishing procedures for labeling of containers, container storage standard and employee training.
- 3.3 Used lamps that have been determined to be "non-hazardous" by the lamp supplier meaning the lamps do not exceed the mercury concentration specified by EPA that classifies the lamps as hazardous waste may be disposed of as normal solid wastes and do not have to be recycled as universal wastes. The Director of Building Services will retain appropriate waste characterization data from the lamp supplier that verifies the lamps do not exceed the mercury concentration that would classify them as "hazardous" for purposes of disposal.
- 3.4 Each container used to collect universal wastes will be structurally sound, adequate to prevent breakage and compatible with the contents. The containers will be designed to be closed with a cover or lid.
- 3.5 Each container used to collect universal wastes will be labeled or marked to identify the type of waste such as:
  - "Universal Wastes –Batteries"
  - "Universal Wastes – Lamps"
  - "Universal Wastes – Thermostats"
  - "Universal Wastes – Consumer Electronics"
- 3.6 When consumer electronics are no longer usable or needed at any location on the NJIT campus, they are considered to be "products" for purposes of resale, donation or de-manufacture. The first priority for disposal of consumer electronics will be transportation to qualified recycling firms. Consumer electronics that are being managed as "products" are not considered to be hazardous wastes or universal wastes and do not require compliance with USEPA or NJDEP hazardous waste or universal waste regulations.
- 3.7 NJIT has identified three classifications for consumer electronics that are no useful to the university.
  - A. Approved for De-manufacture of Consumer Electronics
  - B. Approved for UW Handling of Consumer Electronics
  - C. Approved for Refurbishing / Resale / Donation of Consumer Electronics

The university has identified organizations that will accept, if not purchase, used consumer electronics from the university.

- 3.7 When consumer electronics are no longer usable or needed at any location on the NJIT campus and for any reason cannot be resold, donated or de-manufactured as a recycled product, the consumer electronics will be declared to be a "universal waste" for purposes of management or disposal at NJIT.
- 3.8 When any consumer electronics are managed as universal wastes, compliance with NJDEP's Universal Waste Rule is mandatory. Records of all shipments of consumer electronics from the NJIT campus will be maintained to include date of shipment, description of material shipped, name and address of facility. Hazardous waste manifests are not required for shipment. Manager, Computer Maintenance Facility will keep records of consumer electronics shipped as "products" for resale, donation or de-manufacture. The Director of Environmental Affairs will keep records of consumer electronics shipped offsite as universal wastes.


- 3.9 Containers of universal wastes may accumulate on the NJIT campus for no longer than one year from the date the universal waste is first generated. Each container of universal waste will be marked with the earliest date that any universal waste was placed in the container. As a further control to staying within the one year timeframe, arrangements will be made with NJDEP authorized recycling companies for shipment of any accumulated universal wastes no longer than every 6 months.
- 3.10 Only transporters and destination facilities that are licensed and authorized by NJDEP to transport and accept universal wastes will be used at NJIT. The Director of Environmental Affairs will maintain a current list of acceptable transporters and destination facilities for shipment of universal wastes generated on the NJIT campus. Other recycling firms located outside of New Jersey may be used to recycle universal wastes. In this case adequate documentation will be obtained to verify that the recycling facility is licensed and authorized by the state regulatory agency to accept the universal wastes prior to shipment off the NJIT campus.
- 3.11 The Director of Environmental Affairs will maintain an inventory of the total amount of universal waste generated on the NJIT campus. It is NJIT's objective to be classified as a Small Quantity Handler of Universal Waste (SQHUW). To maintain this classification no more than 11,000 pounds of total universal waste can be accumulated on the campus at any one time. The Director of Environmental Affairs will conduct periodic inspections of the designated locations where universal wastes are stored on the campus to verify that no more than 11,000 pounds are accumulated at any time.
- 3.12 Although there is no NJDEP or USEPA regulatory requirement to keep records of shipments of universal waste, as a best practice, the Director of Environmental Affairs will keep records of all shipments of universal wastes from NJIT for 3 years from date of shipment. The records will include:
- A. Type of Universal Wastes Shipped
  - B. Approximate Quantity Shipped in pounds
  - C. Date of Shipment
  - D. Name of Transporter and Destination Facility.
- 3.13 All NJIT staff whose duties require them to collect, store or handle any universal wastes will be trained on the NJIT universal wastes procedures and the emergency response actions in the event of a spill or breakage that could release pollutants to the environment. The Director of Environmental Affairs in concert with the Director of Building Services will be responsible to identify the NJIT staff in need of the training and to provide the universal waste training annually.

#### **4.0 Record and Document Retention**

- 4.1 The records that will be maintained by the Director of Environmental Affairs for 3 years related to this SOP include:
- A. List of universal wastes collection points on the NJIT campus
  - B. Copy of current contract between NJIT and universal wastes transporters and recycling destination facilities
  - C. Records of each shipment of universal wastes as described in 3.9 above
  - D. Records of universal waste training for all NJIT designated staff

#### **5.0 Regulatory and Statutory Requirements**

- 5.1 The governing regulations for this SOP are:
- A. USEPA 40 CFR 273, Standards for Universal Waste Management
  - B. NJDEP- NJAC 7:26A-7.1&7.2

	UNIVERSITY SAFETY ENVIRONMENTAL MANAGEMENT SYSTEM University Heights Newark, New Jersey 07102	
		<b>Document Control No.  USEMS SOP E - 4- 11</b>
<b>Document Title: Regulated Medical Waste Compliance</b>		

## 1.0 Purpose and Scope

- 1.1 The purpose of this SOP is to establish the NJDEP regulatory requirements, staff responsibilities and prevention and control procedures for the storage, handling and disposal of regulated medical waste (RMW) at NJIT.
- 1.2 Regulated Medical Waste is normally generated in the Student Health Services Center and in the biology laboratories. The definitions and classes of RMW are specified in Section 3.1 below.

## 2.0 Responsibilities

- 2.1 The Director of Health Services is primarily responsible for the implementation of the procedures in this SOP and for maintaining records to verify compliance with the regulatory requirements as specified in New Jersey Administrative Code 7:26, Subchapter 3A. Regulated Medical Wastes (7:26-3A).
- 2.2 The Director of Purchasing is responsible to negotiate and maintain a contract for regulated medical waste removal with a qualified regulated medical waste transporter and disposal company.
- 2.3 The Director of Environmental Affairs is responsible to keep this SOP current in light of new regulatory requirements or changes in operations related to regulated medical waste generation at NJIT.
- 2.4 The Director of Environmental Affairs will assist the Director of Medical Services to prepare the annual registration of NJIT as a generator of Regulated Medical Waste (RMW), and for the payment of the appropriate fee. The registration year runs from July 22 to July 21 of the following year and fees are payable by August 20 of each calendar year.
- 2.5 The Director of Environmental Affairs will submit an annual generator form to NJDEP for the period June 22 through June 21 of the following year on forms available from NJDEP at:

Bureau of Resource Recovery and Technical Programs  
Division of Solid and Hazardous Waste  
New Jersey Department of Environmental Protection  
P.O. Box 414  
Trenton, NJ 08625-0414

The report will cover all RWM generated, treated or destroyed, and disposed of and will be submitted to the department by July 21 of each calendar year. The generator annual report will include, but not be limited to, the following information:

- A. The date of the report
- B. A description of the regulated medical waste, identified by Waste Class
- C. The total quantity in pounds for the year for each Waste Class of regulated medical waste generated, treated, destroyed, or disposed of
- D. The name and NJDEP solid waste transporter registration number of every transporter who transported the generator's regulated medical waste
- E. The name and address of each intermediate handler or destination facility and a description of quantity in pounds for each Waste Class of regulated medical waste sent to each facility
- F. The method of treatment, destruction or disposal of each Waste Class by quantity in pounds (for example, on-site treatment, on-site incineration, disposal via sanitary sewer)

### 3.0 Assessment, Prevention and Control Procedure

3.1 Regulated medical waste generated at NJIT may include the wastes listed below as defined by N.J.A.C. 7:26-3A:

- A. Cultures and Stocks:** Cultures and stocks of infectious agents and associated biologicals, including: cultures from medical and pathological laboratories; cultures and stocks of infectious agents from research and industrial laboratories; wastes from the production of biologicals; discarded live and attenuated vaccines; and culture dishes and devices used to transfer, inoculate, and mix cultures.
- B. Pathological Waste:** Human pathological wastes, including tissues, organs, and body parts and body fluids that are removed during surgery or autopsy, or other medical procedures, and specimens of body fluids and their containers.
- C. Human Blood and Blood Products:** Liquid waste human blood; blood; items saturated and/or dripping with human blood; or items that were saturated and/or dripping with human blood that are now caked with dried human blood; including serum, plasma, and other blood components, and their containers, which were used or intended for use in either patient care, testing and laboratory analysis or the development of pharmaceuticals. Intravenous bags (only if they have come into contact with blood or other regulated body fluid), soft plastic pipettes and plastic blood vials are also included in this category.
- D. Sharps:** Sharps that were used in animal or human patient care or treatment or in medical research, or industrial laboratories, including sharp, or potentially sharp if broken, items such as, but not limited to, hypodermic needles, all syringes to which a needle can be attached (with or without the attached needle) and their components, including those from manufacturing research, manufacturing and marketing, pasteur pipettes, scalpel blades, blood vials, carpules, needles with attached tubing, acupuncture needles and culture dishes (regardless of presence of infectious agents). Also included are other types of broken or unbroken glassware that were in contact with infectious agents, such as used slides and cover slips.
- E. Animal Waste:** Contaminated animal carcasses, body parts, and bedding of animals that were known to have been exposed to infectious agents during research (including research in veterinary hospitals), production of biologicals, or testing of pharmaceuticals. Carcasses that are not known to have been exposed to agents infectious to humans are considered Waste Type ID 25, and, therefore, are not included in this class.
- F. Isolation Wastes:** Biological waste and discarded materials contaminated with blood, excretion, exudates, or secretions from humans who are isolated to protect others from certain highly communicable diseases, or isolated animals known to be infected with highly communicable diseases.

**G. Unused Sharps:** The following unused, discarded sharps that were intended to be used: hypodermic needles, suture needles, syringes, and scalpel blades.

3.2 Responsibility for packaging and labeling of regulated medical waste (RMW) rests with the Director of Environmental Affairs. NJIT will not offer for transport, storage, treatment or disposal any waste which is not packaged in accord with this SOP. As a bag or other container becomes full, it must be immediately sealed, packaged, labeled and managed as described in Section 3.2.A.1-5. RMW transporters may provide services to NJIT, including packaging and labeling of Regulated Medical Waste; however this will not relieve NJIT of the responsibility for packaging and labeling the RMW as required by this SOP.

A. All RMW will be packaged as follows before transporting or offering for transport off-site:

1. Placed in a container or containers that is:
  - a. Rigid;
  - b. Leak-resistant;
  - c. Impervious to moisture;
  - d. Sufficiently strong to prevent tearing or bursting under normal conditions of use and handling; and
  - e. Sealed to prevent leakage during transport.
2. In addition to the requirements above, NJIT will:
  - a. Package sharps and sharps with residual fluids in packaging or containers that are puncture-resistant; and
  - b. Package fluids (quantities greater than 20 cubic centimeters) in packaging or containers that are break-resistant and tightly lidded or stoppered.
3. NJIT need not place oversized regulated medical waste in containers, but will note any special handling instructions for these items in Box 14 of the medical waste tracking form.
4. Solid waste that is not being managed as regulated medical waste will not be packaged for shipment inside a regulated medical waste container or in containers attached to, or part of, a regulated medical waste container.
5. All waste packaged in "Biohazard" labeled bags or bags with the universal biohazard symbol on them will be presumed to be potentially infectious and will be managed as RMW for transport and disposal.

B. Each container of untreated regulated medical waste will have a water resistant label affixed to or printed on the outside of the container. The label will include the words "Medical Waste" or "Infectious Waste", or display the universal biohazard symbol. Red plastic bags used as inner containers at the point of generation (e.g. soiled utility room) need not display a label.

C. NJIT will mark each individual container of regulated medical waste according to the following marking requirements before the waste is removed from the storage area:

1. The outermost surface of the outer container or any inner container used to meet the packaging requirements at N.J.A.C. 7:26-3A.11 will be marked with a water resistant identification tag of sufficient dimension to contain the following information:
  1. NJIT name;
  2. NJIT address.
  3. The transporter's name;
  4. The transporter's NJDEP solid waste registration number;
  5. The date of shipment; and
  6. Identification of contents as medical waste.
2. In addition to the requirements of 3(a) above, if NJIT has used inner containers, including sharps and fluid containers, each inner container will be marked with indelible ink or imprinted with water-resistant tags. The marking or the tag will contain NJIT's name and address.

3.3 RMW will be contained in a manner and location that:

- A. Maintains the integrity of the packaging and affords protection from water, rain and wind.
- B. Maintains the RMW in a non-putrescent state, using refrigeration when necessary.



- C. Prevents unauthorized access (i.e. locking outdoor storage areas which includes any trailers), and limits access to authorized employees.
  - D. Affords protection from animals and does not provide a breeding place for or a food source for insects and rodents
- 3.4 The storage period for regulated medical waste is limited as follows:
- A. RMW will be disposed of immediately if it becomes putrescent or emits odors
  - B. All RMW will be disposed of within one year of the date of generation, or sooner as determined by the Director of Environmental Affairs. The only exception is for RMW that must be stored for longer periods to provide for the decay of radioactive materials in accordance with applicable Federal and State statutes and regulations.
- 3.5 RMW will be placed in separate containers from other waste at the point of origin in the laboratories. Containment of RMW will be in an area separate from other wastes. Areas used for the containment of RWM will be secured so as to deny access to unauthorized persons and will be marked with prominent warning signs and the biohazard symbol on, or adjacent to, the exterior of entry doors, gates or lids. Wording of warning signs will be in English, "CAUTION – INFECTIOUS WASTE STORAGE AREA – UNAUTHORIZED PERSONS KEEP OUT". Warning signs will be readily legible during daylight from a distance of at least 25 feet.
- 3.6 The Director of Environmental Affairs will ensure that regulated medical waste is transported from NJIT only by vendors who have a valid New Jersey Regulated Medical Waste Transporter registration. A copy of the current Transporter registration will be retained by the Director of Environmental Affairs.
- 3.7 The Director of Environmental Affairs or his designee will complete a regulated medical waste tracking form before shipping, or causing the shipment of, regulated medical waste off site. The tracking form will consist of a multi-copy form provided by the NJ DEP or equivalent approved in writing by NJ DEP.
- 3.8 Before signing the Generator Certification (Block 15) on the regulated medical waste tracking form, the Director of Environmental Affairs or his designee should verify that all information is accurate, clear and legible, and that the total quantity in Block 13 is correct. The unit of measurement (usually pounds) should also be noted in Block 13. Copy No. 5 is the generator copy and will be reconciled with the signed Copy 1 received from the disposal facility.
- 3.9 Copies of the signed regulated medical waste tracking forms will be retained for 3 years by the Director of Environmental Affairs.
- 3.10 If the Director of Environmental Affairs does not receive a copy of the tracking form with the handwritten signature of the owner or operator of the destination facility within 35 calendar days of the date of shipment, he will immediately contact the destination facility, transporter(s), intermediate handler(s) and collection facility(s) as appropriate to determine the status of the shipment. If, within 45 days of the date of shipment, NJIT still has not received a signed copy of the manifest from the Regulated Medical Waste management facility, the Director of
- 3.11 Environmental Affairs will submit a generator exception report to NJ DEP. The notification will include a legible copy of the original tracking form, a cover letter signed by the Director of Environmental Affairs explaining the efforts taken to locate the regulated medical waste, and its final disposition if ascertained, and the results of those efforts.

#### **4.0 Record and Document Retention**

- 4.1 The records and documents that will be maintained for 3 years related to this SOP include:
- A. Current copy of the contract with the Regulated Medical Waste disposal facility and transporter.
  - B. Current copy of the RMW transporter's NJ Regulated Medical Waste Transporter Registration
  - C. Regulated Medical Waste Monthly Generator Log.
  - D. Regulated Medical Waste Manifests Copy 1 and Copy 5 signed by NJIT and the disposal facility.

- E. Copies of training documentation for persons at NJIT handling Regulated Medical Waste.
- F. Copies of RMW exception reports filed with NJ DEP (three years from the date the report was submitted to NJ DEP).

## **5.0 Regulatory and Statutory Requirements**

- 5.1 The governing regulations for this SOP are N.J.A.C. 7:26 Subchapter 3A. Regulated Medical Waste. The Director of Environmental Affairs will keep a current copy of this regulation available at the university.

## REGULATED MEDICAL WASTE - GENERATOR FACT SHEET

### Questions & Answers

The New Jersey Regulated medical Waste program is a comprehensive management system that provides for the proper and safe tracking, on-site control, collection, and disposal of medical wastes by using a special tracking form together with specific packaging, marking, labeling, reporting and other requirements. The Regulated medical Waste Fact Sheets a publication of the Solid and Hazardous Waste (DSHW), Bureau of Resource Recovery and technical programs. These Fact Sheets are designed only as an information guide, to be read in conjunction with the New Jersey Regulated medical Waste regulations. All persons are responsible for compliance with the RMW regulations at N.J.A.C. 7:26-3A ET SEQ.

#### REPORT ALL INCIDENTS CONCERNING RELEASES OF RMW BY CALLING Public Safety at Ext. 3111

**Q1. Are regulated medical waste (RMW) generators required to dispose of (have a registered transporter pick up) their waste monthly or at definite time periods?**

A. No, the medical waste regulations do not require generators to dispose of their waste monthly or provide specific time frames for the disposal of RMW. However, all RMW must be disposed of at least once per year. (N.J.A.C. 7:26-3A.12.(b))

**Q.2 Are carpules generated at a dentist's office considered RMW?**

A. Yes, carpules are RMW (N.J.A.C. 7:26-3A.6(a)). They are classified as Class 4 - Sharps. They must be handled with the other sharps such as syringes (with or without the attached needle), needles, endo files, burrs, etc. generated at a dentist's office.

**Q3. What are the regulated body fluids?**

A. Regulated body fluids are liquids emanating or derived from humans and are limited to blood, cerebrospinal, synovial, pleural, peritoneal, pericardial fluids, semen, vaginal secretions, and amniotic fluid. Saliva and urine are not regulated body fluids.

**Q4. What is isolation waste Class 6? Is waste generated while treating a patient with AIDS (Acquired Immune Deficiency Syndrome) considered to be isolation waste?**

A. Isolation waste is defined as "Any biological waste and discarded materials contaminated with blood, excretion, exudates or secretions from humans who are isolated to protect others from certain highly communicable diseases (such as lassa fever or smallpox, etc.) or animals known to be infected with highly communicable diseases" (N.J.A.C. 7:26-3A.6(a)). The infectious agents causing these diseases are listed in Level 4 of the Centers for Disease Control's (CDC's) Document "Classification of Etiologic Agents on the Basis of Hazard". The CDC guidelines do not list the AIDS virus, therefore waste generated while treating a patient with AIDS is not an isolation waste Class 6. A list of infectious agents included in Class 6 is available from the Bureau of Resource Recovery and Technical Programs (Bureau).

**Q5. Are intravenous (IV) bags, tubes and needles that had only saline or nutrient medium in them considered regulated medical waste (RMW)?**

A. The needles are always considered RMW pursuant to N.J.A.C. 7:26-3A.6(a). However, if the IV bags and tubing have not come into contact with blood or other regulated body fluid, and they are separated from the needle then the IV bag and tubing alone are not considered RMW.

**Q6. Are paper towels or latex gloves containing a drop (or a few drops) of blood or other regulated body fluid considered RMW?**

A. No, paper towels or gloves that are not saturated with blood or a regulated body fluid and are not either dripping and soaked in or have dried or caked after having been saturated with such fluids are not RMW.

**Q7. Are orthodontic wires, brackets and bonding material considered RMW?**

A. Orthodontic wires, brackets and bonding material are generally not considered RMW as they do not meet the definition of RMW. These items would only meet the definition for Class 4 RMW and have to be managed as RMW, if they became saturated and/or dripping with blood or regulated body fluids, or were saturated and/or dripping and are now dried and caked with blood or regulated body fluids (N.J.A.C. 7:26-3A.6(a)). Additionally, in certain very rare circumstances, orthodontic wires or other oral appliances would be regulated as Class 6 - Isolation Wastes, if they were removed for some reason from a patient with any of the serious diseases listed at CDC Level 4.

**Q8. Are strep test cards, discs and slides considered RMW?**

A. If strep test cards, discs and slides are medical diagnostic test systems that contain any biologicals, such as animal antibodies or products of their metabolism, they would be considered RMW Class 1 - Cultures and Stocks and would be subject to all RMW regulations(N.J.A.C. 7:26-3A.6(a)). However, if they are medical diagnostic test systems that consist of non-biological reagents, they would not be considered RMW. Swabs that are used to inoculate a culture are considered RMW Class 1 - Cultures and Stocks.

**Q9. Are animal blood and vaccine vials considered RMW?**

A. Blood vials that have been used in animal care are considered RMW Class 4 Sharps and must be handled as such. Animal vaccine vials that have contained agents that have the potential to cause disease in humans are considered RMW Class 4 - Sharps (N.J.A.C. 7:26-3A.6(a)). Vaccine vials that have contained agents infectious only to non-humans are not considered RMW.

**Q10. Are barium enema bags considered RMW?**

A. No, barium enema bags are generally not considered RMW, as they do not meet the definition of RMW found at N.J.A.C. 7:26-3A.6. These items would only be considered RMW if they are saturated and/or dripping with blood or are now caked with dried human blood or regulated body fluids. Additionally, in certain very rare circumstances these items would be regulated as Class 6 - Isolation Wastes, if they were generated from a patient with any of the serious diseases listed at CDC Level 4.

**Q11. When is my annual generator report (AGR) due? Must I request it be mailed to me?**

submitting a completed annual report to NJDEP by July 21 of each calendar year (N.J.A.C. 7:26-3A.21.d). The AGR form is mailed to all registered generators. However, if you fail to receive a form you may request one by calling (609) 984-6620.

**Q12. If for some reason the NJDEP did not receive an AGR from a generator by the due date and requests the AGR from the generator; however, the generator did submit the report and has documentation to prove that, what should the generator do to respond to such request?**

A. The generator should submit a copy of the completed AGR from its records.

**Q13. If I have more than one office, must I register each location with the Department?**

A. Yes, each location that generates RMW must be registered with the NJDEP (N.J.A.C. 7:26-3A.5) unless a location is a temporary location operating less than 15 days per year (N.J.A.C.7:26-3A.17(e)). Call (609)984-3448 for a registration packet

**Q14. If generators treat and destroy their own RMW by methods such as treating with chlorine bleach and grinding, are they considered to be a destination facility? Do they have to be registered as a destination facility?**

A. Yes, generators that both treat and destroy their own RMW on site are considered destination facilities and they must be registered as such with the NJDEP. This includes all facilities that accept RMW from other registered generators for treatment and destruction. Registration forms are available by calling (609) 984-6620.

**Q15. Where can a generator obtain medical waste tracking forms? Is there a fee for them? How many forms can be ordered at one time?**

A. A generator/transporter can obtain the medical waste tracking forms, free of charge from the NJDEP, Bureau of Resource Recovery and Technical Programs, PO Box 414, Trenton, NJ 08625-0414 or by calling (609) 984-6620 during normal business hours.

**Q16. Is a generator required to submit copies of tracking forms to the NJDEP?**

A. No, generators are not required to submit copies of tracking forms to the NJDEP. The copies of these forms must be retained at the generator's office for at least three years from the date the waste was generated/accepted by the initial medical waste transporter unless the NJDEP specifically requires an additional retention period. The New Jersey Department of Health and Senior Services (DHSS) inspectors during their compliance inspections check these records.

**Q17. Are other generators, such as hospitals, permitted to pick up RMW generated by another generator, such as a private practitioner?**

A. No, generators, such as hospitals cannot transport another generator's RMW without possessing the permits listed at N.J.A.C. 7:26-3A.27. These requirements include:

- a. Registering as an RMW transporter in accordance with N.J.A.C. 7:26- 3A.8;
- b. Registering as a solid waste transporter; and
- c. Obtaining a certificate of publicconvenience and necessity issuedby the Division of Solid andHazardous Waste.

**Q18. What should I do if I do not receive Copy 1 of the Medical Waste Tracking Form from the destination facility?**

A. If you do not receive a completed Copy 1 of the tracking form with a handwritten signature of the owner/operator within 35 days of initial transport off site, you should contact the destination facility and attempt to determine the status of the tracked waste. If, within 45 days of initial transport off site you still do not receive Copy 1 of the tracking form you must submit an exception report to: NJDEP, Bureau of Solid Waste Compliance and Enforcement, P0 Box 407, Trenton, NJ 08625-0407 (N.J.A.C. 7:26-3A.22(b)).

**Q19. If I have more than one office, may I take the RMW to one site for storage, consolidation or disposal?**

A. Yes, if a generator generates less than 50 lbs. per month and transports its waste in a vehicle weighing less than 8,000 lbs. (N.J.A.C. 7:26-3A.17) but a RMW tracking form must still be used to transport the RMW from one site to another. Please note that generators which accept RMW for storage or consolidation must be registered as a collection facility and generators which accept RMW for disposal must be registered as RMW destination facility.

**Q20. May mail services be used to transport RMW?**

A. Yes, the U.S. Postal Service can be used to transport RMW Class 4 - Sharps and Class 7 - Unused Sharps for disposal. The RMW must be sent registered or certified mail, return receipt requested (indicating the person to which the package is sent, signature of the sender, date and address where delivered) or priority mail as required by N.J.A.C. 7:26-3A.17(b). The generator must retain the original receipt and the returned registered or certified mail receipt and attach them to the generator copy of the tracking form.

The generator must sign the certification section of the tracking form by hand; sign the transporter section indicating the transporter is the U.S. Postal Service and note the date the shipment was mailed; and ensure that the tracking form accompanies the RMW while in transit (N.J.A.C. 7:26-3A.17(b)).

**Q21. How do I dispose of RMW that is derived from radioactive medical materials?**

A. Such waste may be returned to the supplier of the original radioactive medical materials using a registered RMW transporter and completing a RMW form as described in N.J.A.C. 7:26-3A.19(h).

**Q22. May I recycle RMW?**

A. Yes, certain materials that are reused or recycled in accordance with all applicable Federal, State and local laws and regulations for the handling and managing of such materials, are not considered RMW if the generator first treats the materials and, for sharps, destroys them prior to shipping off site (N.J.A.C. 7:26-3A.6(b)).

**Q23. What is the proper way to mark and label packages of RMW?**

A. See Figure 1 on page 4 (N.J.A.C. 7:26-3A .14 and 15)


**Q24. If I am in compliance with the NJDEP's medical waste regulations, can I assume that I am in compliance with OSHA's regulations?**

A. No, the Federal Occupational Safety and Health Administration (OSHA) has separate regulations with which you must comply for a broader range of patient contact issues; materials and wastes produced at your business other than RMW. You may contact OSHA at (609) 757-5181.

**Q25. Is waste generated from Body Art Establishments (i.e. tattoo parlors, Body Piercers and permanent cosmetic professionals) considered RMW?**

The public health risks inherent to Body Art arise largely from the use of sharps and the potential to transmit bloodborne pathogens. Therefore, in 2001 the Department of Health & Senior Services promulgated N.J.A.C. 7:26-8:27 entitled "Body Art Procedures". This subchapter incorporates the RMW regulations at N.J.A.C. 7:26-3A by cross-reference. Therefore sharps and blood soaked items from Body Art establishments must be managed as RMW.

**REPORT ALL INCIDENTS CONCERNING RELEASES OF Regulated Medical Waste  
Public Safety at ext. 3111**

	<p style="text-align: center;">UNIVERSITY SAFETY ENVIRONMENTAL MANAGEMENT SYSTEM</p> <p style="text-align: center;">University Heights Newark, New Jersey 07102</p>	
		<p style="text-align: center;"><b>Document Control No. USEM SOP E- 4 - 12</b></p>
<p><b>New Jersey Institute of Technology Indoor Air Quality Compliance Program</b></p>		

## 1.0 Purpose and Scope

- 1.1 The "Indoor Air Quality Compliance Program" (reference N.J.A.C. 5:23-11.1 through 11.12) has been written pursuant to the authority of the Public Employees Occupational Safety and Health Act (N.J.S.A. 34:6A-25 et seq.). The purpose of this document is to control matters relating to indoor air quality in existing buildings occupied by public employees during their regular work hours. This program includes procedures for reporting and responding to complaints of indoor air quality.
- 1.2 As adopted by reference by the Commissioner, the nationally recognized standards of the American Society of Heating, Refrigerating and Air Conditioning Engineers, known as ASHRAE 55-1981 (Thermal Environmental Conditions for Human Occupancy) and ASHRAE 62-1989 (Ventilation for Acceptable Indoor Air Quality), including all subsequent revisions and amendments thereto, shall be the standard for evaluating indoor air quality in all buildings or portions of buildings.

## 2.0 Responsibilities

- 2.1 The Office of Facilities Management and Planning and Construction shall be responsible for ensuring that compliance with the Indoor Air Quality Program is maintained for public employees within all facilities during capital renovation and construction projects and for implementing any work practice controls as outlined in this document when necessary and appropriate.

When applicable, this office shall notify the Office of Health and Environmental Safety of remediation progress and/or completed abatements.

- 2.2 The Office of Environmental Health and Safety, is responsible for the overall administration and coordination aspects of all indoor air quality complaints. The Director for Environmental Health and Safety shall act as the liaison between the employee and the department charged with investigation and/or remediation of the alleged indoor air quality complaint(s).

All indoor air quality complaints involving air contaminants and/or health related problems shall be formally directed to the Office of Health and Environmental Safety, extension 3059.

- 2.3. The Director of Technical Services shall be responsible for directing all investigation and/or remediation requests to the appropriate shops within the office of Physical Plant. When responding to indoor air quality complaints, this department shall adhere to the work practices and procedures as outlined in this document.

When necessary and appropriate, the Office of Physical Plant shall notify the Office of Environmental Health and Safety of remediation progress and/or completed abatements.

2.3 Mechanical Engineering Services (MES) shall be responsible for ensuring that required indoor air quality is maintained; for overseeing the operations of the HVAC ventilation systems for each building on campus; and, for directing all investigation and/or remediation requests forwarded to this office for resolution.

All indoor air quality complaints regarding temperature, humidity, ventilation systems, lack of fresh air, or mechanical difficulties shall be investigated by the MES department.

When necessary and appropriate, this department shall notify the Office of Health and Environmental Safety of remediation progress and/or completed abatements.

### **3.0 Assessment, Prevention and Control Procedures**

3.1 The following work practices and preventative measures shall be adhered to and implemented by all departments in charge of facility maintenance, renovations and/or capital construction projects initiated on this campus.

3.2 Equipment Maintenance (N.J.A.C. 5:23 – 11.10)

The Facilities Department shall establish and follow a preventative maintenance schedule in accordance with accepted practice for the following equipment and/or systems:

3.2.1. HVAC Systems - Scheduled maintenance of the HVAC systems shall include checking and/or changing air filters; checking and/or changing belts; lubrication of equipment parts; checking the functioning of motors; and confirming that all equipment is in operating order. Damaged or inoperable components shall be replaced or repaired as appropriate. Additionally, any reservoirs or parts of this system with standing water shall be checked for microbial growth, cleaned and changed regularly.

3.2.2 Any other building systems equipment not listed above that requires routine maintenance shall be included in the preventative maintenance schedule.

3.2.3 The maintenance schedule shall be updated to show all maintenance performed on equipment. The schedule shall include the date that such maintenance was performed and the name of the person or company performing the work.

3.2.4 The maintenance schedule shall be made available upon request to any representative of an enforcing agency.

3.3 Temperature (ASHRAE 55-1981, Paragraph 5.1 - 7.3)

The ASHRAE standard specifies conditions in which 80% or more of the occupants should find the environment thermally acceptable. In its simplest form, temperatures shall be maintained within the parameters outlined below, as established by ASHRAE 55.1981.

In winter: 68 - 74.5 degrees F (71 degrees F is optimum)

In summer: 73 - 79 degrees F (76 degrees F is optimum)

Higher summer temperatures up to 82.5 degrees F are allowed if air movement is proportionately increased up to 160 feet per minute (fpm). This is a good breeze. More often air would be moving at about 30 fpm.

Lower temperatures down to 59 degrees F are allowed for persons doing heavy physical labor. Higher temperatures up to 84 degrees F are allowed for people wearing minimal, lighter weight clothing.

3.4 Humidity (ASHRAE 62-1989, Paragraph 5.11)



Relative humidity measurements shall be maintained in accordance with paragraph 5.11 of the ASHRAE Standard 62-1989.

### 3.5 Air Circulation (ASHRAE 62-1989, Paragraph 6.1.3)

Air flow must reach the breathing zone of building occupants. Air must not get short-circulated back into the air exhausts before reaching people. No dead air pockets shall be permitted.

### 3.6 Fresh Air and Other Indoor Contaminants (ASHRAE 62-1989, Paragraph 6)

3.6.1 Outdoor air which is supplied to the building must be of good quality, or it must be cleaned before use. The amount of outdoor air which must be supplied varies, depending on the type of activity in the space.

3.6.2 New Jersey Institute of Technology shall implement measures such as the relocation of air intakes and other pathways of building entry, where necessary, to restrict the entry of outdoor air contaminants such as vehicle exhaust fumes, into the building.

3.6.3 When general ventilation is inadequate to control air contaminants emitted from point sources within workplaces, New Jersey Institute of Technology shall implement other control measures such as local source capture exhaust ventilation or substitution.

3.6.4 Sources of indoor pollution must be collected and removed close to the source. Separate exhaust ventilation in places such as cooking areas, lavatories, print shops, laboratories may be required if there are no windows or if there is not sufficient mechanical ventilation to remove odors from such areas.

3.6.5 Air inlets must be located to avoid sources of pollution from the outdoors. Odors and irritants must be eliminated. Enough flowing fresh air will normally dissipate such odors and irritants.

### 3.7 Cleaning and Maintenance Chemicals, Pesticides and Other Hazardous Chemicals in the Workplace

3.7.1 All supervisors shall assure that all chemical-containing products are used and applied according to manufacturers' recommendations.

3.7.2 All supervisors shall furnish and maintain the appropriate Material Safety Data Sheets for their chemical-containing products. All Material Safety Data Sheets shall be made accessible to all employees.

3.7.3 New Jersey Institute of Technology shall inform employees working in areas to be treated with potentially hazardous chemicals, at least within 24 hours prior to application, of the type of chemicals intended to be used.

### 3.8 Mold, Mildew, Microbial Growth – Microbial Contamination (N.J.A.C. 5:23-11.10)

3.8.1 New Jersey Institute of Technology shall control microbial contamination in buildings by routinely inspecting for, and promptly repairing, water leaks that can promote the growth of biologic agents. Microbial contamination in buildings shall also be controlled by promptly drying, replacing, removing, or cleaning damp or wet materials.

3.8.2 New Jersey Institute of Technology shall take measures to remove visible microbial contamination (mold/mildew) in ductwork, humidifiers, other HVAC and building system components, or on building surfaces when found during regular or emergency maintenance activities or during visual inspection.

3.8.3 Porous building materials contaminated with microbial growth must be replaced or disinfected, such as water-stained ceiling tiles. Only un-contaminated steam or potable water may be used for humidification. Air ducts and drain pans must be inspected on a routine maintenance schedule and, when necessary and appropriate, cleaned.

### 3.9 Smoking (N.J.A.C. 5:23-11.3)

3.9.1 In accordance with Section 5:23-11.3(a)2 of Subchapter 11, "Indoor Air Quality Standards and Procedures for Buildings Occupied by Public Employees" which specifically states that "the air from designated smoking areas shall not be re-circulated to non-smoking areas in buildings covered by this subchapter" and in accordance with the recommendations of both the United States Environmental Protection Agency and the United State Surgeon General regarding the public health hazard related to the inhalation of secondary smoke, New Jersey Institute of Technology has declared itself to be a SMOKE-FREE institution as of October 16, 1993.

3.9.2 Smoking is permitted in any building on campus, including residence halls.

3.9.3 New Jersey Institute of Technology shall post signs that will clearly inform anyone entering the workplace that smoking is prohibited.

### 3.10 Laboratories and Other Industrial Facilities

These facilities must comply with each aforementioned requirements, except in cases where an Indoor Air Quality problem involves a source of chemical contamination. In such cases, New Jersey Institute of Technology must comply with air contaminant levels regulated by the Public Employees Occupational Safety and Health Act.

### 3.11 Renovation and Construction Work Practices and Procedures

#### 3.11.1 General

During renovation, New Jersey Institute of Technology shall assure that work procedures and appropriate controls are utilized to minimize degradation of the indoor air quality of public employees performing such activities and public employees occupying other areas of the building.

3.11.2 Indoor renovation and construction projects which will degrade the building's indoor air quality should be scheduled at such a time to lessen the impact of employee exposure to air contaminants. This includes, but is not limited to, the application of pesticides, painting, and carpet installation, regardless of length of exposure time.

3.11.3 It is a recommendation to isolate areas of renovations, painting, carpet laying, etc., from occupied, non-construction areas, through the use of physical barriers and separation of involved ventilation systems. If possible, this type of work shall be performed in the evening, on weekends, or during vacations/holidays. Supplying a maximum amount of ventilation to the areas, initially on a 24-hour basis can assist in rapid dispersion of contaminant levels.

### 3.12 Work Plan Development

3.12.1 Before the commencement of remodeling, renovation, or similar activities in which the indoor air quality of public employees may be affected, the project supervisor shall meet with the contractor or individual(s) performing the work and shall develop and implement a work plan designed to minimize the entry of air contaminants to other areas of the building during and after performance of the work.

3.12.2 The work plan shall consider all of the following where appropriate:

- Requirements of this standard.
- The Director of Mechanical Engineering Services shall be contacted and informed of work to be done and to ensure that implementation of means to assure that HVAC systems continue to function effectively during remodeling and renovation activities.
- Isolation or containment of work areas and appropriate negative pressure containment.
- Air contaminant suppression controls or auxiliary air filtration/cleaning.
- Controls to prevent air contaminant entry into the HVAC air distribution system.

3.12.3 When painting projects are accomplished the following shall be followed:

- Implementation of Work Plan, as above.
- 
- Mechanical Engineering Services shall be contacted and informed of location to be painted. If necessary and appropriate, Mechanical Engineering Services shall open affected air handlers and ensure that they remain open for a 24 hour period.
- If project permits, non-odorous paint(s) shall be selected.
- If necessary, paint additives shall be used to diminish paint odors.
- If painting is accomplished during occupied hours, box fans shall be placed in the perimeter of painting location so as to increase circulation of fresh air.
- All paint cans and materials shall be completely closed and sealed when not in use.
- Painting projects should be scheduled for times when full occupancy is not expected; such as weekends, nights, or end of the work week.

3.2.3 When carpet installation projects are accomplished the following shall be followed:

- Implementation of Work Plan, as above.
- Mechanical Engineering Services shall be contacted and informed of location to be carpeted. If necessary and appropriate, Mechanical Engineering Services shall open affected air handlers and ensure that they remain open for a 24-hour period.
- When necessary and appropriate, ionizers shall be used to help diminish carpet odors.
- If carpet installation is accomplished during occupied hours, box fans shall be placed in the perimeter of location so as to increase circulation of fresh air.
- Carpeting projects should be scheduled for times when full occupancy is not expected; such as weekends, nights, end of work-week.
- The University should seek out preferred suppliers that can cure new carpets, expanded foam furniture and fixtures, removing residual hazardous gases, prior to installations. When practical, the University will attempt to schedule new furniture and carpet installations on a day preceding the weekend or holiday, to allow time for off gassing while the building is unoccupied.

#### 5.0 Prior Notification of Public Employees Who Work in the Building

5.1 The department in charge of work activities as described above shall notify public employees at least 24 hours in advance or promptly in emergency situations, of work to be performed in the building that may introduce air contaminants into their work area.

5.2 Notification shall include anticipated adverse impacts on indoor air quality or workplace conditions, and duration of said adverse impacts.

#### 5.3 Renovation Work and Cleaning Operations

Renovation work, new construction and/or cleaning operations which result in the diffusion of dust, stone, and other small particles, toxic gases or other harmful substances in quantities hazardous to health shall be safeguarded by means of local ventilation or other protective devices to insure the safety of the public and shall be performed in accordance with Section 3019 of the BOCA National Building Code, 1990 edition, the requirements of the building subcode.

5.4 Renovation areas in occupied buildings shall be isolated and dust and debris shall be confined to the renovation or construction area. Following the completion of any construction or renovation work, the supervisor shall ensure that appropriate measures are taken to allow materials to off-gas prior to employee occupancy. The supervisor or the University's hired contractor shall check all product labels or seek and obtain information from the manufacturers of any product used on campus to decipher whether or not the products contain VOCs (such as solvents, formaldehyde, or isocyanate) which could be emitted during regular use. This information shall be used to select products and to determine necessary measures to be taken to comply with this section.

5.5 The following products shall be checked prior to use: paints, adhesives, sealants, solvents, or installation of insulation, particle board, plywood, floor coverings, carpet backing, textiles, or other materials in the course of renovation or construction.

## **4.0 Indoor Air Quality Complaint Process for University Employees**

4.1 The procedures below are to be followed when an employee wishes to file an initial indoor air quality complaint to the appropriate University department.

### **4.1.2 Temperature Related Complaints**

If it is a temperature related complaint, please call Mechanical Engineering Services directly on 973-596-3123. Do not complete a complaint form. The issue will be managed by the Building Management Specialist.

### **4.1.2 Lack of Fresh Air Complaints**

If it is a complaint regarding lack of fresh air, please call Mechanical Engineering Services directly on 973-596-3123. Do not complete a complaint form. The issue will be managed by the Building Management Specialist.

### **4.1.3 Odor Complaints**

If it is a complaint regarding unusual or chemical odors, please call Mechanical Engineering Services directly on 973-596-3123. Do not complete a complaint form. The issue will be managed by the Building Management Specialist.

4.1.4 File all other complaints included supposed health or illness related problems that are assumed to be building related:

4.1.4.1 The employee should contact the Office of Environmental Health and Safety at 973-596-3059 and explain the nature of the issue.

4.1.4.2 The Office of Health and Environmental Safety shall review the complaint form and assign it a case number. As necessary and appropriate, the Office of Health and Environmental Safety shall delegate the responsibility of abatement action to the proper department. (e.g. Facilities; Building Services; Mechanical Engineering Services; Housing Operations.)

4.1.4.3 The Office of Health and Environmental Safety shall contact the employee within five working days of receipt of the complaint and notify the employee of the corrective measure(s) taken or to be taken with tentative dates for completion.

4.1.4.4 Corrective measures shall be carried through until the required indoor air quality measurements are achieved.

## **4.2 Filing an Indoor Air Quality Complaint to an Official State Agency**

4.2.1 If an employee believes that the University has not appropriately responded to the indoor air quality complaint, the employee has the right to file her/his complaint with an outside state agency.

### **4.2.2 Filing a Formal Complaint to a State Agency**

If the condition persists or if the University fails to respond to the complaint within 5 working days, the employee may request further action by notifying the Department of Health & Environmental Safety (DOH) in writing.

NJ Department of Health & Senior Services  
PEOSH Program  
P.O. Box 360  
Trenton, NJ 08625-0360  
Phone: (609) 984-1863  
Fax: (609) 984-2779

4.2.3 Within five working days of receipt of the complaint, the Department shall notify New Jersey Institute of Technology that a complaint has been filed.

4.2.4 If New Jersey Institute of Technology has had an opportunity to respond to the complaint as outlined above, then the enforcing agency shall proceed to its investigation.

4.2.5 If the employee files the complaint directly to the Department, the enforcing agency shall give New Jersey Institute of Technology the opportunity to respond as outlined above.

4.2.6 Please note that there are generally two complaint categories: health related and building related

## **5.0 Recording Keeping**

### **5.1 Maintenance Records**

The Office of Physical Plant shall maintain inspection and maintenance records as required and appropriate, which shall include the specific remedial or maintenance actions taken, the name and affiliation of the individual performing the work, and the date of the inspection or maintenance activity. Records shall be maintained for three years.

### **5.2 Written Indoor Air Quality Compliance Program**

The Office of Health and Environmental Safety shall maintain the written compliance program and plan as required and appropriate under N.J.A.C. 5:23-11.

### **5.3 Employee Complaints**

The Office of Health and Environmental Safety shall maintain a record of employee complaints of signs or symptoms that may be associated with building-related illness as required and appropriate under N.J.A.C. 5:23-11. These complaints shall be promptly transmitted to the designated person for resolution.

### **5.4 Retention of Records**

The Office of Health and Environmental Safety shall retain records required to be maintained under this section for at least three years, or rendered irrelevant due to HVAC system replacement or redesign.

### **5.5 Availability**

The records required to be maintained by this paragraph shall be available on request to employees and/or their designated representative and State/Federal Agencies for examination and copying.

### **5.6 Transfer of Records**

Should New Jersey Institute of Technology cease to do business, records that are required to be maintained shall be provided and retained by the successor employer.

## Definitions

**Acceptable Indoor Air Quality:** Air in which there are no known contaminants at harmful concentrations as determined by cognizant authorities and with which a substantial majority (80% or more) of the people exposed do not express dissatisfaction.

**Air Contaminants:** Refers to substances contained in the vapors from paint, cleaning chemicals, pesticides, outdoor air pollutants and other airborne substances which singularly, or together, may cause material impairment to employees working within the non-industrial environment.

**ASHRAE:** The American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc. ASHRAE 55-1981 - Thermal Environmental Conditions for Human Occupancy. ASHRAE 62-1989 - Ventilation for Acceptable Indoor Air Quality.

**Building-related Illness:** This describes specific medical conditions of known etiology which can be documented by physical signs and laboratory findings. Such illnesses include sensory irritation when caused by known agents, respiratory allergies, asthma, nosocomial infections, humidifier fever, hypersensitivity pneumonitis, Legionnaires disease, and the signs and symptoms characteristic of exposure to chemical or biologic substances such as carbon monoxide, formaldehyde, pesticides, endotoxins, or mycotoxins.

**Building Systems:** Include, but are not limited to, the heating, ventilation and air conditioning (HVAC) system, the potable water systems, the energy management system and all other systems in a facility which may impact indoor air quality.

**Complaint:** Employee complaints are separated into 2 categories: Those that require an Indoor Air Quality Complaint Form to be completed; and, those that only require a telephone call to the appropriate department. Page 9 of this document explains the complaint process in detail.

**Contaminant :** Any unwanted airborne constituent that may reduce the quality of air.

**Department:** Means the Department of Health & Environmental Safety, unless the context clearly indicates otherwise.

**Designated Person:** A person who has been given the responsibility by the employer to take necessary measures to assure compliance with this section and who is knowledgeable in the requirements of this standard and the specific building systems servicing the affected building or office.

**Designated Smoking Area:** New Jersey Institute of Technology is a smoke free institution, this definition is not applicable to the University's Indoor Air Quality Program.

**Employer:** Employer means public employer and shall include any person acting directly on behalf of, or with the knowledge and ratification of:

- a. The State, or any department, division, bureau, board, council, agency or authority of the State, except any bi-state agency; or,
- b. Any county, municipality, or any department, division, bureau, board, council, agency or authority of any county or municipality, or of any school district or special purposes district created pursuant to law.

**Health-related Problems:** Any complaint that involves a symptom such as headaches, nausea, dizziness, etc.

**HVAC System:** The collective components of the heating, ventilation and air-conditioning system including, but not limited to, filters and frames, cooling coil condensate drip pans and drainage piping, outside air dampers and actuators, humidifiers, air distribution ductwork, automatic temperature controls, and cooling towers.

**Non-industrial Work Environment:** An indoor or enclosed work space such as, but not limited to, offices, educational facilities, commercial establishments, and healthcare facilities, and office areas, cafeterias, and break rooms located in manufacturing or production facilities used by employees. Non-industrial work environments do not include manufacturing and production facilities, residences, vehicles and agriculture operations.

**Renovation and Remodeling:** Building modification involving activities that include but are not limited to: removal or replacement of walls, ceilings, floors, carpet, and components such as moldings, cabinets, doors and windows; painting, decorating, demolition, surface refinishing, and removal or cleaning of ventilation ducts.

**Exhibit E- 4- 12B**

**Indoor Air Quality Standard Inspection Checklist**

Location: \_\_\_\_\_

Inspection #: \_\_\_\_\_


Inspector: \_\_\_\_\_ Date: \_\_\_\_\_

<b>COMPLIANCE PROGRAM - GENERAL REQUIREMENTS</b>		<b>Y</b>	<b>N</b>	<b>N/A</b>
<b>N.J.A.C.</b> · <b>12:100-</b> 13.3(a)	Has a designated person been identified to handle the implementation and documentation of the New Jersey indoor air quality standard? Name/Title/Phone #: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13.3(a)	Has the employer ensured that the designated person is familiar with all the requirements of the standard?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13.3(a)1	Is there an established, operating and documented preventive maintenance schedule for the heating, ventilation and air conditioning (HVAC) system in accordance with the manufacturer's recommendations or accepted practice for the HVAC system?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13.3(a)1	Does the HVAC preventive maintenance schedule include: checking and/or changing air filters, checking and/or changing belts, lubrication of equipment parts, checking the functioning of motors and confirming that all equipment is in operating order?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13.3(a)1	Are damaged or inoperable components of the HVAC system replaced or repaired as appropriate?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13.3(a)1	Are parts of the HVAC system with standing water checked visually for microbial growth?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13.3(a)2	Is general or local exhaust ventilation used where housekeeping and maintenance activities could reasonably be expected to result in exposure to hazardous substances above applicable exposure limits?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13.3(a)3	When the carbon dioxide level exceeds 1,000 parts per million, is the HVAC system checked and repaired as necessary to ensure the system is operating properly?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13.3(a)4	In office buildings/schools, when the temperature is outside of the range of 68 to 79 degrees Fahrenheit, is the HVAC system checked and repaired as necessary to ensure the system is operating properly?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13.3(a)5	When a contaminant is identified in the make-up air supply, is the source of the contaminant eliminated or the make-up inlets and/or exhaust air outlets relocated to avoid entry of the contaminant into the air system?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13.3(a)6	If buildings do not have mechanical ventilation, are windows, doors, vents, stacks, and other portals used for natural ventilation operating properly?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13.3(a)7	Are complaints promptly investigated that involve signs or symptoms that may be associated with Building-Related Illness or Sick Building Syndrome?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13.3(a)8	Does the employer have a written plan that meets the requirements of the subchapter?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13.3(a)9	Is the written compliance plan reviewed and updated annually to reflect new or updated procedures?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



<b>CONTROLS OF SPECIFIC CONTAMINANTS</b>		<b>Y</b>	<b>N</b>	<b>N/A</b>
13.4(a)	When point sources generate airborne levels of contaminants above applicable limits, is local exhaust ventilation or substitution used to reduce the exposure levels to below the limits?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13.4(b)	Does the employer control microbial contamination by promptly repairing water intrusion that can promote growth of biologic agents?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13.4(c)	Does the employer remediate damp or wet materials by drying, replacing, removing, or cleaning same within 48 hours of discovery and continue remediation until water intrusion is eliminated?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13.4(d)	Are visible microbial contaminants removed from ductwork, humidifiers, dehumidifiers, condensate drip pans, heat exchange components, and other HVAC and building system components, or on building surfaces, such as carpeting and ceiling tiles, when found during regular or emergency maintenance activities or during visual inspection?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>RENOVATION/REMODELING</b>		<b>Y</b>	<b>N</b>	<b>N/A</b>
13.5(a)	During renovation work and/or new construction, are local ventilation or other protective devices used to safeguard employees and students from dust, stone and other small particles, toxic gases or other harmful substances in quantities hazardous to health?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13.5(a)	Are renovation areas in occupied buildings isolated so that air contaminants, dust, and debris are confined to the renovation or construction area by use of measures such as physical barriers, pressure differentials, and/or performing work during periods of minimal occupancy?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13.5(a)(1)	Are work areas cleaned and aired out as necessary prior to re-occupancy?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13.5(a)(2)	Is hazard information used to select products and to determine necessary measures to be taken?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13.5(b)	Before selection and use, are product labels and (M)SDS sheets checked or is information obtained on whether the use of paints, adhesives, sealants, solvents or installation of insulation, particle board, plywood, floor coverings, carpet backing, textiles or other materials contain volatile organic compounds such as solvents, formaldehyde, or Isocyanates that could be emitted during regular use?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13.5(c)	Are employees notified at least 24 hours in advance, or promptly in emergency situations, of work to be performed on the building that may introduce air contaminants into their work area?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

<b>RECORDKEEPING</b>		<b>Y</b>	<b>N</b>	<b>N/A</b>
13.6(a)	Is the maintenance schedule updated to show all maintenance performed on the building systems?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13.6(a)	Does the maintenance schedule include the dates that the building systems maintenance was performed and the names of the persons or companies performing the work?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13.6(b)	Are maintenance schedules with the information required by the indoor air quality standard retained for at least three years?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13.6(b)	Are the records required to be maintained by this section available for inspection by PEOSH?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13.6(b)	Are the records required to be maintained by this section available for inspection by employees and employee representatives for examination and copying within 10 working days of request?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>EMPLOYER'S RESPONSE TO A SIGNED COMPLAINT</b>		<b>Y</b>	<b>N</b>	<b>N/A</b>
13.7(a)	If the employer receives a complaint notification from the PEOSH Program about an indoor air quality problem, is a written response sent back to PEOSH within 15 working days?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13.7(a)	Do the employer's written responses to complaint notifications received from the PEOSH Program about an indoor air quality problem include any combination of the following: 1) A statement that the complaint is unfounded; 2) A description of any remedial action already taken; 3) An outline of any remedial measures planned but not yet taken with a timetable for completion; and/or 4) A statement that a study of the problem, with a timetable for completion of the study, has been initiated?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13.7(b)	If the employer plans remedial measures or a study initiated in response to a complaint notification received from the PEOSH Program, is a written report describing the remedial measures implemented and/or a copy of a study's report submitted to the PEOSH Program within 15 working days of completion?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13.7(c)	If remedial work is initiated in response to a complaint notification from the PEOSH Program, are permits obtained and work performed as required by N.J.A.C. 5:23 (the New Jersey Uniform Construction Code)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13.8(a)	If available, are the following documents provided to the PEOSH Program when requested in response to an employee complaint: 1) As-built construction documents; 2) HVAC system commissioning reports; 3) HVAC systems testing, adjusting and balancing reports; 4) Operations and maintenance manuals; 5) Water treatment logs; and 6) Operator training materials?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

	UNIVERSITY SAFETY ENVIRONMENTAL MANAGEMENT SYSTEM University Heights Newark, New Jersey 07102	
		<b>Document Control No.</b> <b>USEMS SOP S - 4 - 1</b>
<b>Document Title: Emergency Action Plans</b> <b>29CFR 1910.38</b>		

## 1.0 Scope and Purpose

- 1.1 The NJIT Emergency Preparedness and Response Plan outlines the course of action and specifies responsibilities throughout the campus organization in the event of a major emergency. The President or senior administrator present whenever such an emergency reaches proportions beyond the capacity of routine procedures activates The Emergency Preparedness Plan. The campus will interact with City of Newark, Essex County and State of New Jersey Police and Emergency Management departments, and other agencies during an emergency as is possible. Simultaneously the campus Crisis Communications plan will be activated.
- 1.2 The purpose of this Plan is to describe the organization, staff and coordination necessary to ensure the protection of personnel and students in the event of an emergency evacuation occurring at University Heights, New Jersey campus and specified offsite activities under any emergency condition. The Plan recognizes the university's responsibilities and prescribes actions to be taken by respective departments within the university.
- 1.3 The major goals of the emergency preparedness and response plan are the preservation of life, the protection of property, and the continuity of campus operations. Secondary objectives include:
- A. Prescribing authority, responsibilities, functions, and operations of the campus emergency management organization, including the management of critical resources.
  - B. Coordinating emergency operations with those of other agencies.

For a more detailed review of campus business recovery activities refer to the master Emergency Preparedness and Response Plan.

## 2.0 Emergency Response Priorities

- 2.1 NJIT's emergency response will be guided by the following priorities. Some adjustment within these categories may be necessary depending on the context of a particular emergency.
- A. People** – NJIT's highest priority is the safety and well being of those who live, study, and work within the NJIT community.
  - B. Buildings used by dependent populations** - Residences, occupied classrooms and offices, childcare centers, occupied auditoriums, arenas and special event venues
  - C. Buildings critical to health and safety** - Medical facilities, emergency food supplies, sites containing potential environmental or health hazards
  - D. Facilities that sustain emergency response** - Energy systems and utilities, communications systems, computer installations, transportation systems
  - E. Classroom, research, and administrative buildings** - Unoccupied rooms and buildings intended to support NJIT's academic mission should be protected by any means that do not require the members of the NJIT community to assume undue risks to their own safety.

This emergency action plan must be kept in the workplace, and available to employees for review and must include:

- Procedures for reporting a fire or other emergency;
- Procedures for emergency evacuation, including type of evacuation and exit route assignments;
- Procedures to be followed by employees who remain to operate critical plant operations before they evacuate;
- Procedures to account for all employees after evacuation; and
- Procedures to be followed by employees performing rescue or medical duties, if any are planned.

### **3.0 Responsibilities**

#### **3.1 Department Supervisors**

- Ensure you are aware of the emergency procedures.
- Know the location of emergency equipment and evacuation routes.
- Ensure personnel in your area are aware of their responsibilities during an emergency.
- Identify physically challenged individuals in your program. Assign two aides for every physically challenged person.
- Identify at least two (2) volunteer employees for each shift to serve as Fire Wardens.
- Assure each Warden attends the Fire Warden meetings.
- Assure evacuation paths in the department remain unobstructed, adequately lit and Exit lights are operating
- Assist, when necessary, with customer or visitor evacuation and ensure they remain outside of and away from the building during an emergency evacuation.
- Take a headcount at the point of assembly outside of the building.

#### **3.2 Director of Environmental Health and Safety**

- Organize the campus emergency organization
- Assure the Emergency Plan is reviewed and updated as required by changes in the facility and personnel.
- Organize evacuation training for staff and Fire Wardens.

#### **3.3 Department Environmental Health and Safety Officers**

- Periodically assess the facility egress routes and assure none are obstructed.
- Periodically assess the facility exit lights and assure none are obstructed.
- Work with local fire officials to designate appropriate points for assembling the staff during an evacuation.
- Prepare site diagrams displaying all points of egress and assembly points for each department and assure the are placed in conspicuous spaces in the building

#### **3.4 Faculty**

- Know where the nearest exits are and guide students out of the building.
- 

#### **3.5 Staff**

- Announce the need to evacuate to all employees through the intercom system.
- Call Public Safety when alerted to an emergency.

### 3.6 Staff

- Know where to exit the building and where to assemble outside in the event an evacuation is required.
- Know what to do and where to go in the event a hurricane, tornado or hazardous material leak occurs.
- Report fires or other emergency situation to your supervisor and the receptionist.
- Use the pullbox fire alarm system when a fire is observed
- **No employee at NJIT is permitted to use a portable fire extinguisher unless he or she has been trained and has been authorized to do so.**

## NJIT Emergency Procedures

### REPORTING AN EVENT

1. Upon observing an emergency event, the employee will alert his or her supervisor and call Public Safety at Ext. 3111 and provide the following information:
  - A. Nature of the event
  - B. Location of the event
2. If it can be accomplished without risk, all electricity, except lights and computers, must be turned off and all gas feed valves must be shut.
3. Evacuate when prompted by continuous sounding fire alarms or by an official announcement, assure the route is safe before proceeding.

### EMERGENCY EVACUATION INSTRUCTIONS:

1. Upon hearing an alarm immediate action must be taken.
2. If it can be accomplished without risk, all electricity, except lights and computers, must be turned off and all gas feed valves must be shut.
3. Evacuate when prompted by continuous sounding fire alarms or by an official announcement, assure the route is safe before proceeding.
4. Be aware of and make use of designated primary and alternate evacuation routes.
5. Close doors and windows as you leave.
6. Leave the building in an orderly manner without rushing or crowding.
7. Provide aid to those who need assistance in an emergency evacuation situation.
8. Be aware of and follow instructions given by your supervisor and other officials, as you will be asked to proceed on foot to designated assembly areas, or evacuate the campus.
  - A. Evacuate to at least 300 feet from the building to the designated area if it remains safe.
  - B. Stay out of the way of emergency vehicles.
9. Department Supervisors ascertain if all employees have evacuated.
10. Report any individuals that have been injured or left behind to emergency responders.
11. Do not re-enter the building until all-clear is given by official announcement.

## EVACUATION EMERGENCIES

In most cases, the evacuation would apply only to the building that is immediately affected. In some cases, such as local terrorism, flooding, or earthquake the evacuation could apply to the entire campus.

- Major Fire or Explosion
- Hazardous Materials Release
- Chemical or Radiation Spill
- Aircraft Collision with Building
- Flooding
- Earthquake
- Structural Failure
- Asbestos Release
- Bomb Threat
- Weapons
- Local Level Terrorism

## SEVERE OR INCLEMENT WEATHER WARNING

### 1. SEEK SHELTER IMMEDIATELY IN DESIGNATED AREAS

#### A. If inside a building:

1. Go to the lowest level of the building, if possible
2. Stay away from windows
3. Go to an interior hallway
4. Use arms to protect head and neck in a "drop and tuck" position

#### B. If there is no time to get inside:

1. Lie in a ditch or low-lying area or crouch near a strong building
2. Be aware of potential for flooding
3. Use arms to protect head and neck in a "drop and tuck" position
4. Use jacket, cap or any similar items, if available, to protect face and eyes

## TORNADO WATCH OR WARNING


### 1. IF TORNADO IS *SIGHTED* NEAR THE CAMPUS

2. Dial the Public Safety phone number to report tornado sighting
3. Seek a safe shelter inside of the building

### 4. IF A TORNADO IS IMMINENT NEAR YOU

5. Use interior hallways away from building's exterior windows as a tornado shelter

- A. close all doors to rooms with exterior windows
- B. avoid all windows and other glassed areas
- C. the most dangerous locations of a building are usually along south & west sides, and at corners
- D Protect yourself by going into a "drop and tuck" position

	UNIVERSITY SAFETY ENVIRONMENTAL MANAGEMENT SYSTEM University Heights Newark, New Jersey 07102	Revised
		<b>Document Control No.  USEMS SOP S - 4 - 2</b>
<b>Document Title: Employee Hazard Communication  29 CFR 1910.1200</b>		

## 1.0 Purpose and Scope

- 1.1 The purpose of this procedure is to describe the program for informing all employees of the risks of chemical hazards associated the work place and how they can protect themselves.

## 2.0 Responsibilities

- 2.1. The Director for Environmental Health and Safety with the assistance of the Department Environmental Safety and Health Officer (DESHO is responsible for administering the *HAZCOM Plan* throughout the designated department).
- 2.2 The Director for Environmental Health and Safety with the assistance of the DESHO is responsible for reviewing the policies outlined in the *NJIT Chemical Hygiene Plan* and the *HAZCOM Plan* with Department Chairs and Facility Managers.
- 2.3 The designated DESHO in each department is responsible for implementation of the HAZCOM Plan in their respective departments
- 2.4 The Principal Investigator is responsible for conducting an inventory of the workplace for chemicals and toxic substances, maintaining a current record of the inventory, and ensuring a (M)SDS is available for the chemicals inventoried and accessible to all employees that are potentially exposed.
- 2.5 The Purchasing Department will insure that on all chemical orders instructions are printed for the supplier to send a copy of the (M)SDS to the Office of Environmental Health and Safety.
- 2.6 The DESHO is responsible for the training education and information available to each new employee, transferred employee, and employee observed not following the program requirements.

Note: As of June 1, 2015, SDS (Safety Data Sheets) will be required to be provided by all chemical manufacturers in order to conform to the revised HAZCOM 2012 standard. (M)SDS or MSDS Material Safety Data Sheets will be replaced as new SDS are received to the Office of Environmental Health and Safety.

## 3.0 Assessment, Prevention and Control Procedures


- 3.1 Copies of the *NJIT Hazard Communication Program* will be available on-line. The central file of *(M)SDS Files* is maintained in the Public Safety Office and are accessible 24 hours a day, seven days a week. The master *(M)SDS Files* is available during normal business hours in the Office of Environmental Health and Safety. In addition, to (M)SDS, a copy of the last chemical inventory by facility will be maintained in both offices.
- 3.2 The Director of Environmental Health and Safety with the assistance of the DESHO will:
- A. Train anyone providing assistance implementing the Hazard Communication Plan (i.e., facility managers or department supervisor).



- B. Maintain an inventory of hazardous chemicals for the Department by facility.
  - C. Submit the inventory for the Department annually to the University Safety and Environmental Program Director for review and compilation toward the Community Right to Know Plan (NJIT SOP 4-E 9)
  - D. Maintain training records of HAZCOM training and periodically submit to the Assistant Director.
  - E. Identify non-routine task that may involve the introduction of new chemicals into the workplace.
- 3.3 The Department Environment, Safety and Health Officer will:
- A. Identify chemicals found in the workplace, review the associated hazards, and adverse effects.
  - B. Ensure the *Chemical Hygiene Plan* and *HAZCOM Plan* are current and available to all employees.
  - C. Communicate to employees the chemical hazards involved when performing non-routine tasks.
  - D. Instruct employees relocated to new facilities/areas the physical and health hazards associated with the chemicals in their work area.
- 3.4. The DESHO reviews the *HAZCOM Plan* with new employees, at the time of hire, and documents this review on Hazard Communication Training Documentation Form
- 3.5 All Staff will:
- A. Review the *HAZCOM Plan* during the first 2 weeks of employment.
  - B. Be familiar with (M)SDS and the location of the (M)SDS File/Binder.
  - C. Label secondary containers upon transfer of chemicals.
  - D. Attend refresher training provided by DESHO as required.
  - E. Consult with the Facility Manager, Department Chair and/or DESHO regarding the chemical hazards involved when performing non-routine tasks.
- 3.6 All hazardous chemical containers must be labeled unless the contents are designated for immediate and complete use during the shift. Labeling of containers will be in accordance with *The NFPA Hazard Identification System* or conform to the *Global Harmonizing System (GHS)*.
- 3.7 Chemical inventories (e.g., exposure records) must be kept for at least 30 years. These records should identify the chemical, where it was used, and when it was used. The Department Environmental Safety and Health Officer is responsible for submitting chemical inventories to the University Safety and Environmental Program Director for archival.
- 3.8 When relevant, results of environmental and biological monitoring, designated as exposure records and analyses using exposure or medical records, will be preserved and maintained for at least 30 years. The University Safety and Environmental Program Director is responsible for archival of these documents.
- 3.9 Medical records must be kept for the duration of employment plus 30 years. The University Safety and Environmental Program Director is responsible for archival of these documents.
- 3.10 Research staff using/storing hazardous chemicals in a facility must provide (M)SDS sheets to the DESHO to be included in the (M)SDS File/Binder. These chemicals and (M)SDSs will be inventoried and indexed separately from facility inventories.
- 3.11 Environmental Health and Safety and/or the Director of Environmental Health and Safety will *audit* the *HAZCOM Plan annually*.

Note: As of June 1, 2015, compliance with the GHS will be required and replace *The NFPA Hazard Identification System*.

Note: As of June 1, 2016, NJIT will only have SDS on file in order to comply with the revised HAZCOM 2012 standard. All (M)SDS will be replaced indefinitely.

	UNIVERSITY SAFETY ENVIRONMENTAL MANAGEMENT SYSTEM University Heights Newark, New Jersey 07102	
		<b>Document Control No.</b> <b>USEMS SOP S - 4 - 3</b>
<b>Document Title: Laboratory Chemical Hygiene Plan</b> <b>29 CFR 1910.1450</b>		

## 1.0 Purpose and Scope

- 1.1 This program applies to all laboratory personnel who work with hazardous chemicals. These lab-specific procedures, when combined with the General Procedures for Chemical Laboratories comprise a comprehensive Chemical Hygiene Plan designed to protect lab personnel from the health hazards of chemicals used in the laboratory.

## 2.0 Responsibilities

### 2.1 Administration

- NJIT is responsible for ensuring the safety of its employees and for complying with all related requirements of state and federal regulations. Because of the importance the university places on safety, the administration encourages employees at all levels to promote positive attitudes regarding safety, to incorporate safety into their work practices, and to cooperate fully in the implementation of safety-related programs.

### 2.2 Faculty/Principal Investigator

- The Faculty/Principal Investigator is charged with adapting and implementing a lab-specific Chemical Hygiene Plan (CHP). This includes maintaining a chemical inventory, ensuring access to material safety data sheets, developing written standard operating procedures (SOPs) for use of highly hazardous chemicals, enforcing safety practices, providing or scheduling employee training, and reporting hazardous conditions to the Department Environmental Safety and Health Officer. The supervisor must also review the lab-specific SOPs and Chemical Hygiene Plan annually and update the documents as necessary.
- The first time you customize your Chemical Hygiene Plan and Chemical Inventory, send a copy to the Director of Environmental Affairs for review. Electronic submission is preferred, but a printed copy is also acceptable.
- The Chemical Inventory should be updated whenever new hazardous materials are brought into the laboratory and updated list once again forwarded to the Director of Environmental Affairs.

### 2.3 Lab Workers

- Lab Workers are responsible for observing all appropriate practices and procedures contained in the Chemical Hygiene Plan as well as other general safety practices, for attending designated training sessions, and for reporting hazardous or unsafe conditions to the PI or DESHO. Any deviation from procedures involving hazardous chemicals requires prior approval.

### 2.4 Department Environmental Safety and Health Officer

- The specific responsibility for developing and assisting in the implementation of NJIT programs for health and safety in laboratories resides with the Department Environmental Health and Safety Officer (DEHSO). The DESHO is designated as the Department Chemical Hygiene Officer, performs the lead role in this effort. The DESHO will perform periodic lab safety reviews, assist conducting General

Laboratory Safety Training and provide technical guidance in development and implementation of lab-specific Chemical Hygiene Plans.

### **3.0 General Laboratory Safety Rules**

- 3.1 Safety should be thought about, acted upon, and encouraged until it becomes a habit for all workers. Every laboratory worker will observe the guidelines for *General Safety In Laboratories*.
- 3.2 Prior to ordering any hazardous materials, the material, equipment and nature of the work to be performed should be discussed with the Director of Environmental Affairs.
- 3.3 Prior approval of the Faculty/Principal Investigator is required for access to a laboratory. Certain operations such as working alone after hours or leaving experiments or equipment running unattended after hours require prior approval. Other procedures requiring prior approval include:
  - 3.4 Ordering and Storing Chemicals  
The general procedure *Ordering and Storing Chemicals* contains information concerning the ordering, use and storage of hazardous chemicals, and discusses labeling requirements for chemical containers. Materials should be ordered through the Director of Purchasing to assure an (M)SDS is obtained. The general procedure *Flammables and Combustibles* provides guidance regarding storage of flammable and combustible liquids.
  - 3.5 Lab workers are not permitted to remove transport hazardous waste from a laboratory unless he / she has passed the *Hazardous Waste Training* program.

### **4.0 Chemical Inventory**

- 4.1 The Faculty/Principal Investigator is responsible for ensuring maintenance of an accurate and current chemical inventory. *Chemical Inventory Criteria* discusses the type of chemicals required to be included in the chemical inventory. (See Exhibit 4-1)
- 4.2 The first time you customize your Chemical Hygiene Plan and Chemical Inventory, send a copy to the DESHO. Electronic submission is preferred, but a printed copy is also acceptable. Subsequent changes in the inventory should be forwarded to the Director of Environmental Affairs.
- 4.3 Material Safety Data Sheets (MSDS)  
Prior to using any chemicals, laboratory personnel will make sure they are aware of the health risks, chemical reactivity, and safe handling practices. The (M)SDS can be a ready source of this information. (M)SDSs accompany shipments of chemicals, or can be obtained from the manufacturer/supplier of the chemical. The NJIT USEMS webpage has links to some of these vendors.
- 4.4 An (M)SDS for each hazardous chemical must be available in the lab or department. The (M)SDS must be readily accessible to all lab personnel during working hours. (M)SDS may be maintained as hard copies in an organized fashion such as an *(M)SDS File or Binder*, or may be accessed through a bookmarked Internet site. If the Internet is used, each person in the lab who uses chemicals must be registered if required by the site and trained to use the site to access and print an (M)SDS.

### **5.0 Standard Operating Procedures for Highly Hazardous Chemicals**

- 5.1 Lab-specific SOPs providing detailed information relevant to safety and health considerations are required when laboratory work involves the use of highly hazardous chemicals as defined by OSHA. Consideration should be given to disposing of highly hazardous chemicals that are stored in the lab but are not in active use. *Hazard Control for Highly Hazardous Chemicals* can assist the Faculty/Principal Investigator in developing the special procedures required to minimize the risks posed by these chemicals.

5.2 Individual lab units will need to develop their own lab-specific Safety Plan, unique to the work, materials, equipment and hazards in the laboratory. Principal investigators (PI) should develop specific SOPs and training for highly hazardous chemicals unique to their research/activities. The Director of Environmental Affairs is available to assist the PI with the effort. Some laboratories already have these SOPs in place, while others will have to develop them. *Completing Standard Operating Procedures for Highly Hazardous Chemicals* and the *Standard Operating Procedures Template* are guidelines and a template for developing SOPs relevant to safety and health considerations. The customized written SOPs are an integral part of an individual lab unit Chemical Hygiene Plan and should be kept on file with this document.

### 5.3 Control Measures

The general procedure *Handling Chemicals* discusses laboratory chemical hoods, personal protective equipment and other control measures. Individual SOPs for highly hazardous chemicals will address control measures in detail. The DESHO is available to test the effectiveness of controls and may perform air monitoring if conditions warrant.

## 6.0 Injuries / Chemical Exposures

6.1 The general procedure *Handling a Chemical Exposure Injury* provides information on reporting work-related hazardous exposures and injuries and how to obtain medical care and surveillance. The outcome of an accident/exposure is affected by timely rendering of first aid and medical care. Therefore, this information should be reviewed prior to an accident/exposure occurring so that lab been administered and medical follow-up occurs, report all accidents and potential exposure situations to DESHO for investigation.

6.2 Below are the specific procedures for employees to follow when reporting an injury/ chemical exposure:

## 7.0 Spills

7.1 Spills of toxic substances should be resolved immediately. The general procedure *Handling Chemical Spills* describes proper spill response procedures.

## 8.0 Waste Disposal

8.1 When hazardous materials become outdated, unstable or are no longer of use to the laboratory, the Faculty/Principal Investigator is responsible for the proper disposal of the chemicals. After disposal the item should be deleted from the chemical inventory list.

8.2 The general procedure *Waste Disposal* provides summary guidelines for proper disposal of laboratory generated wastes and laboratory chemicals. For complete information regarding waste disposal refer to the complete USEMS SOPs 5-E-7 and 5-E-8 *Waste Disposal Procedures*.

## 9.0 Decommissioning a Laboratory

9.1 Prior to vacating or renovating a laboratory space, the Faculty/Principal Investigator is responsible for following the prescribed Laboratory Decommissioning Procedures.

## 10.0 Training


10.1 All employees who work in laboratories are required to receive general lab safety training as well as lab-specific training. The DEHS Lab Safety Coordinator conducts *General Laboratory Safety Training* that covers requirements of the OSHA Chemical Hygiene Standard, as well as general laboratory safety rules.

10.2 The Faculty/Principal Investigator is responsible for providing *Lab Specific Training* to all laboratory employees. This training is based on the contents of the lab-specific Chemical Hygiene Plan, including SOPs for highly hazardous chemicals.

## 11.0 Recordkeeping

11.1 Permanent records are maintained by DESHO including:

- A. Environmental monitoring done to determine the presence and concentration of hazardous substances in laboratories.
- B. Chemical hood performance testing in laboratories.
- C. Results of accident investigations and recommendations for actions to minimize the risk of recurrence.
- D. Records of General Laboratory Safety Training.
- E. The following records are maintained by the Faculty/Principal Investigator for each lab:
  1. An up-to-date, accurate Chemical Hygiene Plan
  2. Training records for lab-specific training which include employee signatures
  3. (M)SDS for all hazardous chemicals currently stored in the laboratory
  4. The inventory of hazardous chemicals stored in the laboratory
  5. SOPs for Highly Hazardous Chemicals currently in use in the laboratory

	UNIVERSITY SAFETY ENVIRONMENTAL MANAGEMENT SYSTEM University Heights Newark, New Jersey 07102	<b>Document Control No.</b> <b>USEMS SOP S - 4 - 4</b>
	<b>Document Title: Personal Protective Equipment</b> <b>Noise - 29CFR 1910.95,</b> <b>Personal Protective Equipment - 29CFR 1910.132, 29CFR 1910.133. 29CFR</b> <b>1910.134, 29CFR 1910.135, 29CFR 1910.136, 29CFR 1910.137 and 29CFR 1910.138</b> <b>Non-ionizing Radiation / Lasers - 29CFR 1926.54</b>	

## 1.0 Scope and Purpose

- 1.1 The New Jersey Institute of Technology is committed to providing a safe working environment for all employees, students and visitors. As part of this commitment, personal protective equipment (PPE) is provided to help mitigate the hazards inherent to particular tasks or lab environments. The purpose of this document is to review the requirements for PPE's, outline the means of methods for identifying hazards the require PPE and to provide a mechanism for the continuing review of PPE requirements.
- 1.2 This SOP will describe the PPE program, and assign responsibility for maintenance of the program.
- 1.3 Guidelines for selecting and using PPE for specific tasks are included at the end of this document.

## 2.0 Responsibilities

- 2.1 Responsibility for safe operation of NJIT facilities and for the safety of personnel proceeds from the individual and his/her supervisor, to department heads, Director of Environmental Health and Safety and ultimately to the University Safety and Environmental Management System Director.
- 2.2 The Department Head is responsible for providing adequate facilities, equipment, instruments, supervision, and instructions to control safety hazards and to comply with applicable state and federal requirements.
- 2.3 The Department Environmental Safety and Health Officer has the following responsibilities for assisting the department to identify and control hazards that require PPE.
  - A. Assisting principle investigators and faculty as needed to conduct hazard assessments, engineering controls, PPE selection and maintenance programs and staff training and education in the individual laboratories and for non-routine projects.
  - B. Performing the initial hazard assessment with department supervisors for non-laboratory tasks.
  - C. Assessing the availability of effective engineering controls that may eliminate or reduce the need for donning PPE.
  - D. Provide training in the use and maintenance of required PPE.
  - E. Performing periodic assessments for compliance with this SOP, providing feedback to the department head, Director of Environmental Health and Safety and University Safety and Environmental Management System Director.
  - F. Retaining a central file for staff education and training in the department.

- 2.4 Principle Investigators and Faculty are responsible for conducting the initial hazard analysis for each new project, eliminating hazards through appropriate engineering controls, identifying appropriate PPE for the hazards presented, establishing an appropriate PPE maintenance program, documenting the education / training of staff and students working the project and maintaining a current (M)SDS File / Binder for each project.
- 2.5 Department Supervisors are responsible for conducting the initial hazard analysis with assistance as needed from the Department Environmental Safety and Health Officer for each position in the department and non-routine tasks, eliminating hazards through appropriate engineering controls, identifying appropriate PPE for the hazards presented, establishing an appropriate PPE maintenance program and educating / training those working the project.
- 2.6 Employees and staff are responsible for participating in department education and training programs, using and maintaining the required PPE and reporting occupational hazards that could result in injury or illness to him or her self or a colleague.
- 2.7 The Director of Environmental Health and Safety (DHSCA) is responsible for assuring and active Personal Protective Equipment program has been established in each department, participates in the hazard analysis as requested by a DESHO, periodically reviews the thoroughness of Hazard Analyses and active use of PPE by employees, staff and visitors throughout the university. Annually, the USM reviews the overall PPE compliance initiative through each department submitting a summary report to each department head, DESHO and the University Safety and Environmental Management System Director.

### **3.0 Hazard Analysis**

- 3.1 For each occupational position in each department and for each research project and initial assessment of the materials and work methods will be conducted for the purpose of identifying the hazards the worker or student is potentially exposed. A separate hazard analysis will be conducted for non-routine tasks prior to the initiation of any work.
- 3.2 The hazard analysis will review the potential for injury to various parts of the body including inhalation, ingestion and absorption:
  - A. Head
  - B. Face and eyes
  - C. Hands
  - D. Feet
  - E. Respiration
  - F. Hearing
  - G. Other body part
- 3.3 The hazard analysis of specific tasks and experimental areas will be reviewed and updated yearly by the DESHO, or if warranted by routine observation.
- 3.4 Most hazards are task specific and the area where they are performed is subject to change with short notice.
- 3.5 The hazard Analysis will be kept on file in an area accessible to employees and staff of the department, in the respective laboratory or workspace with a copy of each retained by the DESHO.
- 3.6 Hazard analysis for new tasks will be added as soon as practical after the decision / discovery of the work to be performed.

### **4.0 Program Review**

- 4.1 The Director of Environmental Health and Safety will review this program annually with assistance as required from the Director of Environmental Affairs.
- 4.2 Feedback will be offered to each department head and DESHO.
- 4.3 A report summarizing the review will be submitted to the University Safety and Environmental Program Director.
- 4.4 **Electrical Work:** Work on energized electrical systems is actively discouraged at NJIT. Working in areas where it is possible to contact exposed electrical components requires use of hard hats and safety shoes which are specifically designed for high voltage resistance (Class B hardhats.) Specific tasks that have been identified as potentially exposing personnel to electrical flash hazards require additional fire retardant clothing. Where practical, projects requiring work on energized electrical systems should be contracted out to a qualified tradesman that maintains an effective electrical safety effort.
- 4.5 **Hazardous chemical/solvent use:** Gloves are required. The type of glove provided/ donned should match that recommended in the (M)SDS. If work is not done under a hood, respirators are required. In some cases, such as a spill with dangerous levels of hazardous vapors, use of Self Contained Breathing Apparatus (SCBA) is required. Appropriate footwear is required. Safety glasses, face shield or goggles are required. This equipment is specified in the Hazard Analysis for each task.
- 4.6 **Lasers:** Operation of Class III and IV lasers within the nominal hazard zone requires use of appropriate eyewear as designated by the Radiation Protection Office.
- 4.7 **Machine tool use:** Safety glasses are required for all machine tool use including portable equipment. Safety shoes are required. Use of the diamond cutting wheel requires a full face shield.
- 4.8 **Machining of Hazardous Materials:** Cutting, grinding, or sanding of a material requires use of a respirator with canisters appropriate to the dust being generated, including wood, if done without effective local drop ventilation. The appropriate type of protection is stated in the (M)SDS for the respective materials.
- 4.9 **Work in Noisy Environments:** Hearing protection as specified by the Industrial Hygiene Office is required for work where noise levels exceed 85 decibels averaged over an 8 hour day. Personnel routinely exposed to excess noise must be enrolled in the hearing conservation program and will be provided with appropriate hearing protection. There are no known areas with high noise levels on campus; however department heads, supervisors and DESHO's should be alert for a newly created hazard.
- 4.10 **Radioactive Material:** Work with unsealed radioactive material that could have removable radioactivity requires use of lab coats and gloves. The Radiation Safety Committee will specify personal protection.
- 4.11 **Work at heights exceeding 6 ft:** Fall protection equipment is required as appropriate to the job. See the Fall Protection Program.
- 4.12 **Welding:** Use of welding mask, gloves, aprons, and respiratory protection appropriate to the task is required.
- 4.13 **Other:** Any project or task that is deemed to require Self Contained Breathing Apparatus must be reported directly to the Director of Environmental Health and Safety and University Safety and Environmental Management System Director. Projects of this nature are highly discouraged.
- 4.14 **Hard Hats** that are provided by meet ANSI Z-89.1985 class A or B. Class C hard hats are prohibited.
- 4.15 **Safety Shoes** must carry a stamp on the inside that indicates that they meet the specifications provided by ANSI Z41.1-1967. Safety shoes worn in areas where it is possible to contact live electrical components must be appropriate for high voltage work.



4.16 Protective Eyewear must meet the specifications of ANSI Z87.1 and be appropriate to the task.

**Exhibit S- 4- 4A**

# Chemical Hygiene Plan Laboratory Task Hazard Assessment Form

The NJIT Department of Environmental Health and Safety  
Revision 09/2012

**General Information:**

Building
Room Number/Area
Department/Unit:
Process/Procedure (Explain Task):
Routine Procedure                      Yes      No
Non-routine Procedure                  Yes      No

**Hazards/ Potential Hazards Assessment:**

Chemical (Vapor/Dust)
Noise
Thermal
Fire/Explosion
Non-Ionizing Radiation
Ergonomic
Biological
Ionizing Radiation

Other Explain: \_\_\_\_\_

Monitoring

Results:

<b>Potential Accident Frequency</b>	<b>Circle</b>	<b>Low</b>	<b>Moderate</b>	<b>High</b>
<b>Potential Accident Severity</b>	<b>Circle</b>	<b>Low</b>	<b>Moderate</b>	<b>High</b>

**Personal Protective Equipment Required:**

Hazard Source	PPE Required (See Code)
Eyes -	
Face -	
Head -	
Foot -	
Hand -	
Body -	
Hearing -	
Respiratory Protection -	

**Other Requirements: (Circle Yes(Y) or No (N). If Yes, Attach Additional Pages.)**

Special Technical Skills Training Required: Y / N
Special Project Safety Plan Required : Y / N
Special Tools/ Equipment Required: Y / N
Standard Operating Procedures Published: Y / N
Other: Y / N

Certified By Principle Investigator: \_\_\_\_\_ Date: \_\_\_\_\_

\_\_\_\_\_

# Chemical Hygiene Plan - Part 2

## Laboratory Task Hazard Assessment Form

The NJIT Department of Environmental Health and Safety  
 Chemical Hygiene Plan Revision 09/2012

### Personal Protective Equipment Code

#### Hand Protection

CRG - Chemical Resistant Gloves\*

CLG - Cloth Gloves (Utility)

LEG - Leather Gloves

TRG - Thermal Resistant Gloves

RUG - Rubber Gloves

#### Face/ Eye Protection

CSG - Chemical Splash Goggles

SGS - Safety Glasses with Side Shields

FAS - Face Shield WEM

- Welding Mask WEG -

Welding Goggles **Torso**

#### Protection

CRC - Chemical Resistant Clothing

CRA - Chemical Resistant Apron

LSS - Long Sleeved Shirt

LSC - Long Sleeved Coveralls

WEJ - Welder's Jacket

#### Respiratory Protection

APR - Air Purifying Respirator\*\*

#### Miscellaneous Protection

SAH - Safety Harness and Life Line

HAH - Hard Hat

SAS - Safety Shoes

HEP - Hearing Protection

\*Hand Protection (Glove Material)

\*\*Respiratory Protection / Air Purifying

Respirator (Cartridge Type)

1. Butyl Rubber

1. Dust, Mist and Fumes

2. Natural Rubber

2. Organic Vapor

3. Neoprene Rubber

3. Organic Vapor / Acid Gas

4. Nitrile Rubber

4. Combination - Organic Vapor Acid

5. Polyvinyl Alcohol Plastic

Gas and High Efficiency Particulate Filter

6. Polyvinyl Chloride Plastic

7. Viton

8. 4H / Silver Shield

**Personal Protective Equipment  
Hazard Assessment  
For Laboratory Workers**

Please complete the following hazard assessment for your laboratory. This assessment is required by OSHA for any tasks that require personal protective equipment. Please check all activities that apply to your area. If a task is not listed or if you want to add a new task that requires personal protective equipment, please fill out the blank spaces at the bottom of the page. When the form has been completed click the submit button at the bottom of the page. A completed report will be submitted to this office for OSHA record keeping purposes and a copy will be returned for posting in your lab. Thank you very much for your consideration.

**Date:**

**Department:**

**Building:**

**Room Numbers:**

**Principal Investigator:**

**Assessment By:**

**Email:**

<b>Chemical Hazards</b>			
<b>Check All That Apply</b>	<b>Task</b>	<b>Potential Hazard</b>	<b>Recommended PPE</b>
<input type="checkbox"/>	Working with small volumes of corrosive liquids (< 1 liter).	Skin or eye damage	Safety glasses or goggles Light chemically resistant gloves Lab coat, closed shoe, pants
<input type="checkbox"/>	Working with large volumes of corrosive liquids (> 1 liter), acutely toxic corrosives, or work which creates a splash hazard	Large surface area skin or eye damage, poisoning, or great potential for eye and skin damage	Safety goggles and face shield Heavy chemically resistant gloves Lab coat, closed shoe, pants, and chemically resistant apron
<input type="checkbox"/>	Working with small volumes of organic solvents (< 1 liter).	Skin or eye damage Slight poisoning potential through skin contact	Safety glasses or goggles Light chemically resistant gloves Lab coat, closed shoe, pants
<input type="checkbox"/>	Working with large volumes of organic solvents (> 1 liter), very dangerous solvents, or work which creates a splash hazard	Major skin or eye damage, or potential poisoning through skin contact	Safety goggles and face shield Heavy chemically resistant gloves Lab coat, closed shoe, pants, and chemically resistant apron
<input type="checkbox"/>	Working with toxic or hazardous chemicals (solid or liquid).	Potential skin or eye damage, potential poisoning through skin contact.	Safety glasses (goggles for large quantities), light chemically resistant gloves, lab coat, closed shoe, pants.
<input type="checkbox"/>	Working with acutely toxic or hazardous chemicals (solid or liquid).	Great potential skin or eye damage, great potential poisoning through skin contact.	Safety goggles, appropriate heavy chemically resistant gloves, lab coat, closed shoe, pants Coveralls and booties if necessary.
<input type="checkbox"/>	Working with explosives.	Skin or eye damage from flying projectiles or	Blast shield, safety goggles or full face shield, chemically resistant gloves,

		chemicals.	lab coat, closed shoe, pants.
<input type="checkbox"/>	Working with chemical dusts.	Skin or eye damage, respiratory damage.	Safety glasses or goggles, appropriate gloves, lab coat, closed shoes or boots if necessary, pants, Approved respiratory protection (call EH&S).
<input type="checkbox"/>	Chemical spill cleanup.	Skin or eye damage, respiratory damage.	Safety glasses or goggles, appropriate gloves, lab coat, closed shoes or boots if necessary, pants, respiratory protection (call EH&S).
<b>Radiological Hazards</b>			
<b>Check All That Apply</b>	<b>Task</b>	<b>Potential Hazard</b>	<b>Recommended PPE</b>
<input type="checkbox"/>	Working with solid radioactive materials or waste.	Potential cell damage, potential spread of radioactive materials.	Safety glasses, gloves, lab coat, closed shoe, pants.
<input type="checkbox"/>	Working with radioactive chemicals (corrosives, flammables, liquids, powders, etc.).	Potential cell damage or spread of contamination plus hazards for the appropriate chemical hazards above.	Safety glasses (or goggles for splash hazard), light chemically resistant gloves, lab coat, closed shoe, pants. Use PPE for applicable chemical hazards above.
<input type="checkbox"/>	Working with ultraviolet radiation.	Conjunctivitis, corneal damage, erythema.	UV face shield and goggles, lab coat, closed shoe, pants.
<input type="checkbox"/>	Working with Laser radiation.	Retinal eye damage, skin damage.	Appropriate shaded goggles with optical density based on individual beam parameters, lab coat, closed shoe, pants. No jewelry or reflective items allowed.
<input type="checkbox"/>	Working with infrared emitting equipment (i.e. glass blowing).	Cataracts, flash burns to cornea.	Appropriate shaded goggles, lab coat, closed shoe, pants.

### Biological Hazards

Check All That Apply	Task	Potential Hazard	Recommended PPE
<input type="checkbox"/>	Working with radioactive human blood, body fluids, or blood borne pathogens (BBP).	Potential cell damage, potential spread of radioactive contaminants, or potential BBP exposure.	Safety glasses (goggles for splash hazard), light latex gloves, lab coat, closed shoe, pants.
<input type="checkbox"/>	Working with small volumes of human blood, body fluids, tissues, or blood borne pathogens.	Potential contraction of infectious disease, potential spread of infectious disease.	Safety glasses, light latex gloves, lab coat, closed shoe, pants.
<input type="checkbox"/>	Working with large volumes of human blood, body fluids, tissues, or blood borne pathogens.	Increased potential for infectious disease or increased potential for spread of infectious disease.	Safety goggles with face shield, latex gloves, lab coat, closed shoe, pants. Coveralls and boot covers if necessary.
<input type="checkbox"/>	Working with live or poisonous animals and plants.	Animal bites, stings, or infectious disease. Skin or eye damage from contact with animal or plant poisons.	Safety glasses or goggles, protective gloves, lab coat, closed shoe, pants.
<input type="checkbox"/>	Working with animal specimens (preserved or unpreserved).	Potential exposure to infectious disease, animal toxins, or preservatives.	Safety glasses or goggles, protective gloves, lab coat, closed shoe, pants.

### Physical Hazards

Check All That Apply	Task	Potential Hazard	Recommended PPE
<input type="checkbox"/>	Working with cryogenic liquids.	Major skin, tissue, or eye damage.	Safety glasses or goggles for large volumes, heavy insulated gloves, lab coat, closed shoe, pants
<input type="checkbox"/>	Working with very cold equipment or dry ice.	Frostbite, hypothermia.	Safety glasses, insulated gloves and warm clothing, lab coat, closed shoe, pants.
<input type="checkbox"/>	Working with hot liquids, equipment, open flames (autoclave, bunsen burner, water bath, oil bath).	Burns resulting in skin or eye damage.	Safety glasses or goggles for large volumes, insulated gloves, lab coat, closed shoe, pants.
<input type="checkbox"/>	Metal arc or tungsten arc (TIG) welding.	Conjunctivitis, corneal damage, erythema, skin burns.	Appropriate shaded goggles and face shield, gloves, lab coat, closed shoe, pants.
<input type="checkbox"/>	Instrument repair.	Eye damage from foreign objects.	Safety glasses, no loose clothing or jewelry.
<input type="checkbox"/>	Metal or woodworking.	Eye damage from foreign objects, lacerations from burrs or splinters.	Safety glasses, gloves, no loose clothing or jewelry.
<input type="checkbox"/>	Working in nuisance dusts.	Skin or eye damage, respiratory damage.	Safety goggles, appropriate gloves, lab coat, closed shoes or boots if necessary, pants, NIOSH approved dust mask or other respiratory protection (call EH&S).
<input type="checkbox"/>	Glassware washing.	Lacerations.	Heavy rubber gloves, lab coat, closed shoes, pants.
<input type="checkbox"/>	Working with loud equipment, noises, sounds, or alarms, etc.	Potential ear damage and hearing loss.	Ear plugs or headphones as necessary.



**Exhibit S- 4 – 4C**

**NJIT Department of Health & Environmental Safety  
Laboratory Safety Inspection Report**

File # \_\_\_\_\_

Building \_\_\_\_\_ Room # \_\_\_\_\_ Dept. \_\_\_\_\_ Date \_\_\_\_\_

Poor Housekeeping

- glass stored on floor
- clutter
- excess materials or equipment

Defective Plumbing

- leaky faucet
- defective rubber hose

Fire Extinguisher(s)

- missing
  - incorrect type
  - discharged
- Inspected/serviced \_\_\_\_\_

Fire Blankets

- missing
- improperly stored/located

Eye Wash/Emergency Shower

- defective
  - missing
- Inspected \_\_\_\_\_

Wastes

- container not provided
- container not labeled
- log not maintained
- excessive quantities (90 day rule)
- tops on/off waste containers

Spill Kit

- missing
- materials/absorbents need replenishing
- instructions missing

Mechanical Hazards

- vacuum pumps need belt guards

Inspector: \_\_\_\_\_

sharp points or edges on equipment

Other Hazards

- food stored in refrigerator
- food prepared/consumed in lab
- smoking in lab

Exits

- aisle/door blocked
- kickout panel missing/blocked
- emergency lighting operational

Electrical

- defective/hazardous wiring
- circuits overloaded
- electrical covers missing

Gas Cylinders

- improperly stored
- improperly secured/located
- improperly labeled
- not capped

Hoods

- properly operating
- Checked with metering device \_\_\_\_\_  
Last serviced on \_\_\_\_\_

Chemicals

- improper storage of chemicals
- cabinet available  wood  metal
- proper labels/RTK followed Y N

Emergency Information

- missing/not posted on door
- needs updating

NJ RTK – NFPA Placarding

- missing/not posted properly
- needs updating

Sent to: \_\_\_\_\_

	UNIVERSITY SAFETY ENVIRONMENTAL MANAGEMENT SYSTEM University Heights Newark, New Jersey 07102	
		<b>Document Control No.</b> <b>USEMS SOP S – 4 - 5</b>
<b>Document Title: Confined Space Entry 29CFR 1910.146</b>		

## 1.0 Scope and Purpose

1.1 This SOP provides an outline of operations, procedures, responsibilities, and minimum safety requirements to be followed while entering, exiting, and working in confined spaces at normal atmospheric pressure.

### 1.2 NJIT employees are prohibited from entering any designated “Permit Required Confined Space”.

## 2.0 Responsibilities

- 2.1 It will be the responsibility of each Department Manager, Supervisor and Department Environmental Safety and Health Officer to remain observant for the creation of potential confined spaces within the premises of their respective departments.
- 2.2 Any space that is deemed to be a potential confined space should be brought to the attention of the Director of Environmental Health and Safety.
- 2.3 The Director of Environmental Health and Safety will conduct a Confined Space Assessment to determine if the area must be classified and labeled as a “Permit Required Confined Space”.
- 2.4 Upon identification of a “Permit Required Confined Space”, the Director of Environmental Health and Safety will ensure an appropriate weather proof label “PERMIT REQUIRED CONFINED SPACE, DO NOT ENTER” is placed at all potential points of access to the area.
- 2.5 The Director of Environmental Health and Safety will notify, in writing, Director of Technical Services, the department head, DESHO and the University Safety and Environmental Management System Director of all “Permit Required Confined Space” classifications.
- 2.6 The Director of Technical Services will assure that an initial confined space identification assessment has been conducted throughout the campus and an inventory of potential confined spaces and a Permit Required Confined Analysis is conducted for all such spaces.
- 2.7 The Director of Technical Services will inform, in writing, all department heads, the University Safety and Environmental Program Director of all Confined Spaces within the respective premises of their departments.
- 2.8 Department heads will inform the employee and staff of their departments of all “Permit Required Confined Spaces” to which they are potentially exposed and prohibit entry into those spaces regardless of circumstances or need.
- 2.9 The Director of Environmental Health and Safety will periodically inspect the campus facilities to determine if any new confined spaces have been unknowingly created.

- 2.10 Review the qualifications of any contractor that is hired for work that may require entry into a confined space and will assure that such contractors maintain an active Confine Space Entry Procedure including rescue capability.

### 3.0 Operational Procedure

- 3.1 Classifications - NIOSH (National Institute for Occupational Safety and Health) has three (3) classifications for confined spaces based on life threatening characteristics.
- A. Class "A" - an environment that is immediately dangerous to life of health. (Entry by permit only will have a posted sign.)
  - B. Class "B" - an environment that has the potential for causing injury and illness if preventative measure are not used, but is not immediately dangerous to life and health.
  - C. Class "C" - an environment that has potential hazards, which would not require any special modifications of the work procedures.

### 4.0 Definitions

- 4.1 Confined Space
- A. One large enough and so configured that a person can bodily enter and perform work; **AND**
  - B. One that has limited or restricted means of entry and exit; **AND**
  - C. One that is not designated for continuous occupancy.
- 4.2 Permit required Confined Space
- A. Contains or has the potential to contain a hazardous atmosphere; **OR**
  - B. Contains material that has the potential of engulfing and entrant; **OR**
  - C. Contains an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls or by a floor which slopes downward and tapers to a smaller cross section; **OR**
  - D. Contains any other recognized serious safety or health hazard.
- 4.3 Lock out/Tag out
- A. The placement of a lock or tag on the energy isolation device in accordance with an established procedure, indicating that the device will not be operated until the removal of the lock or tag.
- 4.4 Hazardous Atmosphere
- A. Any atmosphere which may cause immediate or delayed death, injury or disease and exposures are toxic, poisonous, corrosive, flammable, or has the ability to be physically incapacitating or dangerous.
  - B. Hazardous atmospheres include; levels of flammability of 10% of the lower explosive limit (L.E.L.), oxygen deficient atmospheres with levels below 19.5%, or enriched atmospheres above 23.5%, or airborne combustible dust greater than its L.E.L.

## 5.0. Confined Space Descriptions

- 5.1. Open Topped Enclosures
  - A. Spaces with depths that restrict the natural movement of air. (pits, selected types of tanks, excavations)
- 5.2. Enclosures with Limited Openings
  - A. Spaces with extremely limited openings for entry or exit. (sewers, casings, tanks, manholes, sump pits, elevator pits, air conditioning units, vaults, tunnels, doorways to enclosed spaces that are not full size, access/egress by means of a ladder, and silos)

## 6.0. Precautions

- 6.1 NJIT employees are prohibited from entering enter “Permit Required Confined Space”
- 6.2 A major cause of confined space injuries and or fatalities is the failure to recognize the incident for what it is...A Confined Space Incident.
- 6.3. Do not underestimate the seriousness of confined space incidents. More than half of the casualties in confined space rescues are to the rescuers themselves.

## 7.0. Hazard Identification

- 7.1 An initial inventory of potential confined spaces will be conducted and recorded.
- 7.2 Each potential confined space will be assessed to determine if it is a “Permit Required Confined Space”.
- 7.3 Hazards will be identified for each confined space. The hazard identification process will include, but not be limited to, a review of the following:
  - A. The past and current uses of the confined space that may adversely effect the atmosphere of the confined space.
  - B. The physical characteristics, configuration, and location of the confined space.
  - C. Biological hazards.
  - D. Mechanical or physical hazards.
  - E. Existing or potential hazards in the confined space such as: Flammable, oxygen deficient and toxic environments.
- 7.4 “Permit Required Confined Spaces” that are so designated because of a mechanical a safety hazard will be assessed to determine if the hazard rating can be reduced to eliminate the “Permit Required’ designation through engineering controls.

Note #1 - A group of gases may stratify within a confined space. This is one reason why a person may survive exposure to a gas on one level, while another dies from exposure to the same or a different gas at another level.

Note #2 - Physical & mechanical hazards may also be encountered. Areas of concern are utility Installations, certain types of machinery, areas offering extremely limited working areas, etc.

## 8.0 Emergency Response

- 8.1 Arrangements will be made for City of Newark emergency services to respond to an incident that is "confirmed" to be a confined space emergency and will immediately receive a "Confined Space Response" that will include:
  - A. NJIT Public Safety
  - B. City of Newark Fire Department and Rescue services

- C. University Director of Environmental Affairs
- D. Director of Environmental Health and Safety

## **9.0 Emergency Response Guidelines**

- 9.1 NJIT Public Safety will respond, confirm the severity of the situation.
  - A. Confirm City of Newark rescue services have been called for assistance.
  - B. Protect the scene
  - C. Determine if an evacuation of the area is warranted and initiate evacuation of the area.
  - D. Consult with Physical Plant Engineers and Building/Property Owners as to the characteristics of the involved confined space.
  - E. Determine if utility companies must be notified to eliminate ignition or electrical sources.
  - F. Set up an operations and rescue perimeter.
  - G. Determine if it may be necessary to shut down building services in the immediate area.
  - H. Determine if additional lighting will be necessary to accommodate a rescue.
- 9.2 Public Safety will decide whether or not to activate Crisis Team to the degree necessary to control the emergency. Accumulate information required to conclude the operation safely. Plan operations and alternatives carefully, considering the hazards that may be faced specific to the confirmed spaces' use.
- 9.3 Inform the Senior Administrator on Call of the incident if the Campus Incident Management System (SOP S-5-1) is activated.
- 9.4 The NJIT Safety and Director of Environmental Affairs will assist in the determination of the severity of the event and provide input toward the need for evacuation of the premises.

**Exhibit S- 4- 5A**


**New Jersey Institute of Technology  
Confined Space Hazard Assessment**

**Building** \_\_\_\_\_ **Floor** \_\_\_\_\_  
**Space** \_\_\_\_\_ **Date** \_\_\_\_\_  
**Assessment Last Modified** \_\_\_\_\_

<b>Confined Space</b> - must meet all the below criteria		<b>Permit Required Confined Space</b> must be a confined space and meet any one of the below criteria	
<input type="checkbox"/>	Is large enough or so configured that an employee can bodily enter and perform work... <b>AND</b>	<input type="checkbox"/>	Contains or has a potential to contain a hazardous atmosphere... OR
<input type="checkbox"/>	Has limited or restricted means for entry or exit <b>AND</b>	<input type="checkbox"/>	Contains a material that has the potential for engulfing an entrant... OR
<input type="checkbox"/> Is not designed for continuous employee occupancy. <input type="checkbox"/>		<input type="checkbox"/>	Has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly covering walls or by a floor which slopes downward and tapers to a smaller cross-section... OR
		<input type="checkbox"/>	Contains any other recognized serious safety or health Hazard *

<b>Authorized Entry Points</b>	
<input type="checkbox"/> <b>Top</b>	<input type="checkbox"/> <b>Side</b>
<input type="checkbox"/> <b>Bottom</b>	
<b>Hazards *</b>	<b>Source/Type</b>
Explosive Atmosphere	
Combustible Material	
Electrical Circuits	
Toxic Gases	
Toxic Material	
Thermal Hazards	
Machinery	
Slip / Fall Hazards	
Engulfment Hazards	
Entrapment Hazards	

**Comments:**

	<b>UNIVERSITY SAFETY ENVIRONMENTAL MANAGEMENT SYSTEM</b> University Heights Newark, New Jersey 07102	
		<b>Document Control No. USEMS SOP S - 4 - 6</b>
<b>Document Title Bloodborne Pathogens Program 29CFR 1910.</b>		

## 1.0 Scope and Application

1.1 The purpose of this exposure control plan is to eliminate or minimize employee occupational exposure to blood or other infectious body fluids. Other potentially infectious body fluids include: semen, vaginal secretions, cerebrospinal fluid, synovial fluid, pleural fluid, peritoneal fluid, amniotic fluid, saliva in dental procedures, and any body fluid visible contaminated with blood. Employees that could be potentially exposed included

- First aid and other emergency responders;
- Custodians that clean the restrooms;
- An injured employee's supervisor; and
- A maintenance person that cleans a machine after an injury that spilled blood.

## 2.0 Responsibilities

2.1 Department Environmental Safety and Health Officer (DEHSO)

- Coordinates and administers the Bloodborne Pathogens Program (BPP) for the department;
- Acts as first point of contact for employees with questions related to the BPP;
- Conducts and maintains an inventory of:
  - First aid personnel; and
  - Locations where activities that involve human body fluids occur in the department.
- Assists to educate and train those employees that are potentially exposed to human body fluids.
- Maintains employee education and training records for those that are exposed.
- Maintains are record of all employees accepting and rejecting the hepatitis B vaccination.
- Assures "red bag" biohazard medical receives proper disposal as a regulated medical waste.
- Arranges a medical appointment for employees that want to receive the Hepatitis B vaccination through Human Resources.

2.3 Director of Environmental Health and Safety

- Ensures each department has inventoried potential exposures and personnel;
- Arranges a Hepatitis B vaccination for those employees that want the protection;
- Trains and educates affected staff;
- Assists the Director of technical Services to establish an effective bio-hazardous waste disposal plan.
- Assists Facilities Department to pre-qualify and select qualified bio-hazardous waste contractors.
- Annually audits performance in accordance with this program.

2.4 Department Supervisor

- Identifies and assures employees receive Bloodborne Pathogens education before working with human blood or other body fluid.
- Observes employees to assure rules are followed and required personal protective equipment is used.

## 2.5 Individuals

- Use the required personnel protective equipment when potentially exposed to human body fluids;
- Use Universal Precautions if exposed to blood or other human fluid
- Reports exposures to Human Resources immediately.

## 3.0 Engineering and Work Practice Controls

3.1 Universal precautions will be observed by all employees in order to prevent contact with blood or other potentially infectious materials. All blood or other potentially infectious materials will be considered infectious regardless of the perceived status of the source individual.

3.2 Engineering and work practice controls will be utilized to eliminate or minimize exposure employees working at New Jersey Institute of Technology.

3.3 Employees must wash their hands or other skin with soap and water, or flush mucous membranes with water, as soon as possible following an exposure incident (such as a splash of blood to the eyes or an accidental needle stick). \*\*

3.4 Employees must wash their hands immediately (or as soon as feasible) after removal of gloves or other personal protective equipment.\*\*

3.5 \*\*Employees will familiarize themselves with the nearest hand washing facilities for the buildings in which they work. Because most NJIT buildings are public access, they will have available hand washing facilities in public restrooms and custodial/janitorial closets. **(If hand washing facilities are not available, the Physical Plant will provide either an antiseptic cleanser in conjunction with clean cloth/paper towels or antiseptic towelettes. If these alternatives are used, then the hands are to be washed with soap and water as soon as feasible.)**

3.6 Physical Plant employees who encounter improperly disposed needles will notify EH&S of the location of the needle(s). Additionally, the appropriate authorities at the location will be notified (i.e., lab manager, head resident). Needles will be disposed of in labeled sharps containers provided at the location. If sharps containers are not available at that location, EH&S will pick up and dispose of the needles in an appropriate, labeled sharps container. Needles should never be recapped.

3.6.1 Needles may be moved or picked up only by using a mechanical device or tool (forceps, pliers, broom and dust pan).

3.6.2 Breaking or shearing of needles is prohibited.

3.6.3 No eating, drinking, smoking, applying cosmetics or lip balm, or handling contact lenses is allowed in a work area where there is a reasonable likelihood of occupational exposure.

3.6.4 No food or drinks will be kept in refrigerators, freezers, cabinets, shelves, or on counter tops or bench tops where blood or other potentially infectious materials are present.

3.6.5 Employees must perform all procedures involving blood or other potentially infectious materials in such a manner as to minimize splashing, spraying, splattering, and generation of droplets of these substances.

## 4.0 Housekeeping

4.1 Decontamination will be accomplished by utilizing the following materials:

4.1.1 10% (minimum) solution of chlorine bleach

4.1.2 Lysol or other EPA-registered disinfectants



- 4.2 All contaminated work surfaces, tools, objects, etc. will be decontaminated immediately or as soon as feasible after any spill of blood or other potentially infectious materials. The bleach solution or disinfectant must be left in contact with contaminated work surfaces, tools, objects, or potentially infectious materials for at least 10 minutes before cleaning.
- 4.3 Equipment that may become contaminated with blood or other potentially infectious materials will be examined and decontaminated before servicing or use.
- 4.4 Broken glassware will not be picked up directly with the hands. Sweep or brush material into a dustpan.
- 4.5 Known or suspected contaminated sharps will be discarded immediately or as soon as feasible in containers that are closable, puncture-resistant, leak-proof on sides and bottom, and marked with an appropriate biohazard label. If sharps container is not pre-labeled, biohazard labels are available through EH&S.
- 4.6 When containers of contaminated sharps are being moved from the area of use or discovery, the containers will be closed immediately before removal or replacement to prevent spillage or protrusion of contents during handling, storage, transport, or shipping.
- 4.7 Reusable containers will not be opened, emptied, or cleaned manually or in any other manner that would expose employees to the risk of percutaneous injury.

## **5.0 Regulated Bio-hazardous Waste**

- 5.1 Other regulated waste will be placed in containers that are closable, constructed to contain all contents and prevent leakage of fluids during handling, storage, transportation or shipping.
- 5.1 The waste must be labeled or color-coded and closed before removal to prevent spillage or protrusion of contents during handling, storage, or transport.
- 5.3 Biohazard bags and labels are available through the EH&S department office.
- 5.4 A qualified disposal contractor hired by Physical Plant will handle disposal of bio-hazardous waste. This will be coordinated through the EH&S department if pre-existing disposal arrangements have not already been made through the Student Health Center.

## **6.0 Laundry Procedures (To be deleted if no laundry service is provided)**

- 6.1 Laundry contaminated with blood or other potentially infectious material will be handled as little as possible. Such laundry will not be sorted or rinsed in the area of use.
- 6.2 The Environmental Health & Safety Department will coordinate cleaning or disposal of contaminated laundry.

## **7.0 Personal Protective Equipment**

- 7.1 Where occupational exposure remains after institution of engineering and work controls, personal protective equipment will also be utilized.
- 7.2 The Physical Plant will provide gloves, face shields, masks, eye protection, and aprons at no cost to employees. The Physical Plant will replace or repair personal protective equipment as necessary at no cost to employees.
- 7.3 All personal protective equipment will be chosen based on the anticipated exposure to blood or other potentially infectious materials. The protective equipment will be considered appropriate only if it does not permit blood or other potentially infectious materials to pass through or reach the employee's clothing, skin, eyes, mouth, or mucous membranes under normal conditions of use and for the duration of time for which the protective equipment will be used.

## **8.0 Hepatitis B Vaccine**

- 8.1 The Hepatitis B vaccination will be made available after the employee has received the training in occupational exposure and within 10 working days of initial assignment. It will be made available to all employees who have potential occupational exposure unless the employee has previously received the complete Hepatitis B vaccination series, antibody testing has revealed that the employee is immune, or the vaccine is contraindicated for medical reasons.
- 8.2 If the employee initially declines Hepatitis B vaccination, but at a later date decides to accept the vaccination, the vaccination will then be made available.
- 8.3 All employees who decline the Hepatitis B vaccination offered will sign the OSHA-required waiver indicating their refusal.
- 8.4 If U.S. Public Health Service recommends a routine booster dose of Hepatitis B vaccine at a future date, such booster doses will be made available at no cost to the employee.
- 8.5 The Hepatitis B Vaccine will be offered to all staff with a potential exposure to human body fluids.
- 8.6 The vaccine will also be offered to EHS emergency responders.
- 8.7 Depending on their job situation and likelihood of exposure, the vaccine may also be offered to plumbers, housekeeping staff, custodial staff, preventive maintenance personnel, electricians, and other personnel as necessary.

## **9.0 Post Exposure Evaluation and Follow-up**

- 9.1 All exposure incidents will be reported, investigated, and documented. When the employee incurs an exposure incident, it will be reported immediately to their supervisor.
- 9.2 Following a report of an exposure incident, the exposed employee will go to the medical center designated by human Resources for a confidential medical evaluation and follow-up, including at least the following elements:
  - A. Documentation of the route(s) of exposure.

- B. A description of the circumstances under which the exposure occurred.
- C. The identification and documentation of the source individual. (The identification is not required if the employer can establish that identification is impossible or prohibited by state or local law.)
- D. The collection and testing of the source individual's blood for HBV and HIV serological status.
- E. Post-exposure treatment for the employee, when medically indicated in accordance with the U.S. Public Health Service.
- F. Counseling.
- G. Evaluation of any reported illness.

9.3 The Healthcare professional evaluating an employee will be provided with the following information:

- A. A copy of this plan.
- B. A copy of the OSHA Bloodborne Pathogen regulations (29 CFR 1910.1030)
- C. Documentation of the route(s) of exposure.
- D. A description of the circumstances under which the exposure occurred.
- E. Results of the source individual's blood testing, if available.
- F. All medical records applicable to treatment of the employee, including vaccination status.

9.4 The employee will receive a copy of the evaluating healthcare professional's written opinion within 15 days of the completion of the evaluation.

9.5 The healthcare professional's written opinion for Hepatitis B vaccination is limited to the following: (1) whether the employee needs Hepatitis B vaccination; (2) whether the employee has received such a vaccination. The healthcare professional's written opinion for post-exposure evaluation and follow-up is limited to the following information:

- A. That the employee was informed of the results of the evaluation.
- B. That the employee was informed about any medical conditions resulting from exposure to blood or other infectious materials that require further evaluation or treatment.

9.6 All other findings or diagnoses will remain confidential and will not be in a written report.

9.7 All medical evaluations will be made by or under the supervision of a licensed physician or by or under the supervision of another licensed healthcare professional. An accredited laboratory must conduct all laboratory tests at no cost to the employee. All medical records will be kept in accordance with 29 CFR 1910.20.

## **10.0 Employee Education and Training**

- 10.1 All high-risk employees will participate in a training program. Training will occur before assignment to a task where occupational exposure may take place and at least annually thereafter. Additional training will be provided when changes such as modification of tasks or procedures affect the employee's occupational exposure.
- 10.2 Any employee who is exposed to infectious materials will receive training, even if the employee was allowed to receive the HBV vaccine after exposure.
- 10.3 The training program will include at least the following elements:
- A. An accessible copy of the regulatory text of 29 CFR 1910.1030 and an explanation of its contents.
  - B. A general explanation of the epidemiology and symptoms of bloodborne diseases.
  - C. An explanation of the modes of transmission of bloodborne pathogens.
  - D. An explanation of the employer's exposure control plan and the means by which the employee can obtain a copy of the written plan.
  - E. An explanation of the appropriate methods for recognizing tasks and other activities that may involve exposure to blood or other potentially infectious materials.
  - F. An explanation of the use and limitations of methods that will prevent or reduce exposure, including appropriate engineering controls, work practices, and personal protective equipment.
  - G. Information on the types, proper use, location, removal, handling, decontamination, and disposal of personal protective equipment.
  - H. An explanation of the basis for selection of personal protective equipment.

**Exhibit S-4- 6A**

**Bloodborne Pathogens Inventory of Exposures**

Department \_\_\_\_\_ Building \_\_\_\_\_

Assessor \_\_\_\_\_ Date \_\_\_\_\_

<b>Room / Location</b>	<b>Description of Activity Involving a Body Fluid</b>	<b>Name of Positions with Potential Exposure</b>

**New Jersey Institute Of Technology  
BLOODBORNE PATHOGENS TRAINING  
DOCUMENTATION FORM**

Date of Training: \_\_\_\_\_

Name and Title of Trainer: \_\_\_\_\_

Employee Name: \_\_\_\_\_ Employee

ID No.: \_\_\_\_\_ Department:

Position: \_\_\_\_\_

I have participated in and understand the my rights and obligations under the NJIT Bloodborne Pathogens Program. I understand that NJIT will arrange for me to receive a Hepatitis B vaccination if I so desire one.

Signature \_\_\_\_\_ Date \_\_\_\_\_

Trainer's Signature \_\_\_\_\_ Date \_\_\_\_\_

**DESHO Certification**

Signature \_\_\_\_\_ Date \_\_\_\_\_

**Exhibit S-4 -6C**

**Hepatitis B Vaccine Declination**


I understand that due to my occupational exposure to blood or other infectious materials that I may be at risk of acquiring Hepatitis B virus infection. I have been given the opportunity to be vaccinated with the Hepatitis B vaccine at no charge to myself. However, I decline the Hepatitis B vaccination at this time. I understand that by declining this vaccine, I continue to be at risk of acquiring Hepatitis B, a serious disease. If in the future I continue to have occupational exposure to blood or other potentially infectious materials and I want the Hepatitis B vaccine, I can receive the vaccine series at no charge to me.

Print Name \_\_\_\_\_

Signature \_\_\_\_\_ Date \_\_\_\_\_

DESHO Certification

Signature \_\_\_\_\_ Date \_\_\_\_\_

	UNIVERSITY SAFETY ENVIRONMENTAL MANAGEMENT SYSTEM University Heights Newark, New Jersey 07102	
		<b>Document Control No.</b> <b>USEMS SOP S - 4 - 7</b>
<b>Document Title: Control of Hazardous Energy Program  Lockout Tagout (LOTO)  29CFR 1910.</b>		

## 1.0 Scope and Application

- 1.1 Servicing and/or maintenance which takes place during normal production operations is covered by this plan if:
- A. An employee is required to remove or bypass a guard or safety device; or
  - B. An employee is required to place any part of his or her body into an area of the machine or piece of equipment where work is actually performed upon the material being processed (point of operation) or where an associated danger exists during a machine cycle.
- 1.2 These instructions apply to any source of electrical, pneumatic, hydraulic, thermal, chemical or other type of energy.
- 1.3 Minor tool changes and adjustments (e.g., clearing jammed paper from a copier, printer or typewriter) and other minor servicing activities, which are routine, repetitive, and take place during normal production operations, are not covered by this plan. This type of maintenance must be completed using alternative safety measures (e.g., proper use of manufacturer-required and recommended machine guards).
- 1.4 This plan also does not apply to work on cord and plug connected electrical equipment for which exposure to the hazards of unexpected start-up is controlled by unplugging it from the energy source if the plug is under the exclusive control of the employee performing the service.

## 2.0 Responsibilities

### 2.1 Director of Environmental Health and Safety

- Provide consultation to assist in the identification of equipment where LOTO should be utilized.
- Prepare the master LOTO Plan with periodic review and revisions as needed;
- Distribute the LOTO plan to each affected Department Environmental Safety and Health Officer for distribution to all individuals who are authorized by the department to perform maintenance on energized equipment;
- Approve locks to be used by individual departments;
- Investigate and document all reported accidents and/or near-miss accidents that are directly or indirectly related to the locking and tagging of equipment; and
- Provide training and retraining to all authorized employees.



## **2.2 Department Environmental Safety and Health Officers**

- Designate supervisors to implement specific LOTO procedures; and
- Select appropriate locking and tagging devices for their respective department.

## **2.3 Department Supervisors**

- Implement all provisions of the LOTO for work areas under their control;
- Inventory and identify all potentially dangerous equipment capable of releasing hazardous energy during maintenance in work areas or facilities under their control;
- Prepare specific LOTO and emergency procedures for hazardous machinery (refer to Appendix A of the LOTO Plan);
- Identify persons authorized to implement LOTO procedures and assure that each person attends training provided by the Department of Environmental Safety;
- Report all workplace injuries, unsafe conditions and near-misses to the Department of Environmental Safety;
- Instruct authorized LOTO personnel regarding the applicability of this plan to their respective shop;
- Provide proper locking and tagging equipment including locks, tags, multiple lock holders, etc.;
- Direct periodic safety audits of LOTO procedures to determine regulatory compliance, and recommend action to correct conditions of non-compliance; and
- Comply with necessary documentation requirements.

## **2.4 Authorized Employees**

- Adhere to the requirements of the Lockout Tagout Plan;
- Follow guidelines referenced in this plan to protect themselves and others from the release of hazardous energy;
- Ensure the security of their own locking devices;
- Complete all safety training requirements and comply with documentation procedures; and
- Report all workplace injuries, unsafe conditions and near-misses to their supervisors and/or the Department of Environmental Safety.

## **2.5 Affected Employees**

- Notify the appropriate persons when equipment needs servicing; and
- Follow LOTO instructions given by the authorized employees.

## **3.0 Information and Training**

3.1 All participating New Jersey Institute of Technology employees must assume an active role in maintaining a safe working environment by reporting any problems or noncompliance with policies to their supervisor and/or the Department Environmental Safety and Health Officer. All employees are expected to assist their peers and should fully utilize any information provided during formal and informal training sessions. Any staff member who does not understand a policy or procedure should consult their supervisor or Department Environmental Safety and Health Officer for clarification.

3.2 All employees required to service machinery that has the potential for release of hazardous energy will be provided with information and training regarding the Lockout Tagout Plan (LOTO). Employees will be informed of:

- A. The contents of the OSHA standard;

- B. The location and availability of the LOTO Plan;
- C. The procedures covered by the LOTO Plan including:
  - i. Explanations of provisions;
  - ii. Description of physical hazards common to inappropriate locking and tagging of machinery;
  - iii. Description of hazardous energy sources common to New Jersey Institute of Technology;
  - iv. Review of measures to protect employees, faculty, students, staff and visitors from the inadvertent release of hazardous energy;
  - v. Discussion of procedures to de-energize equipment and release or secure all residual energies; and
  - vi. Location of University reference materials on the control of hazardous energy.
- D. Evaluation technique to determine if energy hazards are present.

- 3.3 Training of employees and supervisors in the methods and procedures for LOTO and the provisions of the OSHA Control of Hazardous Energy Standard's requirements will be conducted by the Maintenance Supervisor prior to being permitted to work on energized equipment. The individual department supervisors will be responsible for assuring the training of all authorized employees in the specific operations, safety equipment and emergency procedures used by their respective departments.
- 3.4 Documentation of general LOTO training will be maintained by the Human Resources Manager as part of the employee's permanent record. Documentation of department-specific training, provided by department supervisors, will be maintained within each department. Departmental training records may also be included in the employee's permanent record by sending a copy of the training record with a note requesting it be included in the employee's personnel file to Human Resources.
- 3.5 Retraining will be provided for all authorized and affected employees whenever there is a change in their job assignment, a change in machines, equipment or processes that present new hazard, or when there is a change in the energy control procedure. Retraining will also be conducted whenever a periodic inspection reveals deficiencies in the program.

#### **4.0 Lockout Tagout Procedures**

- 4.1 The following are minimum requirements for the use of energy isolating devices whenever maintenance or servicing is done. They will be used to ensure that the machine or equipment is stopped and isolated from all potentially hazardous energy. Additionally, they will serve as an outline to protect workers from the inadvertent release of hazardous energy.
- 4.2 Locking devices and tags will be used when employees are performing maintenance or service to any machine or system where unexpected or unintentional motion could cause harm. Locking devices will also be used when guards or other safety devices must be removed during service or when moving or energized parts put any part of the employee's body at risk of injury. Examples of conditions where locking and tagging should be used may include, but are not limited to:
- A. Clearing blocked or jammed mechanical equipment;
  - B. Maintenance or repair work on equipment with moving parts;
  - C. Confined space entries (*Refer to the NJIT Confined Space Plan*); and
  - D. Repairs or installation of electrical equipment.
- 4.3 If the equipment being serviced must be temporarily re-activated (for example, to test the equipment as part of the installation) all start-up and lockout procedures must be followed.

#### **5.0 Specific Instructions for Hazardous Machinery**

- 4.1 Specific instructions will be developed for the locking and tagging of machinery or equipment under the following conditions:

- A. When the machine being serviced has the potential for stored or residual energy, or the re-accumulation of stored energy after shut down;
- B. When the machine has multiple energy sources;
- C. When the isolation and locking of the machine will not completely deactivate it;
- D. When the machine cannot be locked out;
- E. When a single lockout device will not achieve a lockout condition; or
- F. When the lockout device will not be under the exclusive control of the authorized employee performing the service.

(Appendix C of this plan can be used to assist the supervisor in preparing specific procedures.)

## 6.0 Working Without a Lock

- 6.1 If a lock cannot be applied to the equipment, and the supervisor can demonstrate that the tagging procedure will provide a level of safety equivalent to that obtained by the use of a lock, a tag may be used instead. A tag used without a lock will be supplemented by one additional safety measure that provides a level of safety equivalent to that obtained by the use of a lock. Additional safety methods may include the removal of an isolating circuit element, blocking of a control switch, opening of an extra disconnecting device or the removal of a valve handle to reduce the likelihood of inadvertent activation. The tagout device will be attached to the same location that the lockout device would have been attached.

## 7.0 Implementing Lockout/Tagout

- 7.1 Employees will implement an orderly shutdown of machinery to avoid any additional or increased hazards resulting from equipment stoppage. The following is a list of steps to be used during shutdown.

### A. PREPARING FOR SHUTDOWN

- i. Identify the types of energy and sources
- ii. Notify affected employees of intent to service equipment

### B. SHUTTING DOWN THE EQUIPMENT

- i. Turn off equipment
- ii. Deactivate energy
- iii. Release all stored or residual energy
- iv. Attach locking and tagging devices
- v. Verify that equipment is secure and deactivated
- vi.

### C. PREPARING TO RETURN EQUIPMENT TO SERVICE

- i. Remove all tools from the equipment
- ii. Inspect the controls to verify they are in the "off" position
- iii. Remove all locking and tagging devices
- iv. Re-energize the equipment
- v. Notify affected employees when machine is back in service

### D. PREPARATION FOR SHUTDOWN:

- i. Identification of the Energy Type or Source  
Determine where and how equipment is being energized. Since some equipment is powered by several sources (e.g., electrical, mechanical, pneumatic, chemical, thermal and hydraulic), all energizing sources will be identified. For complex equipment, refer to the manufacturer's control diagram detailing the locations of all isolating points. These points may include breaker panels, switches and valves. Furthermore, possible residual energy and methods used to dissipate or restrain that energy will be identified. In addition to identifying energy sources, the employee must determine the magnitude of the energy, the hazards of the energy to be controlled and the

methods or means to control the energy. If authorized employees are unable to determine each form of energy, they must consult their supervisors before work is started.

ii. **Notification of employees**

Affected employees must be notified by authorized personnel of the intent to service equipment.

Notification will be given before LOTO controls are applied and should contain the name and job titles of authorized employees, location of equipment being serviced, and duration/date of service.

**E. SHUTDOWN OF MACHINE:**

i. **Shut Off Equipment**

If the machine or equipment is operating, employees will shut it down by the normal stopping procedures (depress the stop button, open the switch, close valve, etc.).

ii. **Deactivate the Energy**

Disconnect the device from all energy sources and release all residual energies that may present a hazard. Inspect the equipment to ensure all energy sources are disconnected.

iii. **Release of Stored or Residual Energy**

Release stored or residual energy, such as that in capacitors, springs, elevated machine members, rotating flywheels, hydraulic systems and pressurized systems (air, gas, steam, or water). If energy is incapable of being released, the employee will reposition, block or utilize some other protective measure to prevent the release of residual energy while service is in progress.

iv. **Attach a Lock and Tag**

Attach a lock and tag, of designated color, type and descriptive warning, on each disconnecting means used to de-energize circuits and equipment on which work is to be performed. The lock will be attached to prevent persons from operating the equipment. Tags must be securely attached to energy isolating devices so that they cannot be inadvertently or accidentally detached during use. Additionally, tags will be attached to all points where equipment or circuits can be energized. If multiple employees are servicing the same equipment, each will attach their own lock to a multiple lock plate.

**Note: No attempt will be made to remove another employee's lock unless the requirements listed in Section III (c) of this document are satisfied.**

- v. **Verify that equipment is secure and deactivated**  
Test the deactivation of the equipment to ensure that equipment cannot be energized and potential energy sources secured. This should be done by:
  - a. Checking that no personnel are exposed;
  - b. Verifying the isolation of equipment by operating the push button or other normal operating controls. Secure all switches to prevent movement to the "on" or "start" position;
  - c. Checking pressure gauges to ensure de-pressurization of lines; and
  - d. Inspecting electrical circuits to confirm zero voltage.

**Note: All employees should consider equipment to be operable at all times except when they have personally locked it out.**

#### F. **RETURNING EQUIPMENT TO SERVICE**

After service has been completed and the machine is ready to be tested or returned to service the following steps must be followed.

- i. **Inspect the machine and work area**  
Inspect the machine(s) to insure that non-essential materials have been removed and the machine is in operating order. Visual inspections will be conducted to ensure: a) tools and equipment are removed and secured safe guards are in place; and b) blocks, pins and chain (used during the lockout) are removed. Additionally, employees will verify all equipment components are fully assembled and operational. Finally, employees will inspect the work area to ensure that all employees have been safely positioned or removed from the area.
- ii. **Inspect the controls**  
Verify the controls are in neutral or the "off" position.
- iii. **Remove the lock devices**  
Each lock will be removed by the authorized employee that applied it or under his/her direct supervision. If the authorized employee is absent from the work place then the lock or tag can be removed by a qualified person designated to perform this task provided that the immediate supervisor:
  - a. Verifies that the employee is not present and therefore unable to remove the lock;
  - b. Makes all reasonable efforts to inform the authorized employee that the lockout/tagout device has been removed; **and**
  - c. Ensures that the authorized employee knows the lockout/tagout device has been removed before work resumes.
- iv. **Re-energize the machine.**  
After completing the above steps, restore the energy to the machine.
- v. **Notify affected employees**  
Notify affected employees that the servicing or maintenance is completed, and the machine or equipment is ready for use.

## Exhibit S-4- 7 A

### Definitions

**Affected personnel:** Persons that may use the machine being serviced during the course of their work day and may attempt to activate machinery while service is being done. Affected persons also include those persons whose job requires working in an area while such servicing or maintenance is being performed.

**Authorized personnel:** Persons that have received training in the use of Lockout/ Tagout equipment and are authorized to perform maintenance. Authorized personnel also include those persons responsible for properly locking and tagging machinery that is to be serviced. (Affected personnel may also be authorized personnel when the employee's duties include servicing or maintenance of machinery.)

**Blank:** A disk inserted into the space between two pipe flanges to prevent the passage of liquid or gases through a pipe.

**Bleed:** The release of stored hydraulic, electrical or pneumatic energy.

**Energy Sources:** Any source of electrical, pneumatic, hydraulic, thermal, chemical or other type of energy.

**Lock:** Keyed device, specified in type and color by the department completing the service, used to secure equipment. Keys for the lock will be kept by the person completing the service only. Locks issued for use with this plan will not be used for other purposes. Additionally, locks will be able to withstand the environment in which they are being used.

**Lockout:** A system in which a lock, when properly attached to a power or energy source, prevents the unintentional activation of equipment. The lock physically holds the switch or handle in the "off" position until it is removed by the authorized personnel.

**Lockout/ Tagout (LOTO):** A list of procedures, abbreviated as LOTO, designed and implemented to protect employees from an accidental discharge of energy. LOTO is used interchangeably with, "Control of Hazardous Energy".

**Servicing and/or Maintenance:** Constructing, repairing, installing, adjusting, inspecting, modifying, lubricating, cleaning and/or clearing jammed equipment.

**Tagout:** A tagging procedure, intended to act only as a warning device, used to prevent the unintentional activation of equipment. The tag used at UM will contain the name and title of the authorized employee and read "DO NOT OPERATE". Tagout device attachment means will be of a non-reusable type, attachable by hand, self-locking, and non-releasable with a minimum locking strength of no less than 50 pounds. All tags and attachment means will also be made to withstand the environment in which they are being used.

**Exhibit S-4- 7 B**

**New Jersey Institute of Technology  
LOCKOUT TAGOUT TRAINING  
DOCUMENTATION FORM**

**Date of Training:** \_\_\_\_\_

**Name and Title of Trainer:** \_\_\_\_\_

**Employee Name:** \_\_\_\_\_ **Employee**

**ID No.:** \_\_\_\_\_ **Department:**

**Position:** \_\_\_\_\_

**I have participated in and understand my rights and obligations under the New Jersey Institute of Technology Lockout Tagout Training Program.**

**Signature**

\_\_\_\_\_ **Date** \_\_\_\_\_

**Trainer's**

**Signature** \_\_\_\_\_ **Date** \_\_\_\_\_

**Department Environmental Safety and Health Officer Certification**

**Signature** \_\_\_\_\_ **Date** \_\_\_\_\_

**Exhibit S-4- 7C**

***Specific Instructions for Hazardous Machinery***

**Part I**

Machine

Name: \_\_\_\_\_

Machine Serial

Number: \_\_\_\_\_

Department

Name: \_\_\_\_\_

Approved by: \_\_\_\_\_

Date: \_\_\_\_\_

**Part II**

**a.** What types of hazardous energy may be present?

Circle all that apply.

Electrical   Chemical   Pneumatic   Hydraulic   Thermal   Other: \_\_\_\_\_

**b.** Complete Energy Check List (Reverse side of this form)

**c.** Special Locking and Tagging instructions:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**Part III**

Attach a diagram or photo identifying lock and tag locations:



**Energy Control Diagram**

**ENERGY CHECKLIST**

Energy Type	Hazard	Magnitude	Control Method
<b>Electrical</b>	Shock Burn Fire	110 VAC 220 VAC 208 VAC/30 ___V ___A	Main Switch Plug Control Fuse Blocks Shielding
<b>Pneumatic</b>	Mechanical/ Pinch Points Crush Laceration Flying Debris	Moderate Slight High ___lb Force	Air Line Valve Gas Cylinder Valve Gas Line Valve _____
<b>Chemical (Gas)</b>	Flammable Corrosive Toxic Reactive	Slight Moderate High	Cylinder Valve Gas Line Valve
<b>Chemical (Liquid)</b>	Flammable Corrosive Toxic Reactive	Slight Moderate High	Valve Flange Plate
<b>Mechanical</b>	Shaft in Motion Moving Parts Crushing Laceration Impalement	Slight Moderate High ___ft-lb ___hp	Main Electrical Switch Plug Control Shielding Blocking Anti-Motion Pin
<b>UV</b>	Skin and Eye Burns	Slight Moderate High ___W/cm <sup>2</sup> @ ___%	Shielding Main Switch Plug Control Circuit Breaker
<b>ElectroMagnet</b>	Strong Field	Slight Moderate High ___Gauss	Main Switch Plug Control Circuit Breaker
<b>Thermal</b>	Burns	Moderate Temperature High Temperature Cryogenic ___°C	Main Switch Plug Control Steam Valve Fluid Line Valve

\*Chart adopted from the January/February 1995 issue of *Compliance Magazine*.

## Exhibit S-4- 7E

### Using the LOTO Plan

- I. PREPARING FOR SHUTDOWN
  - a. Identify the types of energy and sources
  - b. Notify affected employees of intent to service machinery
- II. SHUTTING DOWN THE EQUIPMENT
  - a. Turn off equipment
  - b. Deactivate energy
  - c. Release all stored or residual energy
  - d. Attach locking and tagging devices
  - e. Test to make sure equipment has been deactivated
- III. COMPLETE WORK
- IV. PREPARING TO RETURN EQUIPMENT TO SERVICE
  - a. Remove all tools from the equipment
  - b. Inspect the controls to verify they are in the "off" position
  - c. Remove all locking and tagging devices
  - d. Re-energize the equipment
  - e. Notify affected employees when equipment is back in service

**Exhibit S-4- 7F**

**Machinery and Equipment Inventory**

**Update Date** \_\_\_\_ / \_\_\_\_ / \_\_\_\_


**Supervisor** \_\_\_\_\_

**Department** \_\_\_\_\_

**List all Electrical Equipment not powered by plug and cord.**

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.
- 9.
- 10.
- 11.
- 12.
- 13.
- 14.
- 15.

**A step by step procedure must be written for assuring the de-energizing of the equipment through locks and tags for each machine. Machine using identical procedures may be grouped.**

	UNIVERSITY SAFETY ENVIRONMENTAL MANAGEMENT SYSTEM University Heights Newark, New Jersey 07102	
		<b>Document Control No.</b> <b>USEMS SOP S - 4- 8</b>
<b>New Jersey Institute of Technology  Respiratory Protection Program</b>		

## 1.0 Scope and Application

- 1.1 The New Jersey Institute of Technology Respiratory Protection Program establishes a program for the use of respirators. The criteria is designed for those university personnel who, during their normal duties, are or could be exposed to hazardous substances or atmospheres that may affect their well being or their health, or that may otherwise be detrimental to their safety. The program includes:
- 1.1.1 Efforts to prevent atmospheric contamination through engineering control measures. when feasible. However, when not feasible or while such measures are being instituted or evaluated, the program requires appropriate respiratory protection to personnel who might be exposed to unhealthy or unusual conditions.
  - 1.1.2 Provisions for the proper selection and fitting of respiratory protection equipment and for the training of University personnel in the proper use of such equipment.
  - 1.1.3 Requirements and controls for those employees who must use respirators and for their supervisors.
- 1.2 The Department of Environmental Health and Safety (EH&S) develops, implements and manages safety and health programs for New Jersey Institute of Technology faculty, staff and students. The control of safety and health hazards at the University is primarily through the implementation of engineering, work practice and administrative controls. Personal Protective Equipment (PPE) is used to supplement these controls or whenever the controls are not feasible or are in the process of being implemented. PPE is also recommended whenever exposures to chemical, physical or biological agents can be prevented or reduced by its use.
- 1.3 **The Administration of NJIT prefers not to rely on the use of respiratory protection.** Departments that create exposures that may require the use of respiratory apparel are encouraged to eliminate the need for the equipment through engineering, administrative controls and work practices.
- 1.4 Any activity where respiratory protection is deemed necessary must be reported to the Director of Environmental Health and Safety for evaluation.
- 1.5 This respiratory protection program is established to coordinate the use and maintenance of respiratory protective equipment when such equipment is used to reduce employee exposure to potentially hazardous agents or work environments. An effective comprehensive respiratory protection program is essential to assure that personnel using such equipment are adequately protected. All employee activities involving the use of respiratory protection equipment, as defined in this written program, will be conducted in compliance with the Occupational Safety and Health Administration's (OSHA's) standard for respiratory protection 29 CFR 1910.134.

1.6 When respiratory protection is to be used it is critical that:

- A. the correct type of equipment is chosen;
- B. it is clean and in good working order;
- C. a good fit is obtained; and
- D. the user is adequately trained in the use, care and limitations of the protective device.

1.7 This written program establishes the procedures and requirements necessary to meet established standards and federal regulations for use of respiratory protection equipment and to provide the necessary health and safety protection to those falling within the jurisdiction of the program. Requirements outlined in this manual are mandatory in nature where the word "WILL" is used and are advisory in nature where the word "SHOULD" is used.

## **2.0 Responsibilities**

### **2.1 Department Environmental Health and Safety Officer**

- Keep informed of all areas under his or her jurisdiction where potentially hazardous exposures exist and initiating protection programs that adhere to the respiratory protection requirements of this manual.
- Assure that applicable respiratory protection program requirements for principal investigators, supervisors, or division heads, and university personnel under their supervision are adhered to.
- Report situations that may require respiratory protection to the Director of Environmental Health and Safety
- Identify employees that require education, training, fit testing as required under this program.
- Retain training documentation records for the department employees.

### **2.2 Principal Investigator or Supervisor**

- Each person in charge of a research project, maintenance, service or renovation, or other activity where respiratory protection equipment may be or is required is responsible for:
- Identifying, with the assistance of personnel from EH&S, those employees who may need respiratory protection equipment and scheduling them for fitting and training in the proper use and maintenance of the equipment.
- Requesting assistance from EH&S in evaluating new operations that may present health and safety hazards.
- Coordinating with EH&S in obtaining approval from the Occupational Health Physician before assigning known or suspected medically restricted employees to jobs requiring the use of respirators.
- Enforcing the use of respiratory protection equipment and other requirements when applicable.
- Keeping the department chairperson or director informed of any actions proposed or taken regarding the Respiratory Protection Program.

### **2.3 Individuals**

- Any New Jersey Institute of Technology employee or person, who is required under the Respiratory Protection Program to wear respiratory equipment, or who participates in the Respiratory Protection Program, is responsible for:
- Utilizing the issued respiratory protection equipment in accordance with instruction and training provided by EH&S personnel. This includes maintaining the respirator in a clean condition and ready to use at all times.
- Restricting the use of an assigned respirator to his or her's exclusive use.
- Informing his/her supervisor of any personal health problems that could be aggravated by the use of respiratory equipment.
- Guarding against damage and ensuring respirators are not disassembled, modified, or otherwise altered in any way other than by the changing of respirator cartridges/filters.

- Report any observed or suspected malfunctioning respirator to EH&S personnel.
- Using only those brands and types of respiratory protection equipment for which they have been trained and fitted.

#### **2.4 Director of Environmental Health and Safety**

- EH&S is responsible for performing the following functions: a) Reviewing and approving all purchases of respiratory protection equipment. b) Providing instruction on the need for respiratory protection, criteria for selecting respirators, and respirator fitting, use, and maintenance.
- Issuing the approved respiratory protection equipment, maintaining facilities for the reconditioning and maintenance of equipment, and providing the following additional services:
- Conducting initial, annual, and other required fit tests for employees who utilize respiratory protection equipment.
- Coordinating with University Health services a medical surveillance program for respiratory protection.
- Acting on a consulting basis for respiratory protection.

### **3.0 Authorization For Use**

- 3.1 Only those persons who have been designated by the supervisor, principal investigator or EH&S as being required to utilize respiratory protection equipment and who have been properly fitted and trained in its use will utilize such equipment.

### **4.0 Evaluation of Required Respiratory Protection Equipment**

- 4.1 The Director of Environmental Health and Safety will evaluate and approve the purchase of all respiratory protection equipment before it is used. This selection is, of course, subject to change as new and improved equipment appears on the market.

### **5.0 Instruction, Selection, Fitting, Training, and Maintenance**

- 5.1 The Director of Environmental Health and Safety will provide instruction on the need for respiratory protection, will develop criteria for the selection and fitting of respirators, and will provide training in the proper use and maintenance of respirators.

### **6.0 Respiratory Protection Program Implementation**

- 6.1 The Respiratory Protection Program is administered by the Department of Environmental Health & Safety (EH&S). EH&S provides a centralized facility for purchasing, maintaining, fitting, and evaluating all on-site respiratory protection equipment and for training New Jersey Institute of Technology personnel in its use.

## **7.0 Who Must Wear Respiratory Protection Equipment**

7.1 Respiratory protection devices will be used:

- For activities that cannot be safely controlled by engineering methods, such as for pesticide applications required by the EPA Worker Protection Standard or hazardous exposures to carcinogenic, mutagenic, teratogenic or other highly toxic materials.
- When the working atmosphere is or may be oxygen deficient. If so, air supplied respirators will be used.
- When working in confined spaces where toxic atmospheres are present.
- When airborne radioactive or toxic materials could exceed recommended exposure limits.
- For emergency use when loss of life or serious property loss or damage may be involved.
- For designated employees at the Gannett Health Center for protection against potential exposure to tuberculosis.

## **8.0 How to Obtain Respiratory Protection Equipment**

8.1 Each employee whose duties require the use of a respirator (as jointly determined by EH&S, the employee and the employee's supervisor), must make a request to the Director of Environmental Health and Safety from his/her supervisor's. If the situation cannot be eliminated through engineering controls, the department will be requested to justify the need for the activity creating the hazard. After satisfying necessary requirements, the employee will be issued a new or cleaned and reconditioned respirator; the costs will be charged to the employee's administrative unit.

## **9.0 How to Obtain Replacement Respirators and Cartridges**

9.1 Only employees who are in the Respiratory Protection Program may use respiratory protection equipment.

## **10.0 Procurement of Respirators**

10.1 Half-mask respirators are available to the employee through Purchasing by departmental request. The EH&S Department will stock several NIOSH/MSHA approved brands of respirators that provide needed protection. The user must be authorized by the Director of Environmental Health and Safety (DHSCA) prior to purchasing the equipment. Each respirator will be equipped with a filter and/or cartridges for the specific hazard to be protected against. Emergency needs will be processed through the DHSCA. Some special applications that require assessment by are listed below:

- Full-face respirators, fitted with corrective lens.
- Air-supplied sandblast hoods.
- Air-supplied plastic hoods.
- Powered air-purifying respirators.

10.2 The selection of proper respiratory equipment by the DSHCA follows the "Respiratory Equipment Selection Guide" and American National Standard Institute-Practices for Respiratory Protection (ANSI Z88.2) 1989.

## 11.0 Education and Training

11.1 Education and training of employees in the use of respirators will include a complete description of equipment issued, and the care, maintenance, purpose, and function of all parts thereof. Each employee will be instructed in proper wearing of the respirator approved for his or her use. Training will also include discussion of pertinent federal regulations, safety and health standards and campus policies. The length of these instruction sessions will vary with the type of equipment being described. More time is needed to train personnel who may use equipment in hazardous atmospheres than would be necessary for nuisance dusts, which would not present a hazard to health or life.

## 12.0 Medical Evaluation Questionnaire and Medical Surveillance

12.1 Each employee whose duties require the use of a respirator will be required to complete and submit a Medical Evaluation Questionnaire form to the DHSCA before being fitted with a respirator. The sample Medical Evaluation Questionnaire was developed by a physician. Those who are medically denied to wear a respirator cannot participate in this program.

Additional referrals and medical surveillance may be required following evaluation of the Medical Evaluation Questionnaire form by a medical professional.

## 13.0 Requirements For Fitting and Testing

### 13.1 Qualitative and Quantitative Fit Testing Requirements

13.1.1 All campus personnel required to utilize respiratory protection equipment must be qualitatively and/or quantitatively fit tested prior to use of the equipment. Having multiple sizes and a variety of interchangeable cartridges will facilitate the fitting of respirators. After the selection of the proper respirator has been made the user will wear the proposed respirator for five minutes prior to the initiation of a qualitative or quantitative fit test.

### 13.2 Qualitative Fit Test

13.2.1 A qualitative fit test will be performed in the following manner:

**Positive-pressure check:** With the exhaust port(s) blocked, the positive pressure of slight exhalation should remain constant for several seconds.

**Negative-pressure check:** With the intake port(s) blocked, the negative pressure of slight inhalation should remain constant for several seconds.

**Stannous Chloride Irritant Smoke Test:** Once a satisfactory fit is obtained on the negative or positive pressure checks, the quality of the facial seal is verified by the use of stannous chloride irritant smoke.

13.2.2 The high efficiency particulate filter cartridges are attached to the respirator for this test. The employee will be instructed to close his/her eyes and to breathe normally during the test. The irritant smoke is puffed around the entire face seal and cartridge seal, slowly at first and with increasing smoke density if the wearer experiences no irritation.

### 13.3 Quantitative Fit Test

13.3.1. A quantitative fit test instrument such as PORTACOUNT PLUS, a continuous-flow condensation nucleus counter, is used in determining the particle concentration outside the mask and inside the mask. This ratio is known as the fit factor. A fit factor of 100 is considered passing the test for a half-mask. The test subject will perform the following exercises for each independent test:



- **Normal Breathing (NB)** In the normal standing position, without talking, the subject will breathe normally for at least one minute.
- **Deep Breathing (DB)** In the normal standing position the subject performs deep breathing for at least one minute, pausing so as not to hyperventilate.
- **Turning Head Side To Side (SS)** Standing up, the subject will slowly turn his/her head from side to side between the extreme positions to each side. The head will be held at each extreme position for at least 5 seconds.
- **Moving Head Up and Down (UD)** Standing up, the subject will slowly move his/her head up and down between the extreme position straight up and the extreme position straight down. The head will be held at each extreme position for at least 5 seconds.
- **Jaw Movements (JM)** The subject will be asked to perform some jaw movements during this test.

13.3.2 Additional exercises will be required for employees to be tested with SCBA. Respirator restraining straps may not be over-tightened for testing. The straps will be adjusted by the wearer to give a reasonably comfortable fit typical of normal use. Employees who wear eyeglasses will be tested while wearing them.

#### 13.4 Restrictions

13.4.1. The employee will not be permitted to wear a half-mask or full facemask if the minimum protection factor of 1000 or 3000 respectively cannot be obtained. The test will not be conducted if there is any hair growth between the skin and the facemask sealing surface. If an employee exhibits difficulty in breathing during the test, he or she will be referred to the University Health Services to determine whether the employee can wear a respirator while performing his or her duties.

#### 13.5 Annual Quantitative Fit Testing Requirement

13.5.1 Quantitative fit testing will be repeated at least annually. In addition, because the seal of the respirator may be affected, the quantitative fit testing will be repeated immediately if the test subject has:

- A weight change of 20 pounds or more.
- Significant facial scarring in the area of the face piece seal
- Significant dental changes, i.e., multiple extraction without prosthesis, or dentures.
- Reconstructive or cosmetic surgery.
- Any other condition that may interfere with face piece sealing.

### 14.0 Records

13.1 A record will be made of each test and will be filed in EH&S. After fitting has been completed, each employee will be issued a "Respirator Certification" indicating:

- Brand and type of respirator to be used by the employee.
- Date tested. (Note: This certification must be updated annually).

## Exhibit S- 4- 8 A

### Definitions

**Aerosol** - A system consisting of particles, solid, or liquid, suspended in air.

**Approved** - Tested and listed as satisfactory jointly by the Mine Safety and Health Administration (MSHA) and the National Institute for Occupational Safety and Health (NIOSH).

**Canister (Air-Purifying)** - A container filled with sorbents and catalysts that remove gases and vapors from air drawn through the unit. The canister may also contain an aerosol (particulate) filter to remove solid and liquid particles.

**Cartridge** - A small container filled with air-purifying media.

**Confined Space** - An enclosure such as a storage tank, process vessel, boiler, silo, tank car, pipeline, tube, duct, sewer, underground utility vault, tunnel, or pit that has limited means of egress and poor natural ventilation and that may contain hazardous contaminants or be oxygen deficient.

**Contaminant** - A harmful irritating, or nuisance material that is foreign to the normal atmosphere.

**Economic Poison** - Substances and mixtures of substances intended for defoliating plants, regulating plant growth or for preventing, destroying, repelling or mitigating any and all plant pests.

**Exhalation Valve** - A device that allows exhaled air to leave a respiratory device and prevents outside air from entering through the valve.

**Face piece** - That portion of a respirator that covers the wearer's nose, mouth and eyes in a full face piece. It is designed to make a gas-tight fit with the face and includes the headbands, exhalation valve(s), and connections for an air purifying device.

**Filter** - A fibrous medium used in respirators to remove solid or liquid particles from the airstream entering the respiratory enclosure.

**High-Efficiency Particulate Aerosol (HEPA) Filter** - A filter designed to remove 99.97% of specific type particle material from air.

**IDLH Atmosphere** - An atmosphere immediately dangerous to life or health (IDLH). An IDLH atmosphere poses an immediate hazard to life, such as being oxygen deficient (containing less than 19.5% oxygen), or produces an irreversible debilitating effect on health.

**Inhalation Valve** - A device that allows respirable air to enter the face piece and prevents exhaled air from leaving the face piece through the intake opening.

**Mine Safety and Health Administration (MSHA)** - A Federal agency that tests, approves, and certifies respiratory protection equipment.

**Particulate Matter** - A suspension of fine solid or liquid particles in air, such as dust, fog, fume, mist, smoke, or sprays. Particulate matter suspended in air is commonly known as an aerosol.

**Pesticide** - For the purpose of this manual, the terms pesticide and pesticide chemical are synonymous with economic poison, as defined under the United States Department of Agriculture's Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA).

**Pneumoconiosis** - Producing Dust - Dust that, when inhaled, deposited, and retained in the lungs, may produce signs, symptoms, and findings of pulmonary disease.

**Protection Factor (PF)** - The overall protection afforded by a certain type of respirator as defined by the ratio of the concentration of contaminant outside a face mask or hood to that inside the equipment under conditions of use. For example, if a half-mask respirator has a protection factor of 10, it may be used for protection in atmospheres with a contaminant concentration up to 10 times the permissible exposure limit.

**Qualitative Fit Test** - A test procedure to determine the effectiveness of the seal between the face mask and the wearer's face, usually performed during the fitting process.

**Quantitative Fit Test** - The measurement of the effectiveness of a respirator seal in the ambient atmosphere. This test, using a PORTACOUNT or similar measuring device, is performed by dividing the measured concentration of the dust particles in the ambient atmosphere by the measured concentration of the particles inside the respirator face piece.

**Resistance** - Opposition of the flow of air, as through a canister, cartridge, or particulate filter.

**Respirator** - A device designed to protect the wearer from inhalation of harmful atmospheres.

**Self-Contained Breathing Apparatus (SCBA)** - For the purpose of this manual, a unit designed to provide to the wearer a respirable atmosphere independent of the ambient air. A supply of approved compressed air contained in a gas cylinder is carried by the wearer. SCBA units are generally restricted to types equipped with pressure-demand regulators that maintain positive pressure in a full face mask.

**Supplied-Air Respirator** - For the purpose of this manual, a hose-mask respirator equipped with a face piece, breathing tube, safety harness and safety line. The respirable air is supplied through an air hose connected to a compressed-air cylinder or air compressor.

**Test Subject** - A person wearing a respirator for quantitative fit testing.

**Threshold Limit Value (TLV)** - A list published yearly by the American Conference of Governmental Industrial Hygienists as a guide for exposure concentrations that a healthy individual normally can tolerate for 8 hours a day, five days a week, without harmful effects. Airborne particulate concentrations are generally listed as milligrams per cubic meter of air (mg/m<sup>3</sup>), and gaseous concentrations are listed as parts per million (ppm) by volume.

**Vapor** - The gaseous state of a substance that is solid or liquid at ordinary temperature and pressure.

**Exhibit S- 4- 8 B**

**EMPLOYEE EXPOSURE MEASUREMENT RECORD**

Facility: \_\_\_\_\_ Area: \_\_\_\_\_ Sampled

by: \_\_\_\_\_ Date: \_\_\_\_\_ Temperature:

Altitude: \_\_\_\_\_

Sample #: \_\_\_\_\_ Employee Name: \_\_\_\_\_ SS# \_\_\_\_\_

Operation(s) Monitored: \_\_\_\_\_

Type of Sample: Personal \_\_\_\_\_ Breathing Zone \_\_\_\_\_ Area \_\_\_\_\_

Operating conditions and control methods: \_\_\_\_\_

Time on: \_\_\_\_\_ Time off: \_\_\_\_\_

Elapsed time (minutes) \_\_\_\_\_ Indicated flow rate (LPM) \_\_\_\_\_ Volume (liters) \_\_\_\_\_

Calibration location: \_\_\_\_\_ by: \_\_\_\_\_ Date: \_\_\_\_\_

Sampling/analytical method: \_\_\_\_\_

Evidence of accuracy: \_\_\_\_\_

Remarks, possible interferences, action taken, etc.: \_\_\_\_\_

Results of sampling analysis or instrument reading: \_\_\_\_\_

Exposure of employee (indicate 8-hr average or 15 min) and sample numbers it is based on: \_\_\_\_\_



**Exhibit S- 4- 8 C**

**NEW JERSEY INSTITUTE OF TECHNOLOGY  
MEDICAL EXAMINATION REQUEST**

Date \_\_\_\_\_

Employee Name \_\_\_\_\_

Identification No \_\_\_\_\_

Department \_\_\_\_\_

Job Classification \_\_\_\_\_

The above named employee of New Jersey Institute of Technology has been assigned to work requiring the use of a respirator. It is requested the employee be given an initial/annual medical examination which will include the following:

- 1. A complete physical examination of all systems with emphasis on the respiratory system, the cardiovascular system and digestive tract.
- 2. A chest roentgenogram (posterior - anterior 14 x 17 inches)
- 3. Pulmonary function tests to include forced vital capacity and forced expiratory volume at 1 second.
- 4. Any additional tests deemed appropriate by the examining physician.

The following information should be taken into consideration when evaluating the employee's physical ability to function normally wearing a respirator.

1.	The employee's duties related to the anticipated exposure are: _____ _____
2.	The employee's anticipated exposure level is: _____ _____
3.	Type of respirator to be used: _____ _____
4.	Information from previous medical examinations: _____ _____

It is requested that the examining physician provide to CHIP a signed written opinion containing the results of the medical examination.

\_\_\_\_\_

Name of person supplying the above information:  
Date:

**Exhibit S -4 -8 D**

**(SAMPLE) OSHA RESPIRATOR MEDICAL EVALUATION QUESTIONNAIRE  
(MANDATORY)**

The employer must allow you to answer this questionnaire during normal working hours, or at the time and place that is convenient to you. To maintain your confidentiality, your employer or supervisor must not look at or review your answers, and your employer must tell you how to deliver or send this questionnaire to the health care professional who will review it.

**Part A. Section 1.** (Mandatory) The following information must be provided by every employee who has been selected to use any type or respirator (please print).

Can you read (circle one) Yes / No

1. Today's Date: \_\_\_\_\_
2. Your Name: \_\_\_\_\_
3. Your Age: \_\_\_\_\_
4. Sex (circle one): Male / Female
5. Your height: \_\_\_ft. \_\_\_in.
6. Your weight: \_\_\_\_\_ lbs.
7. Your job title: \_\_\_\_\_
8. A phone number where you can be reached by the health care professional who will review this questionnaire (including the area code): \_\_\_\_\_
9. The best time to phone you at this number: \_\_\_\_\_
10. Has your employer told you how to contact the health care professional who will review this questionnaire? (circle one) Yes / No
11. Check the type of respirator you will use (you can check more than one category):  
\_\_\_ N, R, or P disposable respirator (filter-mask, non-cartridge type only)  
\_\_\_ Other type (for example, half or full face-piece type, powered-air purifying, supplied-air, self-contained breathing apparatus).
12. Have you worn a respirator (circle one): Yes / No  
If yes, what type(s): \_\_\_\_\_

**Part A. Section 2.** (Mandatory) Questions 1 through 9 below must be answered by every employee who has been selected to use any type of respirator (circle Yes / No).

1. Do you currently smoke tobacco, or have you smoked tobacco in the last month: Yes / No
2. Have you ever had any of the following conditions?

A. Seizures (fits):	Yes / No
B. Diabetes (sugar disease):	Yes / No
C. Allergic reactions that interfere with your breathing:	Yes / No
D. Claustrophobia (fear of closed-in places):	Yes / No
E. Trouble smelling odors:	Yes / No
3. Have you ever had any of the following pulmonary or lung problems?

A. Asbestos:	Yes / No
B. Asthma:	Yes / No
C. Chronic bronchitis:	Yes / No
D. Emphysema:	Yes / No
E. Pneumonia:	Yes / No
F. Tuberculosis:	Yes / No
G. Silicosis:	Yes / No
H. Pneumothorax (collapsed lung):	Yes / No

- I. Lung cancer: Yes / No
- J. Broken ribs: Yes / No
- K. Any chest injuries or surgeries: Yes / No
- L. Any other lung problem that you've been told about: Yes / No

4. Do you currently have any of the following symptoms of pulmonary or lung illness?

- A. Shortness of breath: Yes / No
- B. Shortness of breath when walking fast on level ground or walking up a slight hill or incline: Yes / No
- C. Shortness of breath when walking with other people at an ordinary pace on level ground: Yes / No
- D. Have to stop for breath when walking at your own pace on level ground: Yes / No
- E. Shortness of breath when washing or dressing yourself: Yes / No
- F. Shortness of breath that interferes with your job: Yes / No
- G. Coughing that produces phlegm (thick sputum): Yes / No
- H. Coughing that wakes you early in the morning: Yes / No
- I. Coughing that occurs mostly when you are lying down: Yes / No
- J. Coughing up blood in the last month: Yes / No
- K. Wheezing: Yes / No
- L. Wheezing that interferes with your job: Yes / No
- M. Chest pain when you breathe deeply: Yes / No
- N. Any other symptoms that you think may be related to lung problems: Yes / No

5. Have you ever had any of the following cardiovascular or heart problems?

- a. Heart Attack: Yes / No
- b. Stroke: Yes / No
- c. Angina: Yes / No
- d. Heart failure: Yes / No
- e. Swelling in your legs or feet (not caused by walking): Yes / No
- f. Heart arrhythmia (heart beating irregularly): Yes / No
- g. High blood pressure: Yes / No
- h. Any other heart problem that you've been told about: Yes / No

6. Have you ever had any of the following cardiovascular or heart symptoms?

- a. Frequent pain or tightness in your chest: Yes / No
- b. Pain or tightness in you chest during physical activity: Yes / No
- c. Pain and tightness in your chest that interferes with your job: Yes / No
- d. In the past two years, have you noticed your heart skipping or missing a beat: Yes / No
- e. Heartburn or indigestion that is not related to eating: Yes / No
- f. Any other symptoms that you think may be related to heart or circulation problems: Yes / No

7. Do you currently take medication for any of the following problems?

- a. Breathing or lung problems: Yes / No
- b. Heart trouble: Yes / No
- c. Blood pressure: Yes / No
- d. Seizures (fits): Yes / No

8. If you've used a respirator, have you ever had any of the following problems?

- a. Eye irritation: Yes / No
- b. Skin allergies: Yes / No



- c. Anxiety: Yes / No
  - d. General weakness or fatigue: Yes / No
  - e. Any other problem that interferes with your use of a respirator: Yes / No
9. Would you like to talk to the health care professional that will review this questionnaire about your answers? Yes / No
10. Have you ever lost vision in either eye (temporarily or permanently)? Yes / No
11. Do you currently have any of the following vision problems?
- a. Wear contact lenses: Yes / No
  - b. Wear glasses: Yes / No
  - c. Color blind: Yes / No
  - d. Any other eye or vision problem: Yes / No
12. Have you ever had an injury to your ears, including a broken ear drum? Yes / No
13. Do you currently have any of the following hearing problems?
- a. Difficulty hearing: Yes / No
  - b. Wear hearing aid: Yes / No
  - c. Any other hearing or ear problem: Yes / No
14. Have you ever had a back injury? Yes / No
15. Do you currently have any of the following musculoskeletal problems?
- a. Weakness in any of your arms, hands, legs, or feet: Yes / No
  - b. Back pain: Yes / No
  - c. Difficulty fully moving your arms and legs: Yes / No
  - d. Pain or stiffness when you lean forward or backward at the waste: Yes / No
  - e. Difficulty fully moving your head up and down: Yes / No
  - f. Difficulty fully moving your head side to side: Yes / No
  - g. Difficulty bending at your knees: Yes / No
  - h. Difficulty squatting to the ground: Yes / No
  - i. Climbing a flight of stairs or a ladder carrying more than 25 lbs: Yes / No
  - j. Any other muscle or skeletal problem that interferes with using a respirator: Yes / No

## Exhibit S -4 - 8 E


### Mandatory Information for Employees Using Respirators When Not Required Under the Standard

**Signature on this form indicates your understanding that there is a Respiratory Program for The New Jersey Institute of Technology and that there are specific requirements for the use of respirators. This completed form will be kept on file with the Safety Coordinator.**

Respirators are an effective method of protection against designated hazards when properly selected and worn. Respirator use is encouraged, even when exposures are below the exposure limit, to provide an additional level of comfort and protection for workers. However, if a respirator is used improperly or not kept clean, the respirator itself may become a hazard to the worker. Sometimes, workers may wear respirators to avoid exposure to hazards, even if the amount of the hazardous substance does not exceed the limits set by OSHA standards. If your employer provides respirators for your voluntary use, or if you provide your own respirator, you need to take certain precautions to be sure that the respirator itself does not present a hazard. You should do the following:

1. Read and heed all instructions provided by the manufacturer on use, maintenance, cleaning and care, and warnings regarding the respirators limitations.
2. Choose respirators certified for use to protect against the contaminant of concern. NIOSH, the National Institute for Occupational Safety and Health of the U.S. Department of Health and Human Services, certifies respirators. A label or statement of certification should appear on the respirator or respirator packaging. It will tell you what the respirator is designed for and how much it will protect you.
3. Do not wear your respirator into atmospheres containing contaminants for which your respirator is not designed to protect against. For example, a respirator designed to filter dust particles will not protect you against gases, vapors, or very small solid particles of fumes or smoke.
4. Keep track of your respirator so that you do not mistakenly use someone else's respirator.

Signature of Employee \_\_\_\_\_ Date \_\_\_\_\_

	<b>UNIVERSITY SAFETY ENVIRONMENTAL MANAGEMENT SYSTEM</b> University Heights Newark, New Jersey 07102	
		<b>Document Control No. USEMS SOP S - 4- 9</b>
<b>Document Title: Fire Prevention Plan and Alarm Systems 29CFR 1910.</b>		

## 1.0 Scope and Application

- 1.1 This Plan is subordinate to the comprehensive University Emergency Plan. Under the authority of the New Jersey Division of Fire Safety, The University Environmental Health and Safety Department is charged with the responsibility of enforcing the provisions of New Jersey Uniform Fire Code, and is the authority having jurisdiction with respect to fire safety regulations, policies and procedures.

## 2.0 Responsibilities

### 2.1 Director of Environmental Health and Safety

- Assure all fire protection, detection and alarm systems are scheduled for periodic testing and maintenance as required by the National Fire Protection Association guidelines and the City of Newark Fire Marshall.
- Periodically review self inspection and contract service provider documentation to assure the required inspections have been conducted.

### 2.2 Facilities Supervisor

- Assure inspections and testing of all fire protection, detection and alarm systems are conducted as scheduled.
- Select and monitor those contractors hired to perform such inspections and testing to assure the service has been completed on schedule.
- Report any problems to the Director of Environmental Health and Safety and Director of Facilities as soon as practicable after discovery.

### 2.3 Department Environmental Health and Safety Officers

- Report any problems observed regarding the fire protection, detection and alarm systems immediately to the Facilities Supervisor.
- Provide fire prevention safety training for all new employees as part of the orientation.

### 2.4 Department Employees

- Participate in fire prevention training and education as required.

## 3.0 Facility Inspections

- 3.1 The Department of Environmental Health and Safety regularly inspects all university premises to assure compliance with fire safety regulations, test fire protection systems and equipment, and conduct employee training programs to familiarize staff with fire hazards and procedures to be followed in an emergency. Furthermore, employees are apprised of the fire hazards of the materials and processes with which they work during state-mandated Right-to-know training.

## **4.0 Smoking**

- 4.1 Smoking is prohibited in all University buildings and within University-owned motor vehicles eliminating the health and fire hazard associated with the use of smoking materials.

## **5.0 Residence Halls**

- 5.1 Students are prohibited from cooking in the room. The burning of candles is also prohibited.

## **6.0 Hot Work Permits**

- 6.1 A permit system for control of welding and cutting is in place within the Facilities Department to control this potential fire hazard. All other hazards are regulated through the inspection procedures.
- 6.2 Contractors that are hired and need to weld or burn are required to obtain a Hotwork Permit from facilities prior to commencement of all work.

## **7.0 Fire Protection**

- 7.1 University buildings are equipped with portable fire extinguishers in accordance with the requirements of the construction and/or fire safety codes. Employees are not expected to utilize these devices nor are they trained in their use due to the danger of their personal safety, which would result from attempting to extinguish a fire.
- 7.2 There are no fire hoses for building occupant use located in any University building; only fire hose connections for fire department use exist.
- 7.3 Many buildings are protected by automatic sprinkler systems and others are provided with fire standpipe systems.
- 7.4 All major buildings are equipped with automatic fire detection and alarm systems, which are constantly, monitored by the University Public Safety Department.
- 7.5 Special hazards, such as cooking, spray painting and computer installations are protected by fixed suppression systems in addition to the aforementioned types of built-in protection.
- 7.6 Fire safety inspections generate formal, written Notices of Violation, which are issued to the individual responsible for the correction of an observed fire hazard.
- 7.7 Re-inspections are established and are conducted. There is a process that is followed for granting extensions of time for hazard abatement, as well as handling uncorrected cited hazards.
- 7.8 All fire protection systems are inspected at the frequencies required by the Uniform Fire Code. These include automatic sprinkler systems, standpipe systems, fixed suppression systems, fire alarm systems, emergency power generators, fire pumps, fire extinguishers and fire hydrants.
  - 7.8.1 A qualified contractor will be hired to inspect all fire extinguishers monthly, replace as necessary damaged or discharged extinguishers that have been discovered, and to test the extinguishers.
  - 7.8.2 A qualified contractor will be hired to inspect and test all fire alarm systems three (3) times annually, by September, February and June of each year.
  - 7.8.3 A qualified contractor will be hired to inspect and test all sprinkler systems three (3) times annually, by September, February and June of each year.
  - 7.8.4 A qualified contractor will be hired to inspect and test all cooking , spray painting and computer equipment extinguishing systems three (3) times annually, by September, February and June of each year.

7.8.5 A qualified contractor will be hired to clean the hood and ductwork over cooking equipment four (4) times annually.

7.9 The University is empowered, by New Jersey Regulation, to order the abatement of cited fire hazards and vacate buildings where uncorrected hazards exist.

7.10 The University has a comprehensive Emergency Plan jointly developed by the Department of Public Safety, the Department of Environment, Health and Safety (EHS), and Facilities Service. This Plan is subordinate to the comprehensive Crisis Management Plan.

## 8.0 Special Hazards

8.1 Major workplace fire hazards are listed below, along with their proper handling and storage procedures.

<b>Workplace Fire Hazards</b>	<b>Handling and Storage Procedures</b>
Fuel	Fuels may be handled and stored in workplaces only according to OSHA and NFPA standards.
Piped natural gas	Natural gas piping is installed in accordance with Public Utility Commission, OSHA and NFPA standards.
Flammable liquids	Rules for the storage and use of flammable and combustible liquids are described in the <i>NJIT USEMS Manual</i>
Flammable gases	Flammable gases may be used and stored in workplaces only according to OSHA and NFPA standards.
Open Flames	Open flames (like candles) are prohibited in work place areas such as offices and residence halls because of sources of ignition such as paper and wood. Open flames also contribute to indoor air pollution.

8.3 Major potential ignition sources and their control procedures are described below.

<b>Potential Ignition Sources</b>	<b>Control Procedures</b>
Smoking	NJIT policy does not allow smoking in university buildings.
Pyrotechnics	Pyrotechnics are prohibited on campus, subject to written approvals from the VP of Administration, Director of Public Safety, The USEMS Director, the University Safety and Manager and the Director of Environmental Affairs.
Hot work (e.g., welding, soldering, cutting, braising, heating metal, etc.)	The Facilities supervisor distributes fire safety precautions and permits for hot work.
Electrical equipment	Rules for the use of electrical equipment are described in the <i>University Safety And Environmental Management System Manual under Electrical Safety</i> .

8.4 In the event of a fire, workplace fire hazards are controlled by installed building fire sprinklers and other suppression systems and portable fire extinguishers. NJIT Physical Plant is responsible for maintaining building fire suppression systems. Portable fire extinguishers aerosol periodically inspected and replaced as necessary by EH&S. An outside contractor tests, refills and maintains campus fire extinguishers under supervision of the Facilities Department.

## **9.0 Personnel Responsible for Control of Fuel Source Hazards**

9.1 In a fire emergency, the City of Newark Fire Department has access to controls for those buildings with piped natural gas, and are responsible for disconnecting the fuel source. NJIT Physical plant is responsible for disconnecting piped natural gas to allow system maintenance and stop leaks.

## **10.0 Employee Education and Training**

10.1 To prevent fires, this Plan is reviewed with every University employee during the EH&S orientation training (i.e., when employees are initially assigned to their job). In addition EH&S will review the Plan whenever it is changed and whenever the employee's responsibilities or designated actions under the Plan change.

## **11.0 Maintenance of Protection Systems for Heat Producing Equipment**

11.1 Where required, the University has installed fire suppression hood systems in campus kitchens and paint spray hoods. These systems are inspected and cleaned quarterly by an outside contractor, under EH&S supervision.

**Exhibit S- 4- 9 A**

**New Jersey Institute of Technology  
FIRE PREVENTION TRAINING  
DOCUMENTATION FORM**

**Date of Training:** \_\_\_\_\_

**Name and Title of Trainer:** \_\_\_\_\_

**Employee Name:** \_\_\_\_\_ **Employee**

**ID No.:** \_\_\_\_\_ **Department:**

**Position:** \_\_\_\_\_

**I have participated in and understand my rights and obligations under the NJIT Fire Prevention Training Program.**


**Signature** \_\_\_\_\_ **Date** \_\_\_\_\_

**Trainer's Signature** \_\_\_\_\_ **Date** \_\_\_\_\_

**Department Environmental Health and Safety**

**Signature** \_\_\_\_\_ **Date** \_\_\_\_\_

Forms for the completion and certification of the training are available through Director of Environmental Health and Safety.

	<b>UNIVERSITY SAFETY ENVIRONMENTAL MANAGEMENT SYSTEM</b> University Heights Newark, New Jersey 07102	
		<b>Document Control No. USEMS SOP S - 4 - 10</b>
<b>Document Title: Hearing Conservation 29 CFR 1910.95</b>		

## 1.0 Purpose and Scope

The New Jersey Institute of Technology Hearing Conservation Program aims eliminate hearing loss due to workplace noise exposures. The program includes the following elements:

- 1.1 Work environments will be surveyed to identify potentially hazardous noise levels and personnel at risk.
- 1.2 Environments that contain or equipment that produces potentially hazardous noise should, wherever it is technologically and economically feasible, be modified to reduce the noise level to acceptable levels.
- 1.3 Where engineering controls are not feasible, administrative controls and/or the use of hearing protective devices will be employed.
- 1.4 Annual hearing testing will be conducted to monitor the effectiveness of the hearing conservation program. Early detection of temporary threshold shifts will allow further protective action to be taken before permanent hearing loss occurs.
- 1.5 Education is vital to the overall success of a hearing conservation program. Annual training is required and must the employees' and supervisors' responsibilities under the program.
- 1.6 When the sound levels listed below are exceeded, reasonable administrative or engineering controls will be instituted. If the controls fail to reduce the noise exposure to within those listed below, hearing protection will be provided and used to reduce the sound levels to an acceptable level. In addition, OSHA requirements dictate that whenever employee noise exposures equal or exceed an 8-hour time-weighted average (TWA) of 85 dab, slow response, a continuing effective hearing conservation program will be instituted.

## 2.0 Responsibilities

### 2.1 Environmental Health and Safety Department

- The Environmental Health and Safety Department (EH&S) is responsible for developing, implementing, and administering the New Jersey Institute of Technology Hearing Conservation Program;
- Identification of work areas and equipment within New Jersey Institute of Technology facilities where noise levels equal or exceed 85 dBA;
- Identification, through personnel monitoring, of New Jersey Institute of Technology employees whose noise exposure level equals or exceeds an 8-hour TWA of 85 dBA. Notification of employee exposure measurements is sent to the employee, the employee's supervisor and to Human Resources inclusion in annual audiology program.
- Noise surveys and/or noise dosimetry must be conducted to determine which areas require warning signs;



- Train employees in the need for, proper use and care of hearing protection devices. The training must include the following topics:
  - Noise induced hearing loss;
  - Recognizing hazardous noise;
  - Symptoms of overexposure to noise;
  - Hearing protection devices (HPD's)- advantages & limitations;
  - Selection, fitting, use and maintenance of HPD's;
  - Explanation of noise measurement procedures;
  - Hearing conservation program requirements.
  - Identification of noise control measures (including engineering and administrative controls) and recommendations;

## 2.2 Human Resources (HR)

- Human Resources is responsible for arranging baseline and annual audiograms for new employees who may be assigned to tasks with potential exposure to elevated levels of noise.
- HR also schedules and audiograms on an annual basis for employees exposed to sound levels greater than or equal to 85 dBA.
- HR is responsible for notifying EH&S of all employees who have experienced significant changes in hearing (standard threshold shifts) in order that follow-up investigations may be conducted. The affected employee and his or her supervisor will also be notified.
- HR sets up appointments with an occupational medical care provider that performs the audiogram in accordance with PEOSHA/OSHA's noise requirements 29 CFR 1910.95.
- The Environmental Health and Safety Department (EH&S) is responsible for developing, implementing, and administering the New Jersey Institute of Technology Hearing Conservation Program;

## 2.3 Supervisors and Principle Investigators

- It is the responsibility of Supervisors and PI's to ensure that all of their employees exposed to noise levels equal to or greater than 85 dBA have access to appropriate hearing protective devices in the work area and enroll those employee(s) in the Hearing Conservation program if identified as having an 8-hour TWA equal to or exceeding 85 dBA.
- Supervisors and PI's are responsible for enforcing the use of hearing protective devices and engineering and administrative controls in designated noise hazardous areas and dispensing earmuffs when necessary as well as maintaining a supply of disposable earplugs.
- The supervisor must ensure that the following are maintained:
  - Signs posted at the entrance to any work area where noise levels equal or exceed 85 dBA;
  - Supply hearing protection to his/her employee(s) at no cost to the employee(s);
  - Enforcement of the wearing of hearing protection in the designated areas using established disciplinary procedures;
  - Hearing Protection Devices (HPD) are used and maintained as originally intended and in accordance with instructions provided.
- The supervisor or PI is also responsible for coordinating and scheduling HCP training for all New Jersey Institute of Technology personnel who participate in the HCP with EH&S.

## 2.4 Department Environmental, Safety and Health Officers

- Periodically tour the assigned area observing for equipment and activities that may be generating excessive noise levels (hard to hear the person next to you speak).
- Report all such activities to EH&S for further assessment and testing.
- Know the areas of the department that require hearing protection.
- Periodically observe to assure employees working in those areas are wearing the required protection.
- Recognizes change in area activities that may affect the level of noise generated and require further testing.

## 2.5 Individuals

- Employees, students and other visitors are responsible for wearing and maintaining hearing protective devices as instructed.
- Employees enrolled in the University's Hearing Conservation Program must also participate in annual training programs and the medical surveillance program, which includes baseline and annual audiometric testing.

## 3.0 Identification of Hazardous Noise Areas

- 3.1 The Environmental Health and Safety Department (EH&S) will identify work areas within the university facilities where noise levels equal or exceed 85 dBA.
- 3.2 Signs will be posted at the entrance to any work area where noise levels exceed 85 dBA, requiring anyone entering the area to wear proper hearing protection.
- 3.3 Personnel who work in these areas will have hearing protection supplied to them, will be instructed in its proper use, and be required to wear this equipment when in these identified areas. It is the responsibility of the area supervisor to ensure that these precautions are maintained.

## 4.0 Noise Measurements and Exposure Assessments

- 4.1 All noise monitoring will be conducted by EH&S or by a consultant working under the guidance of EH&S.
- 4.2 The monitoring of employees for noise exposure is made up of two parts, area and personal monitoring. Area measurements are generally obtained first. If noise levels are at or above 80 dBA, personal monitoring using dosimeters is then performed.
- 4.3 Sample data sheets will be used to record monitoring data for both area and personal noise monitoring results. EH&S will provide observation of the monitoring to employees who work in the area.
- 4.4 In an area survey, measurements of environmental noise levels are recorded using a sound level meter to identify work areas where employees' exposures may be above hazardous levels, and where more thorough exposure monitoring may be needed. Area monitoring is conducted using a calibrated sound level meter set to the A scale, slow response. Within the area of interest, several different locations will be measured. Typical measurement locations would include:
  - 4.4.1 In the hearing zone at the employee's normal work location.
  - 4.4.2 Next to the noise source(s).
  - 4.4.3 At the entrance(s) to the work area.
  - 4.4.4 At other locations within the area where the employee might work.
- 4.5 A rough sketch of the area will be included with the results showing the locations where the noise readings were obtained.
- 4.6 If the noise levels are below 80 dBA on a time-weighted average basis in the area, no further routine monitoring will be required for that area.
- 4.7 Should any of the noise measurements equal or exceed 80 dBA, records will be maintained as to the noise levels recorded, where they were taken, and the source(s) of the noise.
- 4.8 These records will be updated at least once every two years to determine if any changes have occurred that would warrant remonitoring of exposed personnel.

- 4.9 If any of the measurements equal or exceed a noise level of 80 dBA, employees who work in or near the high noise area or equipment will have their noise exposure determined through personnel monitoring using dosimeters.
- 4.10 All areas where noise levels equal or exceed 80 dBA will be remonitored at least every two years. Whenever an employee exhibits a standard threshold shift, as determined by Occupational Medicine, the employee's work place will be remonitored to identify and rectify the cause.
- 4.11 Any area with noise levels that equal or exceed 80 dBA will also be remonitored whenever a change in production process, equipment, or controls increase the noise exposure such that additional employees are exposed to noise levels at or above 80 dBA on a time-weighted average basis. Areas where the noise levels have dropped below 80 dBA due to alterations in equipment, controls or process changes may be eliminated from the monitoring program after a period of two months.

## **5.0 Personnel Monitoring**

- 5.1 Determination of the noise exposure level will be accomplished using calibrated noise dosimeters.
- 5.2 Each employee to be monitored will have a dosimeter placed on him/her at the beginning of
- 5.3 his/her normal work shift with the microphone placed in the "hearing zone".
- 5.4 The dosimeter will be worn for the full duration of the work shift while the employee performs his/her normal work routine. At the end of the work shift, the dosimeter will be removed and information printed out as soon as possible.
- 5.5 Background information will be collected from each employee detailing job description, unusual job activities, etc., for the time period sampled. Those employees whose noise exposure equal or exceed 80 dBA on an 8-hour TWA will be referred to Human Resources for inclusion in the Hearing Conservation Program.

## **6.0 Engineering and Administrative Controls**

- 6.1 The primary means of reducing or eliminating personnel exposure to hazardous noise is through the application of engineering controls. Engineering controls are defined as any modification or replacement of equipment, or related physical change at the noise source or along the transmission path that reduces the noise level at the employee's ear. Engineering controls such as mufflers on heavy equipment exhausts or on air release valves are required where possible.
- 6.2 Administrative controls are defined as changes in the work schedule or operations that reduce noise exposure. If engineering solutions cannot reduce the noise, administrative controls such as increasing the distance between the noise source and the worker or rotation of jobs between workers in the high noise area should be used if possible.
- 6.3 The use of engineering and administrative controls should reduce noise exposure to the point where the hazard to hearing is eliminated or at least more manageable.

## **7.0 Personal Protective Equipment**

- 7.1 Hearing protective devices (ear plugs, muffs, etc.) will be the permanent solution only when engineering or administrative controls are considered to be infeasible or cost prohibitive. Hearing protective devices are defined as any device that can be worn to reduce the level of sound entering the ear. Hearing protective devices will be worn by all personnel when they must enter or work in

an area where the operations generate noise levels of:

- 7.1.1 Greater than 85 dBA sound levels and/or;
- 7.1.2 120 dB peak sound pressure level or greater.

## 7.2 Types of Hearing Protective Devices

7.2.1.1 Insert Type Earplugs: A device designed to provide an airtight seal with the ear canal. There are three types of insert earplugs - premolded, formable, and custom earplugs.

7.2.2 Pre-molded Earplugs: Pre-molded earplugs are pliable devices of fixed proportions. Two standard styles, single flange and triple flange, come in various sizes, and will fit most people. Personnel responsible for fitting and dispensing earplugs will train users on proper insertion, wear, and care. While pre-molded earplugs are reusable, they may deteriorate and should be replaced periodically.

7.2.3 Formable: Formable earplugs come in just one size. Some are made of material that, after being compressed and inserted, expands to form a seal in the ear canal. When properly inserted, they provide noise attenuation values that are similar to those from correctly fitted pre-molded earplugs. Individual units may procure approved formable earplugs. Supervisors must instruct users in the proper use of these earplugs as part of the annual education program. Each earplug must be held in place while it expands enough to remain firmly seated. A set of earplugs with a cord attached is available. These earplugs may be washed and therefore are reusable, but will have to be replaced after two or three weeks or when they no longer form an airtight seal when properly inserted.

7.2.3.1 Custom Molded Earplugs: A small percentage of the population cannot be fitted with standard pre-molded or formable earplugs. Custom earplugs can be made to fit the exact size and shape of the individual's ear canal. Individuals needing custom earplugs will be referred to an audiologist.

7.2.3.2 Earmuffs: Earmuffs are devices worn around the ear to reduce the level of noise that reaches the ear. Their effectiveness depends on an airtight seal between the cushion and the head.

## 8.0 Selection of Hearing Protective Devices

8.1 Employees will be given the opportunity to select hearing protective devices from a variety of suitable ones provided by EH&S. In all cases the chosen hearing protectors will have a Noise Reduction Ratio (NRR) high enough to reduce the noise at the eardrum to 80 dBA or lower.

## 9.0 Issuance of Hearing Protective Devices

9.1 The issuance of hearing protective devices is handled through both EH&S and the Supervisor. EH&S will issue and fit the initial hearing protective devices (foam inserts, disposables). Instruction on the proper use and care of earplugs and earmuffs will be provided whenever HPDs are dispensed. Personnel requiring earmuffs in addition to earplugs will be informed of this requirement and educated on the importance of using proper hearing protection. The Supervisor will dispense earmuffs when necessary and will maintain a supply of disposable earplugs.

## 10.0 Issuance of Hearing Protective Devices

10.1 The issuance of hearing protective devices is handled through both EH&S and the Supervisor. EH&S will issue and fit the initial hearing protective devices (foam inserts, disposables). Instruction on the proper use and care of earplugs and earmuffs will be provided whenever HPDs are dispensed. Personnel requiring earmuffs in addition to earplugs will be informed of this requirement and educated on the importance of using proper hearing protection. The Supervisor will dispense earmuffs when necessary and will maintain a supply of disposable earplugs.

10.2 Always use and maintain HPDs as originally intended and in accordance with instructions provided.

10.3 Earmuff performance may be degraded by anything that compromises the cushion-to-circumaural flesh seal. This includes other pieces of personal protective equipment such as eyewear, masks, face shields, and helmets.

## **11.0 Maintenance of Hearing Protective Devices**

11.1 Reusable earplugs, such as the triple flange or formable devices should be washed in lukewarm water using hand soap, rinsed in clean water, and dried thoroughly before use. Wet or damp earplugs should not be placed in their containers. Cleaning should be done after each use and prior to another employee wearing the same HPD.

11.2 Earmuff cushions should be kept clean. The plastic or foam cushions may be cleaned in the same way as earplugs, but the inside of the muff should not get wet. When not in use, earmuffs should be placed in open air to allow moisture that may have been absorbed into the cups to evaporate.

## **12.0 Hearing Protection Performance Information**

12.1 The maximum of sound attenuation one gets when wearing hearing protection devices is limited by human body and bone conduction mechanisms. Even though a particular device may provide outstanding values of noise attenuation the actual noise reductions may be less because of the noise surrounding the head and body bypasses the hearing protector and is transmitted through tissue and bone pathways to the inner ear. Note: The term "double hearing protection" is misleading. The attenuation provided from any combination earplug and earmuff is not equal to the sum of their individual attenuation values.

## **13.0 Medical Surveillance**

### **13.1 Notification**

13.1.1 Upon identification of employees whose 8-hour TWA equals or exceeds 85 dBA, EH&S will inform the employee(s), Human Resources and the employees' Supervisor, in writing, of the need to enroll certain employee(s) in the Hearing Conservation Program. Information supplied to Human Resources will include the employee(s) name, supervisor's name, telephone number, and the noise levels recorded in the employee's work area, including dosimetry data. It will be the responsibility of the Supervisor to enroll his/her employee in the Hearing Conservation Program.

13.1.2 In work locations where either through administrative or engineering controls, noise levels are found to have fallen such that the employee's 8-hour TWA is below 80 dBA, EH&S will notify the employees, Human Resources and the employee's Supervisor, by memo, that the employees working in that area are no longer required to be enrolled in the Hearing Conservation Program. The final decision as to an employee's enrollment status will be left with the E.

13.1.3 The results of area and personal monitoring will be forwarded to Human Resources upon completion of the noise surveys.

13.1.4 Any personnel experiencing difficulty in wearing assigned hearing protection (i.e., irritation of the canals, pain) will be advised to immediately report this to their supervisor and make arrangements to go to Human Resources for evaluation as soon as possible.

### **13.2 Audiometric Testing**

13.2.1 Human Resources has the responsibility for administering the Audiometric Testing Program portion of the NJIT Hearing Conservation Program. The object of the audiometric testing program is to identify workers who are beginning to lose their hearing and to intervene before the hearing loss becomes worse. Audiometric testing will be provided to all employees whenever employee noise exposures equal or exceed an 8-hr. time-weighted average (TWA) of 85 dBA. Annual

retesting will be performed for all personnel enrolled in the Hearing Conservation Medical Surveillance Program.

## 14.0 Training

- 14.1 The training and education program will provide information about the adverse effects of noise and how to prevent noise-induced hearing loss. At a minimum, all training will cover the following topics:
- 14.1.1 Noise-induced hearing loss;
  - 14.1.2 Recognizing hazardous noise;
  - 14.1.3 Symptoms of overexposure to hazardous noise;
  - 14.1.4 Hearing protection devices - advantages and limitations.
  - 14.1.5 Selection, fitting, use, and maintenance of HPDs.
  - 14.1.6 Explanation of noise measurement procedures.
  - 14.1.7 Hearing conservation program requirements.
- 14.2 Employees will also be provided with copies of the OSHA noise standard (29 CFR 1910.95) and other handouts describing the New Jersey Institute of Technology Hearing Conservation Program. Information provided in Appendix C of this document may also be used.
- 14.3 Supervisors and PI's must contact EH&S to schedule training for new personnel assigned to work in noisy environments and for retraining of current personnel.
- 14.4 University employees will be encouraged to use hearing protective devices when they are exposed to hazardous noise during activities at home; e.g., from lawn mowers, chain saws, etc.
- 14.5 The Environmental Health and Safety department will provide annual refresher training.

## 15.0 Recordkeeping

- 15.1 Hearing Conservation Program records will include the following:

<b>Record</b>	<b>Location</b>
Medical Evaluation and Audiograms	Environmental Health & Safety
Training Records	Environmental Health & Safety
Hearing Conservation Program manual	Environmental Health & Safety
Work Area Surveys	Environmental Health & Safety
Work Area Sampling	Environmental Health & Safety
Roster of Exposed Personnel and Department.	Environmental Health & Safety Human Resource

- 15.2 All non-medical records (ex. work area and equipment surveys) will be maintained for a period of five years.

- 15.3 Results of hearing tests and medical evaluations performed for hearing conservation purposes as well as noise exposure documentation will be recorded and will be a permanent part of an employee's health record.

- 15.4 All personnel who routinely work in designated hazardous noise areas will be identified and a current roster of such personnel will be maintained by EH&S and Human Resources, and updated periodically.

## Noise Training Information

### NOISE


Supervisors, Principle Investigators and exposed workers must become aware of and understand about the adverse effects of noise and how to prevent noise-induced hearing loss. People exposed to hazardous noise must take positive action, if progressive permanent hearing loss is to be prevented. Each exposed worker and supervisor should know the following:

- A. Noise exposure may result in permanent damage to the auditory system and there is no medical or surgical treatment for this type of hearing loss. Though the use of a hearing aid may provide some benefit, normal hearing will not be restored. Many people don't realize loud sounds can cause hearing loss. Furthermore, in its initial stages, the person may not notice a problem since noise-induced hearing loss is invisible, painless, and the loss involves the inability to hear high frequencies. It is dangerous to ignore the temporary characteristics of noise-induced hearing loss (such as ringing or buzzing in the ears, excessive fatigue, etc.).
- B. Each person should know how to recognize hazardous noise even if a noise survey has not been conducted and/or warning signs posted. Recognizing and understanding the adverse effects of off-duty noise exposures is also important. The best rule to follow is: "If you have to shout at arms length (approximately three feet) to talk face-to-face, you are probably being exposed to hazardous levels of noise."
- C. Preventing noise-induced hearing loss is accomplished by reducing both the time and intensity of exposure. Reducing exposure time is accomplished by avoiding any unnecessary exposure to loud sound. Reducing intensity is usually accomplished by wearing personal hearing protection. Each person must be able to properly wear and care for the particular type of hearing protection selected. Speech communication is difficult in high intensity noise. However, most people don't realize it's easier to understand speech if hearing protection is worn in a hazardous noise environment. Hearing protection reduces the noise and the level of speech, resulting in a more favorable listening level. Hearing protection reduces the intensity of frequencies above the speech range; thus, reducing the noise and accentuating speech. People who claim wearing hearing protection makes it difficult to hear speech are probably in noise levels less than 85 dBA or have already developed a hearing loss.
- D. Each person must know how to tell if they have been overexposed to loud sound. Overexposure may occur even while wearing hearing protection. Earplugs and/or earmuffs alone may not be enough protection. Each time a temporary threshold shift (TTS) occurs, a certain degree of permanent loss results. The recognizable symptoms of overexposure are described as "dullness in hearing or ringing in the ears."

## Hearing Conservation Training Outline

1. How noise damages our hearing
2. Consequences of hearing loss in everyday life:
  - a. Poor speech understanding
  - b. Social isolation from friends and family
  - c. Interference with work and leisure activities
3. Noise exposures that are hazardous
  - a. Off-the-job (gun-fire, power tools, etc)
  - b. On-the-job (sound survey information)
4. Engineering controls implemented or planned
5. HPD choices for the employees department
  - a. How to use them correctly
  - b. How to care for and replace them
  - c. How to solve common HPD problems or complaints
6. Audiometric evaluations-purpose and procedures
  - a. Understand your own audiograms
  - b. Hearing changes may mean inadequate protection
  - c. Non-occupational hearing loss may be detected
7. Ways to protect your hearing on and off the job
  - a. Wear Hearing Protective Devices correctly and consistently
  - b. Avoid unnecessary noise exposures
  - c. Use engineering noise controls
8. The University's HCP policies:
  - a. Importance of HCP
  - b. Participation in HCP a condition of employment
  - c. HCP is a benefit to employees
  - d. Participation is to the employee's own advantage
9. Questions and Answers



	UNIVERSITY SAFETY ENVIRONMENTAL MANAGEMENT SYSTEM University Heights Newark, New Jersey 07102	
		<b>Document Control No.  USEMS SOP S - 4 - 11</b>
<b>Document Title: Control Plan for Toxic and Hazardous Substances  29CFR 1910.1003</b>		

## 1.0 Scope and Application

- 1.1 It is the policy of the New Jersey Institute of Technology in coordination with the Department of Environmental Health and Safety to provide the University community with a safe and healthful environment. This policy is designed to minimize employee and student exposures to toxic and hazardous substances including carcinogens. This policy applies to all NJIT employees and students who may come in contact with toxic substances, carcinogens, biological agents and radioactive materials.

## 2.0 Responsibilities

### 2.1 Department of Environmental Health and Safety (EH&S)

- Responsible for: identifying at-risk job tasks, conducting employee exposure assessments, exposure monitoring, designing/evaluating engineering controls and safe work practices, defining regulated areas, conducting respirator fit testing, waste disposal, training, and record keeping.
- Coordinates the disposal of regulated materials.
- Periodically reviewing and updating this guideline.

### 2.2 Human Resources Manager

- Responsible for arranging medical surveillance.
- Responsible for retaining all medical records.

### 2.3 Principle Investigator

- Responsible for notifying the university Safety Committee of the intent to undertake a research project involving any of the chemical, biological or radioactive materials listed below.
- Responsible for identifying and reporting the presence of the listed materials to the Department Environmental Health and Safety Officer (DESHO)
- Notifying the DESHO of unusual conditions or changes in work practices that would make prior exposure assessments non-representative.
- Responsible assuring those exposed are provided with personal protective equipment at no cost to the employee.
- Enrolling employees exposed into a medical surveillance program when deemed necessary by the Director of Environmental Health & Safety.
- Scheduling and ensuring employee attendance at annual EH&S Laboratory Safety Training
- Ensuring such hazardous materials are properly labeled, stored in a “Designated Area” and that the laboratory room sign has a “Designated Area” sticker affixed to it.

### 2.4 Department Environmental Health and Safety Officers (DESHO)

- Responsible for identifying at-risk tasks, requesting exposure assessments for employees and notifying EH&S of unusual conditions or changes in work practices that would make prior exposure assessments non-representative.
- Responsible assuring those exposed are provided with personal protective equipment at no cost to the employee.
- Enrolling employees exposed to above the OSHA Allowable Limit or STEL into a medical surveillance program.
- Scheduling and ensuring employee attendance at annual EH&S Laboratory Safety Training
- Ensuring the materials are properly labeled, stored in a “Designated Area” and that the laboratory room sign has a “Designated Area” sticker affixed to it.

### 2.5 Individuals

- Faculty, staff and students working in a laboratory are responsible for participating in annual EH&S Laboratory Safety Training and the medical surveillance program if applicable.
- Individuals are also responsible for: using assigned personal protective equipment, using prescribed engineering controls and administrative work practices, and notifying supervisors of unusual conditions or changes in work practices that would make EH&S exposure assessments as being non-representative.

## 3.0 Procedures

3.1 The following materials are regulated by a variety of federal and state agencies because of the extra-hazardous properties. Use of any of these materials imposes additional levels of regulatory and risk control. Any intent to use any of the chemical, biological or radioactive material must be thoroughly reviewed prior to approval for ordering, acquisition and delivery of these materials onto the NJIT campus. This list is not all inclusive of materials that are extraordinarily hazardous or carcinogenic. It is important to review the material safety data sheet prior to obtaining a material and developing an occupational exposure control strategy that is appropriate for the potential health risk.

### 3.2 Extra-Hazardous Chemicals

3.21 The intent to use and known presence of these materials must be reported to EH&S for further review.

1,2-dibromo-3-chloropropane	bis-Chloromethyl ether
1,3-Butadiene	cadmium
2-Acetylaminofluorene	ethyleneimine
3,3'-Dichlorobenzidine (and its salts)	ethylene oxide
4-Aminodiphenyl	formaldehyde
4-Dimethylaminoazobenzene	inorganic arsenic
4-Nitrobiphenyl	lead
acrylonitrile	methylene chloride
alpha-Naphthylamine	methyl chloromethyl ether
benzene	Methylenedianiline
beta-Naphthylamine	N-Nitrosodimethylamine
beta-Propiolactone	vinyl chloride
benzidine	

### 3.3 Biological Agents

3.31 The use or possession of biological agents, toxins or recombinant materials in laboratories must be registered with the Environmental Health and Safety Department (EH&S). The use of biological agents, toxins and recombinant DNA in laboratory animals must be approved by EH&S and the University Safety Committee prior to the initiation of the research. If you have questions, contact University Safety & Environmental Management System Director, or the Director of Environmental Health and Safety.

### 3.4 Select Agents

3.41 Certain restricted biological agents and toxins have been designated as "select agents" by the federal government (USDHHS/CDC and USDA/APHIS). Possession, use and transfer of these restricted agents must be registered with EH&S and the appropriate federal authorities. EH&S is responsible for coordinating the federal registration process for all NJIT principle investigators.

### 3.5 Radioactive Materials

3.51 The US Nuclear Regulatory Commission (NRC) is responsible for regulating the use of most radioactive materials and the New Jersey Department of Environmental Protection (DEP) is responsible for regulating the use of energized equipment including x-ray machines, x-ray diffraction units, electron microscopes, and some radioactive material. The New Jersey Institute of Technology has been granted licenses by the NRC and NJDEP to use radioactive material and x-ray producing equipment. NJIT must follow the applicable NRC and NJDEP regulations as well as specific procedures stated in both licenses. Copies of regulations and the NRC and DEP licenses are available for review in the Office of Environmental Health and Safety (EH&S).

## 4.0 University Safety Committee

4.1 The University Safety Committee (USC) is the committee responsible for development and administration of the employee and laboratory safety programs at NJIT. It recommends policies to the Senior Vice President for Administration and Treasurer. The USC meets on at least once a semester.

## 5.0 Radiation Safety Committee

5.1 The Radiation Safety Committee (RSC) is the committee responsible for development and administration of the radiation safety program at NJIT. It establishes policies and enforces compliance with the program. The RSC has the authority and responsibility for approval of all proposals for radioactive material and/or x-ray use. The RSC meets on at least a quarterly basis.

## Exhibit S -4 – 11 A

### DEFINITIONS

**Exposure Assessment (EA):** A quantitative determination of employee exposure to a specific material. Includes full shift personal samples that are representative of the monitored employee's regular, daily exposure to formaldehyde and fifteen minute short term exposure limit samples during tasks that are believed to result in the highest exposures.

**Designated Area:** A location within the laboratory where acutely toxic mutagenic, carcinogenic, or teratogenic materials are handled and stored. The areas should be demarcated with designated area caution tape of yellow tape with the words designated area written upon it.


**OSHA Action Level (AL):** Under the US Department of Labor, Occupational Safety and Health Administration (OSHA) Occupational Exposure is defined as an exposure to an airborne concentration exceeding the allowable limit measured as an eight-hour time-weighted average (TWA).

**OSHA Permissible Exposure Limit (PEL):** Under the US Department of Labor, Occupational Safety and Health Administration (OSHA) Occupational Exposure to Formaldehyde Standard 29 CFR 1910.1048 is defined as an exposure to an airborne concentration exceeding the allowable limit measured as an eight-hour time-weighted average (TWA).

**OSHA Short Term Exposure Limit (STEL):** Under the US Department of Labor, Occupational Safety and Health Administration (OSHA) Occupational Exposure to a hazardous material is defined as an exposure to an airborne concentration that exceeds the allowable limit for fifteen minute duration.

**Regulated Area:** Any area where the concentration of airborne contaminant exceeds either the OSHA PEL or the STEL.



	<p style="text-align: center;">UNIVERSITY SAFETY ENVIRONMENTAL MANAGEMENT SYSTEM University Heights Newark, New Jersey 07102</p>	
		<p style="text-align: center;"><b>Document Control No. USEMS SOP S - 4 - 12</b></p>
<p><b>Formaldehyde Control Plan 29CFR 1910.1048</b></p>		

## Scope and Application

- 1.1 This plan applies to all University employees who are exposed or potentially exposed to formaldehyde, its solutions, and materials that release formaldehyde.
- 1.2 The University is dedicated to providing safe and healthful work facilities for students and employees, and complying with federal and State occupational health and safety standards. Engineering controls should be instituted to the maximum extent feasible to maintain exposures below permissible limits, followed by other control methods including work and hygienic practices, including the use of personal protective equipment such as eye, face, skin, and respiratory protection. Administrators, managers, faculty, staff and students all share responsibility for minimizing their exposure to formaldehyde.

## Responsibilities

### 2.1 Department of Environmental Health & Safety (EH&S) will:

- Develop and distribute a written Formaldehyde Management Plan;
- Provide or coordinate training for employees who are exposed to formaldehyde at or above an 8-hour average exposure of 0.1 parts per million (ppm). Employees who require training will be identified through exposure monitoring. Employees who require training will be identified through exposure monitoring;
- Conduct exposure monitoring and notify employees in writing of monitoring results within 15 days of receipt;
- Maintain records of all training, exposure monitoring, and respirator fit testing;
- Provide consultative technical guidance to personnel at all levels of responsibility concerning formaldehyde, hazard evaluation, hazard control and hazard information; and
- Annually review the Formaldehyde Management Plan for effectiveness and revise as necessary.

### 2.2 Human Resources

- Coordinate and direct all required or recommended medical surveillance for employees with formaldehyde exposure;
- Provide medical consultations and examinations for workers who have been overexposed or believe they may have been overexposed to formaldehyde; and
- Maintain medical records relating to consultations, examinations and medical surveillance as required by the Plan.

### 2.3 Department Environmental Health & Safety Officers (EH&SHO)

- Assist to identify locations where formaldehyde is used or where building materials contain or may reasonably be expected to off-gas formaldehyde.

### 2.4 Department Heads, Supervisors and Principle Investigators will:

- Assure that all employees who have potential for exposure to formaldehyde are evaluated by EH&S and made aware of the hazards associated with formaldehyde; and
- Insure control measures and personal protective equipment are appropriate for the situation.
- Assure employees understand the elements of the Formaldehyde Plan when it is determined by EHS& through surveys and monitoring that there is occupational exposure.
- Assure that employees are aware of the potential hazards associated with working with formaldehyde and receive appropriate training.
- Notify EH&S when new products or processes are used that might result in formaldehyde exposure and arrange for exposure monitoring through EH&S where needed to document exposure levels.
- Initiate medical surveillance for any employee who has formaldehyde exposure in excess of regulated limits as determined by EH&S, who develops signs and symptoms of overexposure to formaldehyde, or who is exposed to formaldehyde in emergencies.
- Report any problem associated with implementation of the Formaldehyde Management Plan to EH&S.

2.6 Employees and Staff will:

- Comply with the provisions of the Formaldehyde Management Plan and work practices instituted by the Supervisor; and
- Report to their supervisor if they develop signs and symptoms of overexposure to formaldehyde, or who are exposed to formaldehyde in the course of an emergency.

### **3.0 Formaldehyde Assessment and Monitoring**

3.1 The following processes or work operations may result in formaldehyde exposure:

- 3.1.1 Any process that uses formaldehyde for tissue preservation.
- 3.1.2 Any operation that involves grinding, sanding, sawing, cutting, crushing, screening, sieving, or any other manipulation of a material that contains urea-formaldehyde resin and generates formaldehyde-bearing dust, for example, working with some particle boards, plywoods, decorative laminates, textiles, paper, and foundry sand molds.
- 3.1.3 Any processes where there have been employee complaints or symptoms indicative of exposure to formaldehyde.
- 3.1.4 Any liquid or spray process involving formaldehyde.
- 3.1.5 Any process that involves the heating of a formaldehyde-bearing resin.
- 3.1.6 Disposing or processing formaldehyde waste.

3.2 To conduct formaldehyde assessments, EH&S requires an inventory of locations where formaldehyde is used. This may be accomplished by:

- 3.2.1 Reviewing manufacturers information on particle board and plywood fabrication.
- 3.2.2 Reviewing material safety data sheets (MSDS).
- 3.2.3 Reviewing formaldehyde chemical waste inventories.
- 3.2.4 Checking historical use data.
- 3.2.5 Conducting walkthroughs of laboratories where there is formaldehyde tissue preservation.
- 3.2.6 Reviewing laboratory signage data.
- 3.2.7 Any other type of pertinent data, including Human Resources notifications and employee complaints.

3.3 Upon identification, EH&S will identify operations where formaldehyde is used in a manner such that it may be released into the workplace atmosphere or contaminate the skin.

## 4.0 Exposure Assessment Methods

- 4.1 EH&S will use appropriate methods to assess formaldehyde levels, which include:
- 4.1.1 Use of objective data. (i.e., previously documented information that confirms or rebuts formaldehyde exposures at regulated concentrations).
  - 4.1.2 Appropriate workplace contaminant sampling methods.

## 5.0 Monitoring Strategy

- 5.1 When there are different processes where employees may be exposed to formaldehyde, EH&S will select a maximum risk employee. This will be accomplished by observing the worksite.
- 5.2 If measurements show exposure to formaldehyde at or above the action level or the STEL, then all employees identified in the same group will be monitored.
- 5.3 TWA's are usually determined for an 8-hour work shift. A personal sampling pump is affixed to the employee and is collected at the end of the shift. The sample is then analyzed for formaldehyde. STEL assessments are 15-min samples taken during periods of maximum expected concentrations. Multiple STEL measurements may be collected per shift, and only the highest concentration is used to represent the employee's STEL. Employee exposures determine the need for compliance with provisions of the regulation and the Formaldehyde Management Plan.

Exposure scenario	Require monitoring activity
Below the AL and at or below the STEL	No 8-hour TWA or STEL monitoring required
Below the AL and above the STEL	No 8-hour TWA monitoring required; monitor STEL exposures every three months
At or above the AL, at or below the TWA, and at or below the STEL	Monitor 8-hour TWA exposures every six months and monitor STEL exposures every three months
At or above the AL, at or below the TWA, and above the STEL	Monitor 8-hour TWA exposures every six months and monitor STEL exposures every three months
Above the TWA and at or below the STEL	Monitor 8-hour TWA exposures every three months. <sup>1</sup>
Above the TWA and above the STEL	Monitor 8-hour TWA exposures and STEL exposures every three months

- 5.4 The employer may decrease the frequency of 8-hour TWA exposure monitoring to every six months when at least two consecutive measurements taken at least seven days apart show exposures to be at or below the 8-hour TWA PEL. The employer may discontinue the periodic 8-hour TWA monitoring for employees where at least two consecutive measurements taken at least seven days apart are below the AL. The employer may discontinue the periodic STEL monitoring for employees where at least two consecutive measurements taken at least 7 days apart are at or below the STEL.
- 5.5 Monitoring results determine the need and extent of employee training, hygiene procedures, personal protective equipment, follow-up monitoring, and medical surveillance.



5.6 The Formaldehyde Requirements Matrix (Appendix A) summarizes institutional and supervisory responsibilities for employees meeting the specified criteria.

5.67 Department heads, supervisors, or users may contact EH&S to initiate exposure monitoring in their worksites.

## **6.0 Training**

6.1 All employees with any potential exposure to formaldehyde must receive training to provide an understanding of hazards and protection methods. This training is a component of the Chemical Hygiene Program in laboratories, and is addressed by the Hazard Communication Program in all other worksites. Please review these programs if formaldehyde is present in your workplace.

6.2 Employees who are assigned to workplaces where exposure to formaldehyde has been documented at or above the AL, they will be informed of:

6.2.1 A discussion of the contents of OSHA 29 CFR 1910.1048, Formaldehyde;

6.2.2 An explanation of the specific material safety data sheet (MSDS) used in the work area;

6.2.3 The purpose for and a description of the medical surveillance program including:

6.2.4 A description of the potential health hazards associated with exposure to formaldehyde and a description of the signs/symptoms of formaldehyde exposure, and

6.2.5 Instructions to immediately report to the Supervisor any adverse signs or symptoms that the employee suspects is attributable to formaldehyde exposure;

6.2.6 Description of operations in the work area where formaldehyde is present and an explanation of the safe work practices appropriate to limit exposure to formaldehyde in each job;

6.2.7 The purpose for, proper use of, and limitations of personal protective clothing and equipment;

6.2.8 Instructions for the handling of spills and emergencies;

6.2.9 An explanation of the importance of engineering and work practice controls for employee protection and any necessary instruction in the use of these controls;

6.2.10 A review of emergency procedures including the specific duties or assignments of each employee in the event of an emergency; and

6.2.11 Information on the location and availability of written training materials.

6.3 Employees will receive information and training at the time of initial assignment, and whenever there is a change in procedure that may result in a new exposure. EH&S will provide the training annually to each affected employee.

## **7.0 Labels and Regulated Areas**

### **7.1 Labels**

7.1.1 The chemical manufacturer, importer, or distributor will ensure that each container is labeled according to the University's Hazard Communication Program. This includes:

7.1.1.1 All mixtures or solutions composed of greater than 0.1 % formaldehyde; and

7.1.1.2 Materials capable of releasing formaldehyde into the air, under reasonably foreseeable conditions of use, at concentrations reaching or exceeding 0.1 ppm.

7.1.2 Labels will include:

7.1.2.1 The identity of the hazardous chemical;

7.1.2.2 Appropriate hazard warning; and

7.1.2.3 Name and address of the manufacturer, importer, or distributor.

- 7.1.3 It is the responsibility of the user to ensure that containers remain labeled with the identity and appropriate hazard warnings.
- 7.1.4 Temporary containers require only the identity of the material if it is intended for immediate use (within one work shift) by an employee and must be returned to a container with appropriate warnings by the end of the work shift.
- 7.1.5 Materials capable of releasing formaldehyde at levels between 0.1 ppm and the action level will also be labeled with the following additional information:
  - 7.1.5.1 Identified as containing formaldehyde;
  - 7.1.5.2 Name and address of the person responsible for the material; and
  - 7.1.5.3 State that physical and health hazard information can be found on the material safety data sheet.
- 7.1.6 For the materials listed above capable of releasing formaldehyde at levels above the action level, labels will also:
  - 7.1.6.1 Address all hazards as defined in OSHA 29 CFR 1910.1200 (d), Hazard Determination;
  - 7.1.6.2 Address Appendices A and B, 29 CFR 1910.1200, including respiratory sensitization; and
  - 7.1.6.3 Contain the words "Potential Cancer Hazard".
- 7.2 Signage
  - 7.2.1 Areas where the concentration of airborne formaldehyde exceeds either the PEL or STEL will be established as regulated areas. All entrances and access ways will be posted with a sign bearing the following information:

**DANGER**  
**FORMALDEHYDE**  
**IRRITANT AND POTENTIAL CANCER HAZARD**  
**AUTHORIZED PERSONNEL ONLY** for further information contact  
 (Supervisor's name, location, phone) or the Dept. of Environmental Health & Safety x

**8.0 Medical Surveillance**

- 8.1 A medical surveillance program will provide annual examinations for all employees who:
    - 8.1.1 Are exposed to formaldehyde at or above the action level or the STEL.
    - 8.1.2 Develop signs and symptoms of overexposure to formaldehyde and for all employees exposed to formaldehyde in emergencies. (When determining whether an employee may be experiencing signs and symptoms of possible overexposure to formaldehyde, the employer may rely on the evidence that signs and symptoms will occur only in exceptional circumstances when airborne exposure is less than 0.1 ppm and when formaldehyde is present in material in concentrations less than 0.1 percent.)
- Note: Medical examinations will be provided as soon as possible to all employees exposed in an emergency.

- 8.2 The following information will be provided to the university physician by the Supervisor:
  - 8.2.1 A description of the affected employee's job duties as they relate to the employee's exposure to formaldehyde;
    - 8.2.1.2 The representative exposure level for the employee's job assignment;
    - 8.2.1.3 Information concerning any personal protective equipment and respiratory protection used or to be used by the employee;
    - 8.2.1.4 Information from previous medical examinations of the affected employee within the control of the employer; and
    - 8.2.1.5 In the event of a non-routine examination because of an emergency exposure to formaldehyde, the supervisor will provide to the physician as soon as possible a description of how the emergency occurred and the exposure the victim may have received.

- 8.3 All medical procedures will be performed by or under the supervision of a licensed physician and will be provided without cost to the employee, without loss of pay, and at a reasonable time and place. The details of the medical examination can be found in OSHA 29 CFR 1910.1048 (l).
- 8.4 For each examination required under medical surveillance, the employer will obtain a written opinion from the University Health Center Occupational Health Unit. This written opinion will contain the results of the medical examination except that it will not reveal specific findings or diagnoses unrelated to occupational exposure to formaldehyde.
- 8.5 A physician may authorize medical removal from exposure to formaldehyde when an employee reports significant irritation of the mucosa of the eyes/upper airways, respiratory sensitization, dermal irritation, or dermal sensitization attributed to workplace formaldehyde exposure if the physician determines that the exposure was caused by formaldehyde.
- 8.6 After consulting with the university physician regarding the determination of medical removal from exposure to formaldehyde or any restrictions involved, the employee may designate a second physician to review any findings, determinations, or recommendations of the initial physician and have the second physician conduct examinations, consultations, and laboratory tests as necessary to evaluate the effects of formaldehyde exposure and to facilitate the review.

## **9.0 Personal Hygiene Practices**

- 9.1 Employees who are required to change from work clothing into protective clothing to prevent skin contact with formaldehyde will be provided change rooms by their department.
- 9.2 Conveniently located quick drench showers will be used where employees' skin may become splashed with solutions containing 1 percent or greater formaldehyde (including provisions for equipment failure or improper work practices) and employees must be aware of the location of the shower and required to use it immediately.
- 9.3 Eyewash facilities must be placed within the immediate work area for emergency use if there is any possibility that an employee's eyes may be splashed with solutions containing 0.1 percent or greater of formaldehyde.
- 9.4 Protective Equipment and Clothing
- 9.4.1 Employers will comply with the provisions of OSHA 29 CFR 1910.132 (Personal Protective Equipment), 29 CFR 1910.133 (Eye and Face Protection) and the NJIT's Personal Protective Equipment Program.
- 9.4.2 Personal protective equipment and clothing will be selected based on the form of formaldehyde encountered, the conditions of use, and the hazard presented.
- 9.4.3 All eye and skin contact with liquids containing 1% or more of formaldehyde will be prevented by the use of chemical protective clothing made of material impervious to formaldehyde and the use of other personal protective equipment, such as goggles and face shields, as appropriate to the operation. Clothing selection will be made using chemical clothing resistance guides found in manufacturer's literature.
- 9.4.4 Where a face shield is worn, chemical safety goggles are also required if there is a danger of formaldehyde reaching the eye.
- 9.4.5 Full body protection will be worn for entry into areas where concentrations exceed 100 ppm and for emergency entry into areas of unknown concentration.
- 9.5 Maintenance of Protective Equipment and Clothing
- 9.5.1 The employer will assure that protective equipment and clothing contaminated with formaldehyde are cleaned and laundered before reuse.
- 9.5.2 When ventilating formaldehyde-contaminated clothing and equipment, the employer will establish a storage area so that employee exposure is minimized.

9.5.3 Containers for contaminated clothing/ equipment and storage areas will have labels and signs containing the following information:

<p style="text-align: center;"><b>DANGER</b> <b>FORMALDEHYDE-CONTAMINATED [CLOTHING] EQUIPMENT</b> <b>AVOID INHALATION AND SKIN CONTACT</b></p>
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9.6 The employer will inform any person who launders, cleans, or repairs such clothing or equipment of formaldehyde's potentially harmful effects and of procedures to safely handle the clothing and equipment.

9.7 Housekeeping and Preventative Maintenance

9.7.1 For operations involving formaldehyde solutions or gas, the employer will implement a program to detect leaks and spills, including regular visual inspections.

9.7.2 Preventative maintenance of equipment, including surveys for leaks, will be undertaken at regular intervals. In work areas where spillage may occur, the employer will make provisions to contain the spill, to decontaminate the work area, and to dispose of the waste.

9.8 Respirators

9.8.1 Whenever feasible engineering and work practice controls (for example, local exhaust ventilation) cannot reduce employee exposure below the PEL or STEL, the employer will continue to apply these controls to reduce employee exposures to the maximum extent feasible and will supplement them with respirators when required.

9.8.2 Respirators must be used:

9.8.2.1 When exposures meet or exceed the PEL,

9.8.2.2 During periods necessary to install or implement feasible engineering controls,

9.8.2.3 When work operations, such as maintenance and repair activities or vessel cleaning, for which the employer establishes that engineering and work-practice controls are not feasible,

9.8.2.4 In work operations for which feasible engineering and work practice controls are not yet sufficient to reduce employee exposure below the PEL, or

9.8.2.5 During emergencies.

9.8.2.6 The use of respiratory protection will be in accordance with the NJIT Respiratory Protection Program. All workers must be medically evaluated by the university physician to determine the ability of the worker to perform the work while wearing a respirator.

9.8.2.7 Training in the care and use respirators and fit-testing will be conducted by EH&S for only those employees who are authorized by Occupational Health to wear a respirator.

9.8.2.8 Any worker who is not authorized by the Occupational Health Unit will be prohibited from engaging in activities which may expose the worker to airborne formaldehyde at or above the PEL.

9.8.2.9 If air-purifying chemical cartridge respirators are used, the following must be followed:

9.8.2.9.1 If the cartridge contains a NIOSH-approved end-of service life indicator (ESLI), replace the cartridge when breakthrough occurs.

9.8.2.9.2 If the cartridge does not contain an ESLI, replace the cartridge after three (3) hours of use or at the end of the work shift, whichever occurs first.

9.8.2.9.3 If the cartridge does not contain an ESLI, replace canisters used in atmospheres up to 7.5 ppm (10 times the PEL) every four hours or at the end of the work shift, whichever occurs first.

9.9 Appropriate respirators must be selected based upon employee exposure levels.  
 The following types of respirators are appropriate for the indicated exposures:

<b>Formaldehyde exposure (ppm)</b>	<b>Minimum respirator required <sup>1</sup></b>
Up to 7.5 ppm (10 X PEL)	Full face piece with cartridges or canisters specifically approved for protection against formaldehyde. <sup>2,3</sup>
Up to 75 ppm (100 X PEL)	Full-face mask with canister especially approved for protection against formaldehyde, Type C supplied air respirator, demand type, or continuous flow type, with full face piece, hood, or helmet.
Above 75 ppm or unknown. (Emergencies), 100 X PEL	Self-contained breathing apparatus (SCBA) with positive pressure full face piece. Combination supplied-air, full face piece positive pressure respirator with auxiliary self-contained air supply
Firefighting	SCBA with positive pressure full face-piece
Escape	SCBA in demand or pressure demand mode. Full face mask with canister approved for protection against formaldehyde.

1. Respirators specified for use at higher concentrations may be used at lower concentrations.
2. A half-mask respirator with cartridges specifically approved for protection against formaldehyde can be substituted for the full face piece respirator providing that effective gas-proof goggles are provided and used in combination with the half-mask respirator.
3. The employer must provide a powered air-purifying respirator adequate to protect against formaldehyde exposure to any employee who has difficulty using a negative-pressure respirator.

## 10.0 Record Keeping

- 10.1 EH&S maintains all documents relating to Formaldehyde exposure including exposure assessments, air sampling data, respirator fit testing documentation and waste disposal manifests.
- 10.2 Human Resources retains the medical records relating to the medical surveillance program. All records are kept indefinitely.

## Exhibit S-4-12 A

### DEFINITIONS

**Formaldehyde:** The chemical substance HCHO. Chemical Abstracts Service Registry No. 50-00-0.

**Formaldehyde Exposure Assessment (EA):** A quantitative determination of employee exposure to formaldehyde. Includes full shift personal samples that are representative of the monitored employee's regular, daily exposure to formaldehyde and fifteen minute short term exposure limit samples during tasks that are believed to result in the highest exposures.

**Designated Area:** A location within the laboratory where acutely toxic mutagenic, carcinogenic, or teratogenic materials are handled and stored. The areas should be demarcated with designated area caution tape of yellow tape with the words designated area written upon it.

**OSHA Action Level (AL):** Under the US Department of Labor, Occupational Safety and Health Administration (OSHA) Occupational Exposure to Formaldehyde Standard 29 CFR 1910.1048 is defined as an exposure to an airborne, concentration of 0.50 parts per million (ppm) formaldehyde as an eight-hour time-weighted average (TWA).

**OSHA Permissible Exposure Limit (PEL):** Under the US Department of Labor, Occupational Safety and Health Administration (OSHA) Occupational Exposure to Formaldehyde Standard 29 CFR 1910.1048 is defined as an exposure to an airborne concentration of 0.75 parts per million (ppm) formaldehyde as an eight-hour time-weighted average (TWA).

**OSHA Short Term Exposure Limit (STEL):** Under the US Department of Labor, Occupational Safety and Health Administration (OSHA) Occupational Exposure to Formaldehyde Standard 29 CFR 1910.1048 is defined as an exposure to an airborne concentration of formaldehyde of 2.00 parts per million (ppm) over a fifteen minute duration.

**Regulated Area:** Any area where the concentration of airborne formaldehyde exceeds either the OSHA PEL or the STEL.

**Exhibit S-4-12 B**

**STANDARD OPERATING PROCEDURE  
FORMALDEHYDE**

**Date:**

**Principal Investigator:** \_\_\_\_\_

**Room & Building:** \_\_\_\_\_

**Phone Number:** \_\_\_\_\_

**#1 PROCESS**

General handling of **Formaldehyde** (37%) or Formalin.

**#2 DESCRIBE PROCESS, HAZARDOUS CHEMICAL OR HAZARD CLASS**

Will vary by specific lab.

**#3 POTENTIAL HAZARDS**

Regulated Carcinogen, sensitizer.

**#4 PERSONAL PROTECTIVE EQUIPMENT**

Skin and eye protection should be used when working with **formaldehyde**. If airborne exposures are suspected contact the Director of Environmental Health and Safety for consultation.

Eye protection should be selected on potential for splash and exposure.

*Minimum potential:* safety glasses with side shields when only low splash hazard exists (e.g. placing a tissue sample in a container). Chemical splash goggles should be worn if using or transferring larger quantities.

Disposable or lightweight nitrile, neoprene, natural rubber or PVC gloves provide protection from incidental contact. Heavier gloves should be used when extended handling of contaminated or preserved materials or immersion is likely.

A chemically resistant apron should be used when transferring or using large quantities and splash is likely.

**#5 ENGINEERING/VENTILATION CONTROLS**

Work with **formaldehyde** in a fume hood or with or local exhaust ventilation. Use only in an area equipped with a douse shower and eyewash.

**#6 SPECIAL HANDLING PROCEDURES AND STORAGE REQUIREMENTS**

Keep in a tightly closed container. Separate from oxidizing agents.

**#7 SPILL AND ACCIDENT PROCEDURES**

**Small Spills:** Do not attempt cleanup if you feel unsure of your ability to do so or if you perceive the risk to be greater than normal laboratory operations. Absorb incidental spills using a Lab Spill Kit.. Collect and notify the Director of Environmental Affairs for hazardous waste disposal. If splashed on an individual or in eyes flush for 15minutes with copious quantities of water.

**Large Spills:**

Notify others in area. Evacuate room / floor immediately. Alert those on the floor below.  
Call Public Safety at Ext. 3111 and they will notify the Emergency Response Team.  
Protect the area and prevent unnecessary entry until the response team arrives.  
Provide assistance to the response team as requested.

**#8 DECONTAMINATION PROCEDURES**

Varies by specific lab.


**#9 WASTE DISPOSAL PROCEDURES**

Dispose of waste by notifying the Director of Environmental Affairs.

**#10 (M)SDS LOCATION**

Public Safety, EH&S, Lab (M)SDS file



	<b>UNIVERSITY SAFETY ENVIRONMENTAL MANAGEMENT SYSTEM</b> University Heights Newark, New Jersey 07102	<b>Document Control No. USEMS SOP S - 4- 13</b>
	<b>Lead Control Plan 29CFR 1910.1025 &amp; 29CFR 1926.62</b>	

## 1.0 Scope and Application

- 1.1 This plan applies to all University employees where the handling of lead-containing substances presents a risk of being exposed to lead through inhalation or ingestion. It applies to work involving lead containing solders and molten lead used in pipe joints, and work involving the disturbance of lead-based paint. Employees exposed to lead as part of normal repair and maintenance of University property are covered under either Lead Exposure in Construction (29 CFR 1926.62) or Lead Exposure in General Industry (29 CFR 1910.1025).
- 1.3 The University is dedicated to providing safe and healthful work facilities for students and employees, and complying with federal and State occupational health and safety standards. Administrators, project managers, faculty, staff and students all share responsibility for minimizing their exposure to lead. The Lead Management Plan will be implemented for all facilities at NJIT where potential exposure to lead may occur.
- 1.4 Engineering controls should be instituted to the maximum extent feasible to maintain exposures below permissible limits, followed by other control methods including work and hygienic practices, including the use of personal protective equipment such as eye, face, skin, and respiratory protection.
- 1.5 The Lead Management Plan will be reviewed and evaluated for its effectiveness periodically, and updated as necessary.
- 1.6 Abatement, which is the intentional removal, replacement, or enclosure of items containing lead-based paint in order to eliminate future exposure, is covered under Procedures for Abating Lead Containing Substances from Buildings.

## 2.0 Responsibilities

- 2.1 Department of Environmental Health & Safety (EH&S) will:
  - 2.1.1 Develop and distribute the written Lead Management Plan;
    - 2.1.1.1 Assist in identifying employees and coordinate their training. (See Training Section for more specific training information). The training content will depend upon the nature of the activity:
    - 2.1.1.2 For employees who have the potential to be exposed to lead at any level, and are not working in construction, they must be informed annually of the contents of 29 CFR 1910.1025, Substance Data Sheet for Occupational Exposure to Lead and Employee Standard Summary.
    - 2.1.1.3 For employees who have the potential to be exposed to lead at or above the action level of 30 micrograms per cubic meter ( $\mu\text{g}/\text{m}^3$ ), and are working in construction, must be provided a training program as outlined in 29 CFR 1926.62(l).
    - 2.1.1.4 For employees who are exposed to lead in any form, for example, painters and carpenters involved in the disturbance of lead-based paint, and are not performing lead-based paint abatement activities or construction, and are exposed to lead in excess of  $30 \mu\text{g}/\text{m}^3$  on any day during a given year, must be provided a training program as outlined in 29 CFR 1910.1025(l)(1)(ii).
    - 2.1.1.5 For employees performing lead-based paint inspections, or performing lead-based paint risk assessments, must attend New Jersey Department of the Environment approved training courses.

- 2.1.1.6 For employees performing lead-based paint abatement, must attend New Jersey Department of Environmental Protection approved training courses.
  - 2.1.1.7 Depending on the job description, such as project supervisor, project designer, etc., there are other accredited NJDEP training courses. They are listed under the Training section of this Plan.
  - 2.1.2 Maintain records of employee participation in training and provide confirmation back to the departments the list of participants;
  - 2.1.3 Perform exposure monitoring as requested by supervisors;
  - 2.1.4 Coordinate assessment of materials to determine lead content as necessary to determine exposure potential;
  - 2.1.5 Maintain lead inventory information;
  - 2.1.6 Provide technical guidance to personnel at all levels of responsibility concerning lead, hazard evaluation, and hazard control; and,
  - 2.1.7 Review periodically the lead management plan and revise as necessary.
- 2.2 Human Resources will:
- 2.2.1 Coordinate and direct all required or recommended medical surveillance for employees as dictated by regulations;
  - 2.2.2 Provide medical consultations and examinations for workers who have been overexposed or believe they may have been overexposed to lead; and
  - 2.2.3 Maintain medical records relating to consultations, examinations and medical surveillance as required by law.
- 2.3 Vice President Facilities Department will:
- 2.3.1 Oversee contracts requiring disturbance of lead-bearing materials;
  - 2.3.2 Identify requirements for compliance with applicable Federal and State lead regulations in contract specifications;
  - 2.3.3 Coordinate material assessment and provide lead-based paint inventory information to NJDEP for projects administered;
  - 2.3.4 Provide NJDEP with information such as lead air and dust sampling results as necessary to evaluate potential exposures to NJIT employees or satisfy information requests from UM employees and regulatory agencies related to construction operations;
  - 2.3.5 Interface with contractors where enforcement of related contract provisions is required;
  - 2.3.6 Maintain submittal documents and related records from abatement contracts in a manner that is readily retrievable in case of a regulatory inspection;
  - 2.3.7 Communicate requirements to contractors;
  - 2.3.8 Ensure lead waste is managed according to all applicable regulations of this Plan; and
  - 2.3.9 Ensure that paint used contains less than 0.06% lead, which is considered lead-free by the Consumers Product Safety Commission (CPSC).
  - 2.3.10 Maintain a record of the results of all lead paint testing.
  - 2.3.11 Retain a copy of all test results should be forwarded to the Department of Environmental Safety
- 2.4 Department Heads will:
- 2.4.1 Assure that all employees who have potential to contact lead containing materials are aware of the hazards associated with lead; and
  - 2.4.2 Ensure that paint used contains less than 0.06% lead, which is considered lead-free by the CPSC.
- 2.5 Department Environmental Health & Safety Officers will:
- 2.5.1 Know where potential lead based paint exposures exist in the facilities for which they are responsible.

- 2.5.2 Report work activity that could dislodge lead and that has not been properly protected, to the Director, EH&S.
- 2.5.3 Assure that all employees who have a potential to be exposed to lead have received the appropriate training;

#### 2.6 Department Supervisors

- 2.6.1 Know where potential lead based paint exposures exist in the facilities for which they are responsible.
- 2.6.2 Ensure that all employees who will perform abatement to lead-based paint have completed training through an approved lead abatement worker class;
- 2.6.3 Assure that employees under their control follow the lead-based paint work practices described in this program;
- 2.6.4 Arrange for exposure monitoring through NJDEP where needed to document exposure levels or provide negative exposure assessments;
- 2.6.5 Initiate medical surveillance for any employee who has the potential for exposure to lead as outlined in 29 CFR 1910.1025 or 29 CFR 1926.62;
- 2.6.6 Coordinate assessment of materials to determine lead content as necessary to determine exposure potential;
- 2.6.7 Report any problem associated with implementation of the Lead Management Plan in the work area to The Director, Environmental Health and Safety.

#### 2.7 Individuals will:

- 2.7.1 Perform his/her work as safely as possible and follow all safety procedures;
- 2.7.2 Comply with the provisions of the Lead Management Plan and work practices identified for individual tasks; and
- 2.7.3 Report existing health or safety hazards to the supervisor.

### **3.0 Applicable Regulations**

#### 3.1 In the State of New Jersey, lead is regulated under the following statutes:

3.1.1 For University employees exposed to lead during routine maintenance, the University is required to follow OSHA 29 CFR 1910.1025,

#### 3.1.2 Occupational Exposure to Lead. If the work is characterized as construction, then University employees are required to follow OSHA 29 CFR 1926.62, Occupational Exposure to Lead in Construction Work.

Construction work is defined in the Standard as "construction, alteration, or repair, or all of the above, including but not limited to, renovation, demolition, reconstruction, refurbishing, restoration, painting, and decorating".

#### 3.2 Both regulations are essentially similar, except for training requirements.

3.2.1 In OSHA 29 CFR 1910.1025, if employees have a potential to be exposed to lead at any level, they must be informed of the Standard.

3.2.2 In OSHA 29 CFR 1926.62, the training requirements make reference to OSHA's Hazard Communication Standard for the Construction Industry, 29 CFR 1926.59. In addition, OSHA 29 CFR 1926.62 requires a training program for all employees who are subject to exposure to lead at or above the action level on any day or who are subject to exposure to lead compounds which may cause skin or eye irritation (for example, lead arsenate and lead azide).

#### 3.3 Other environmental, health, and safety regulations, and NJDEP and standards that may be applicable include:

3.3.1 Environmental Protection Agency (EPA) 40 CFR Parts 260-265 and 268, Resource Conservation and Recovery Act (RCRA).

3.3.2 New Jersey Department of Environmental Protection (NJDEP) Code of Regulations

3.3.3 Federal Department of Transportation (DOT) Hazardous Substances Title 49 CFR Parts 171-177.

#### **4.0 Assessment of Conditions**

4.1 There are certain procedures to be followed when determining the existence of lead and lead-based paint and assessing the risk to employees and /or building occupants. The following situations may initiate the need for assessment:

4.1.1 Lead exposure from normal maintenance work, which might include lead containing materials such as solder or lead-based paint, and which falls under OSHA 29 CFR 1926.62, will be initially monitored to assess employee exposure levels. Depending on the exposure levels, steps as specified in OSHA 29 CFR 1926.62 will be taken. Lead determination in materials such as solder may be based on material safety data sheet (MSDS) information. If (M)SDS is not available, lead exposure may be estimated from past assessments. For lead-based paint, use the methods specified under Monitoring and Sampling.

4.2 In reference to abatement of lead-based paint, assessments may be made:

4.2.1 At the discretion of the Project Manager, or other designated University representative;

4.2.2 When proposed maintenance work may expose building occupants and/or residents to lead-containing paint and/or dust;

4.2.3 When elevated blood lead levels are reported in employees or building occupants/residents;

4.2.4 When an employee or building occupant experiences symptoms which are indicative of lead poisoning;

4.2.5 When performing risk assessment activities in University owned buildings;

When specifically requested by a representative of the New Jersey Department of Environmental Protection or other appropriate state agency; and

4.2.6 When developing the program and/or scope of work for the planned renovation of an existing facility.

#### **5.0 Monitoring and Sampling**

5.1 This section covers lead-based paint abatement.

5.2 For construction and renovation monitoring and sampling, refer to the previous section, Assessment of Conditions.

5.3 Generally, buildings constructed after 1978 can be assumed to be lead-free.

5.4 For buildings constructed prior to 1978, lead-based paint assessments must be performed for any surface that will be disturbed and is suspected of containing lead-based paint except where it is documented that the building received a complete interior renovation after all interior components were demolished and removed from the structure. Lead-based paint located under newer coatings must also be identified. The assessment may use any of the following methods:

5.4.1 Referencing existing building surveys, construction notes or as-built drawings may be used where the surfaces involved are referenced. Renovation file notes and updated drawings may be used to identify surface replacements.

5.4.2 Substrate testing using an XRF in-paint analyzer, a lead swab, or by collecting a sample of the intact paint and submitting it to an accredited laboratory for lead analysis.

5.4.3 Dust wipe tests.

5.4.4 Lead testing on the windows and floors on surfaces in question.

5.4.5 Visual inspection of condition of paint.

5.4.6 Soil tests for lead contamination.

5.5 If a lead-based paint inventory exists for the surfaces involved in the work, Project Managers shall refer to the inventory for the location of lead-based paint. If an inventory does not exist, and the building was constructed or renovated prior to 1980, substrate testing will be required to ascertain the existence of lead-based paint. If possible, reference should be made to as-built drawings to ascertain the location of lead-based painted structures.

#### 5.6 X-ray Fluorescence (XRF)

5.6.1 XRF is used to identify lead content of flat surfaces. It is the sampling method of choice because it is accurate, results are immediate, and replaces the time-consuming method of obtaining a paint chip sample and analyzing it in a laboratory. Direct reading XRFs provide the operator with a readout of lead concentration in paint in terms of lead per square centimeter ( $\text{cm}^2$ ).

5.6.2 Before an XRF is used, the technician will have passed an instructional seminar demonstrating the correct use of the instrument. Since the instrument uses a radioactive source, all NJIT technicians must will be entered in the NJIT Radiation Safety Program.

5.6.3 In the State of New Jersey, readings greater than  $0.7 \text{ mg/cm}^2$  indicate the presence of lead. For example, if a reading is  $0.7 \text{ mg/cm}^2$ , it is not over the limit set by NJDEP.

#### 5.7 Paint Chip Sampling

5.7.1 Paint chip sampling may be used to:

5.7.1.1 Clarify an inconclusive XRF result.

5.7.1.2 Test a surface that does not lend itself to XRF instrumentation, as defined by the instrument's manufacturer (for example, moldings, windows, playground equipment, and other surfaces that are not flat).

5.7.2.3 Determine the percent of lead to identify material that must be disposed as a hazardous waste. (However, the material must be tested according to Toxicity Characteristic Leaching Procedures (TCLP).

#### 5.8 Spot Testing Using Sodium Rhodonzonate (Lead Swabs)

5.8.1 This method is not intended to measure the concentration of lead but to determine if lead is present. A color change as specified in the test kit directions (i.e., pink) indicates the likely presence of lead paint. The test can alert the user to the presence of lead in paint so that proper precautions can be taken while removing it. If when using this type of spot testing no color change occurs, this should not be interpreted as the absence of lead. Accordingly, before concluding an area or surface does not contain lead-based paint, XRF or paint chip sampling is required.

#### 5.9 Surface Wipe Testing

5.9.1 Surface Wipe Testing may be required under the following conditions:

5.9.1.1 To perform a risk assessment of UM buildings, such as residential or day care centers, particularly those buildings which are occupied by young children;

5.9.1.2 To determine the effectiveness of work practices and/or decontamination activities.

5.9.1.3 Wipe samples for clearance will be conducted when required by regulation, where required by the Project Manager in consultation with Environmental Health & Safety, or by contract specification. Samples will be in accordance with procedures contained in Guidelines for the Evaluation and Control of Lead-Based Paint Hazards in Housing, Wipe Sampling for Settled Lead-Contaminated Dust.

5.9.1.4 Samples may be taken by the Department of Environmental Health & Safety or by an outside contractor.

#### 5.10 Soil Sampling

5.10.1 Soil samples may be collected to determine lead concentration of soil surrounding University buildings when determined by regulation, where required by the

Project Manager in consultation with Environmental Health & Safety, or by contract specification. Refer to the methods specified in Guidelines for the Evaluation and Control of Lead-Based Paint Hazards in Housing, Soil Sampling Protocol For Housing for more information.

## **6.0 Selection of Units and Locations within Units for Lead-Based Paint Testing**

- 6.1 Large-scale lead-based paint inspections are usually performed by a contractor to determine whether lead is present in a house, dwelling unit, a residential building, or other building and if present, to identify which building components contain lead. Where maintenance work involving a wall, window, or other surface is going to be performed, the assessment can be performed by a qualified University employee. Since exposure is based on the amount of lead present and the specific operation, an assessment should be performed for each operation. See Exhibit 12-2 for a list of activities that have been assessed, described as de minimus, and do not require controls. This list will be updated as additional tasks are assessed.
- 6.2 When selecting units for assessment, a systematic approach should be used. Generally, each room's components should be tested. A component is defined as a door, wall, molding, window sash and trim, ceiling, stairs or other component. A standardized inspection record containing the following minimum information is to be completed as components are checked. This information will include: sample identification number, substrate, component, test location, XRF reading, result, classification (positive, negative, or inconclusive), laboratory result, units (mg/cm<sup>2</sup>, %), and final classification. Areas that are not able to be tested with the XRF due to surface configuration may be sampled using the paint chip method.
- 6.3 When testing multiple units, only the project manager or NJDEP will determine which components will be tested. Protocols for lead-based paint inspection used at the University can be found in the HUD Guidelines for the Evaluation and Control of Lead-Based Paint Hazards in Housing, Chapter 7.
- 6.4 A record of the results of all lead paint testing will be maintained by the campus department responsible for the overall maintenance of each facility. In addition, a copy of all test results should be forwarded to the Department of Environmental Safety.

## **7.0 Exposure Monitoring**

- 7.1 Exposure monitoring should be conducted for maintenance activities involving the disturbance of lead-based paint, unless the same type of job has been assessed previously. In this case, a review of the previous assessment can be used to decide if additional monitoring is necessary. The University may use the services of the Department of Environmental Health & Safety or a qualified outside contractor
- 7.2 Exposure Monitoring
  - 7.2.1 If the assessment determines that lead exposure should be monitored, personal exposure monitoring may be conducted. Monitoring and Sampling and analysis will be performed in accordance with NIOSH Method 7082, Sampling Airborne Particulate for Lead.
  - 7.2.2 Analysis will be conducted by an American Industrial Hygiene Association accredited laboratory. Results in excess of the Action Level (AL) will require additional employee protection measures in accordance with either OSHA 29 CFR 1926.62 or OSHA 29 CFR 1910.1025, depending how the work is classified, that is, construction or general industry.
  - 7.2.3 Exposure monitoring will be performed by a representative of the Department of Environmental Health & Safety for maintenance work performed by University employees.
  - 7.2.4 Exposure monitoring for private contractors' employees will be performed by an independent industrial hygiene consultant coordinated by the Project Manager.
  - 7.2.5 As required by the Project Manager, area samples may be taken during large scale maintenance work to determine if lead particulates are infiltrating into occupied spaces.

7.2.6 Sampling and analysis will be performed as described above. Results in excess of the AL of  $30 \mu\text{g}/\text{m}^3$  will require additional employee protection measures as outlined in Personal Hygiene Practices, Respiratory Protection, and this Plan.

7.2.7 Copies of the results of all industrial hygiene monitoring must be forwarded to the Department of Environmental Health & Safety.

7.2.8 Affected employees must be notified in accordance with applicable regulations.

## 8.0 Training

### 8.1 Lead Awareness

8.1.1 Where there is a potential exposure to airborne lead at any level, and the work is classified as repair or maintenance, and not construction, the employee must be informed of the contents of 29 CFR 1910.1025 29 CFR 1910.1025, Substance Data Sheet for Occupational Exposure to Lead and Employee Standard Summary. This information transmission must be repeated at least annually for each employee. The OSHA Lead in Construction Standard, 29 CFR 1926.62, does not require lead awareness training.

### 8.2 Lead-Worker Training

8.2.1 OSHA 29 CFR 1910.1025 and 1926.62 require that an employee health and safety program be implemented for all employees involved in the disturbance (e.g., sanding, planning, scraping, etc.) of lead-based paint and who are exposed to lead in excess of  $30 \mu\text{g}/\text{m}^3$  on any day during a given year. They must attend Lead Worker Training. Departments in consultation with the Department of Environmental Health & Safety will identify the specific individuals/positions involved so that exposure assessment can be performed. All costs associated with training, protective equipment, and medical monitoring provided to campus employees will be assumed by the employee's department.

8.2.2 Training must be repeated each year that the employee may have such an exposure.

8.2.2.1. This category would include employees who have the potential to disturb lead-bearing paint in the course of normal activities such as carpenters, painters and plumbers who use lead containing solders.

8.2.2.2 NJDEP will provide, as requested, the training. It will consist of:

- The hazards associated with lead;
- Employee information concerning sources of lead, including warning labels, signs and material safety data sheets (MSDS);
- Content of the Lead Standard, either General Industry or Construction, whichever is applicable;
- Specific nature of the operations which could result in exposure to lead above the action level;
- Purpose, proper selection, fitting, use and limitations of respirators;
- Purpose and description of the medical surveillance and medical removal programs, including health effects of lead exposure and potential reproductive consequences.
- Engineering controls and work practices for lead-related work;
- Content of this Plan;
- Instructions to employees that chelating agents should not routinely be used to remove lead from their bodies and should not be used at all except under the direction of a licensed physician; and
- Employee's right of access to records under 29 CFR 1910.20.

### 8.3 Lead-Paint Abatement Worker Training

8.3.1 All employees involved in the abatement of lead-based paint must attend a 7-hour New Jersey Department of Environmental Protection (MDE) approved hands-on training course and pass the exam. Abatement means a set of measures

designed to eliminate or reduce lead-based paint hazards. The course must be repeated every three years.

8.3.2 The course includes the following topics:

- The health effects and routes of entry of lead exposure;
- Common sources of exposure to lead
- Work practices necessary to minimize lead dust concentrations, including work area preparation, work area decontamination and waste disposal.
- Requirements of regulations and standards established by MDE and OSHA.
- Relevant worker protection issues, including respiratory protection, protective clothing, safety equipment, medical surveillance, and personal hygiene.

#### 8.4 Lead-Paint Abatement Project Supervisor

8.4.1 All employees who will supervise employees performing a lead-based paint abatement must attend a 28-hour, 4-day New Jersey Department of Environmental Protection approved initial lead-paint abatement supervisors course and have at least 2 years of experience in related construction trades, including but not limited to lead paint abatement, carpentry, painting, or demolition. A 7-hour refresher course will be required every 2 years. The course includes the following topics:

- Regulations governing lead paint abatement activities and projects;
- Window replacement techniques;
- Worker safety and health requirements; and
- Safe and effective lead paint abatement practices.

#### 8.5 Lead-Paint Abatement Project Supervisor - Maintenance and Repainting (Involving Abatement/ Removal Only)

8.5.1 All employees who will only supervise maintenance and repainting projects must complete a 14-hour, 2-day New Jersey Department of Environmental Protection approved initial lead-based paint supervisors course and at least 6 months of professional experience as a carpenter, painter or other skilled construction trade.

8.5.2 A 7-hour refresher course will be required every 2 years for both certifications. The course includes the following topics:

- The topics covered in the initial lead-based paint worker course;
- Pertinent regulations governing lead paint abatement activities and projects;
- Work practices and control measures necessary to minimize lead dust concentrations, including work area preparation, selection and performance of appropriate abatement and window replacement techniques, daily and final cleanup, and waste disposal; and
- Management of worker safety and health programs including respiratory protection and worker Hazard Communication programs.

#### 8.6 Lead-Paint Abatement Project Designer

8.6.1 All employees who will design a lead-based paint removal or remediation project must attend a 35-hour New Jersey Department of Environmental Protection approved initial Project designer course.

8.6.2 A 7-hour refresher course will be required every 2 years. The course includes the following topics:

- All of the topics required for lead paint abatement removal and demolition supervisor accreditation;
- Analytical methods for lead paint hazard assessment;
- Selection and development of an effective lead paint abatement strategy;
- Cost estimation for lead paint abatement;
- Lead paint abatement materials and equipment, regulations and guidelines;



- Writing lead paint abatement project specifications;
- Waste disposal; and
- Insurance and liability.

#### 8.7 Lead Paint Inspector/Risk Assessor

8.7.1 All employees who will identify and measure the lead content in paint must complete a 21-hour New Jersey Department of Environmental Protection approved initial lead paint inspector technician course.

8.7.2 An additional 14-hours of instruction are required for individuals who want to qualify as Risk Assessors.

8.7.3 A 7-hour refresher course will be required every 2 years for both certifications. The course includes the following topics:

##### Inspector curriculum:

- The core worker course topics
- Methods for detecting and measuring lead in paint, dust and soil;
- The performance of lead paint surveys;
- Radiation safety and health, as required to meet radiation licensing provisions;
- Lead hazard assessment, including the condition of paint, condition of substrate, and other conditions which may contribute to lead exposure;
- Regulatory requirements for the abatement or maintenance of lead-containing substances; and
- Hands on experience with a portable XRF, paint chip collection, dust wipe samples and use of qualitative chemical tests.
- Does not include XRF training time which is at the discretion of the XRF manufacturer. XRF training typically takes 6 to 8 hours.

##### Risk Assessor curriculum:

- Above listed requirements;
- Epidemiology of lead exposure;
- Lead toxicity;
- Potential relationships between observed conditions and lead exposures;
- Lead paint disclosure requirements for real estate transactions;
- In-place management of lead paint;
- Remodeling and modernization; and
- Have 1 year experience as an accredited lead paint inspector technician and have conducted 20 lead paint surveys in residential units, public buildings or commercial properties.

## 9.0 Medical Surveillance

9.1 In accordance with OSHA 29 CFR 1910.25 and 1926.62, employees who are performing construction work and are occupationally exposed on any day to lead at or above the AL, will have initial medical surveillance consisting of biological monitoring in the form of blood sampling and analysis for lead and zinc protoporphyrin (ZPP) levels. This will be provided through the university designated physician.

9.2 Employees who are or may be exposed at or above the AL for more than 30 days in any consecutive 12 months will be offered the following medical surveillance, blood sampling and analysis at least every 2 months for the first 6 months and every 6 months thereafter;

9.2.1 Workers with blood lead levels at or above 40 ug/dl will have a blood test at least every two (2) months until two (2) consecutive tests (a week apart) show levels less than 40 ug/dl;

9.2.2 If an employee is medically removed due to elevated blood lead levels, a second (follow-up) blood sampling must be performed within two weeks after the employer receives the results of the first test; and,

9.2.3 Blood tested upon termination of employment.

9.2.3 A ZPP is required on each occasion that a blood lead level measurement is made.

9.2.4 Employees will receive the confidential results of blood tests through the university designated physician.

9.2.5 All medical records remain confidential unless the employee grants permission for his/her records to be released. However, Human Resources, the employee's supervisor and the Department of Environmental Health & Safety will both be notified of an employee's fitness to continue performing lead work and in the event of an employee's blood lead level exceeds 40 ug/dl so that the employee may be moved or transferred to another area until blood lead levels decrease as verified through subsequent blood testing.

9.3 Environmental Safety will investigate the work practices used to determine why the employee's blood tested high for lead.

9.4 In accordance with OSHA 29 CFR 1910.1025, employees not working in construction will have medical surveillance if they are exposed above the AL for more than 30 days per year.

9.4.1 Employees will be offered the following medical surveillance:

9.4.1.1 Blood lead and ZPP analysis will be performed at least every 6 months.

9.4.1.2 At least every 2 months for each employee whose last blood sampling and analysis indicated a blood lead level at or above 40 µg/dl of whole

blood.

9.4.2 The frequency will continue until two consecutive blood samples and analyses indicate a blood lead level below 40 µg/dl of whole blood.

9.4.3 At least monthly during the removal period of each employee removed from exposure to lead due to an elevated blood lead level.

9.4.4 Whenever the results of a blood lead test indicate that an employee's blood lead level is at or above 60 µg/dl and the employee is exposed to lead at or above the action level, the employer will provide a second (follow-up) blood sampling test within two weeks after the employer receives the results of the first blood sampling test.

#### 9.5 Medical Consultation

9.5.1 A medical examination will be provided to each person enrolled in the lead medical surveillance program if at any time the individual experiences symptoms consistent with lead intoxication, needs consultation concerning the potential effects of past lead exposure or on the ability to procreate or carry a healthy child, or has difficulty breathing during fit-testing or the use of a respirator.

9.5.2 The examination will be conducted annually for any individual who has had a blood-lead level of 40 ug/dl or greater or has been medically removed in the past 12 months.

9.5.3 The content of the physical exam will be at the discretion of the attending physician but will include at a minimum the elements listed in OSHA 29 CFR 1926.62 (j) (3) for construction workers or OSHA 29 CFR 1910.1025 (j)(3) for workers not involved in construction.

#### 9.6 Enrollment Information

9.6.1 The supervisor must provide the Human Resources with the following information with each new employee enrolled:

9.6.1.1 A description of the affected employees duties as related to potential lead exposure;

9.6.2 The employees anticipated exposure level to lead and other toxic substances (if applicable); and

9.6.3 A description of personal protective equipment to be used.

9.7 The employee must provide the attending physician with prior blood lead determinations and written medical opinions related to lead exposure. If a second opinion is sought from an outside physician, a copy

of 29CFR 1926.62 must be provided to the physician along with a copy of the employee's lead-related history by the university physician or Human Resources.

#### 9.8 Chelation

9.8.1 OSHA prohibits prophylactic chelation except by a licensed physician and conducted in a clinical setting with thorough and appropriate medical monitoring.

9.8.2 The employee must be notified by the Occupational Health Unit in writing prior to its occurrence. (External physicians must notify the employee and Human Resources).

#### 9.9 Medical Removal Protection

9.9.1 Any employee who has a blood lead level of 50 ug/dl or more will be excluded from work with potential for lead exposure until the employee has had two (2) consecutive blood samples at or below 40ug/dl.

9.9.2 An employee may also be excluded from lead-related work when written results of a medical consultation determine that the employee may be at increased risk of impairment to the employees' health from exposure to lead. The employee may return to former duties upon receipt of a written opinion from the consulting physician that the conditions placing the employee at increased risk are no longer present or of material concern.

9.9.3 Where the employee is unable to return to normal duties within 18 months, the university physician will make a final determination based upon the employee's medical evaluation identifying conditions that could allow an employee to safely return to work or a final medical determination that the employee is incapable of ever safely returning to work. In the event that the employee is found incapable of performing lead-related work, the employee's department will attempt to find an alternate job assignment in the employee's job classification that does not have lead exposure. In the event that no acceptable alternate assignment can be found, the employee's options will be reviewed. These may include disability retirement, termination, or other options as determined by Human Resources.

### **10.0 Personal Hygiene Practices**

10.1 NJIT recognizes that even when airborne lead exposure levels are low, the potential exists for significant lead ingestion due to poor personal hygiene practices. No eating, drinking, application of cosmetics (including lip balm) or smoking is permitted at work sites where lead and lead-based paints are being disturbed. Workers will wash their hands, arms and faces prior to eating, drinking, applying cosmetics or smoking.

10.2 When chemical strippers are used to remove lead-based paint, appropriate impermeable gloves and chemical resistant clothing will be worn for worker protection as well as safety goggles or face shields to protect the eyes from chemical splashes. Portable eye wash equipment must be available on site. The area where the chemical stripper is being used must be well ventilated to avoid exposure to potentially toxic vapors.

### **11.0 Respiratory Protection**

11.1 Workers engaged in lead work will require respiratory protective equipment when industrial hygiene air monitoring indicates anticipated exposures in excess of the PEL.

11.2 The use of respiratory protection will be in accordance with OSHA 29 CFR 1910.134, Respiratory Protection, and NJIT's Respiratory Protection Program.

11.3 All workers must be medically evaluated by the Occupational Health Unit to determine the ability of the worker to perform the work while wearing a respirator.

11.4 Training in the care, use and fitting of the respirator in addition to fit-testing is conducted by EH&S for those employees who are authorized by the university physician to wear a respirator.

11.5 Any worker who is not authorized by the university physician to wear a respirator will be prohibited from engaging in activities which may expose the worker to airborne lead if exposures are anticipated to exceed the OSHA permissible exposure level.

11.6 All employee respirators worn at the work site must be placed in a plastic bag prior to leaving the site and thoroughly cleaned before being worn again. Cleaning should include inspection of the respirator and replacement of worn parts. Fit-checks should be done each time the respirator is worn.

11.7 The medical exam, fit-test and training must be repeated annually.

11.8 Respirators will be selected as follows:

Airborne concentration of lead	Required respirator <sup>1</sup>
Not in excess of 50 µg/m <sup>3</sup>	Half-mask air-purifying respirator equipped with high efficiency filters <sup>2,3</sup> .
Not in excess of 250 µg/m <sup>3</sup>	Full face piece, air-purifying respirator with high efficiency filters <sup>3</sup> .
Not in excess of 500 µg/m <sup>3</sup>	(1) Any powered, air-purifying respirator with high efficiency filters <sup>3</sup> ; or (2) Half-mask supplied-air respirator operated in positive-pressure mode <sup>2</sup> .
Not in excess of 1000 µg/m <sup>3</sup>	Supplied-air respirators with full face piece, hood, helmet, or suit, operated in positive pressure mode.
Greater than 1000 µg/m <sup>3</sup> , unknown concentration or fire fighting.	Full face piece, self-contained breathing apparatus operated in positive-pressure mode.

1. Respirators specified for higher concentrations can be used at lower concentrations of lead.
2. Full face piece is required if the lead aerosols cause eye or skin irritation at the use concentrations.
3. A high efficiency particulate filter means 99.97 percent efficient against 0.3 micron size particles.

## 12.0 Occupant Health and Safety

12.1 Disturbance of lead paint surfaces within a building's interior should only occur under proper work controls.

12.2 Methods of controlling lead exposure to other occupants may include isolating the area by use of plastic sheeting and sealing all ventilation ducts in the area of the work and/or turning off and securing the ventilation system(lockout-tagout).

12.3 Other methods to minimize distribution of lead dust may include wet sanding and the use of HEPA vacuum cleaners. (See Work Practices Section).

12.4 Notification to Building Occupants

12.4.1. Prior to the initiation of any large scale interior or exterior work involving lead-based paint, the Project Manager will forward lead-based paint information to the appropriate department chair or director.

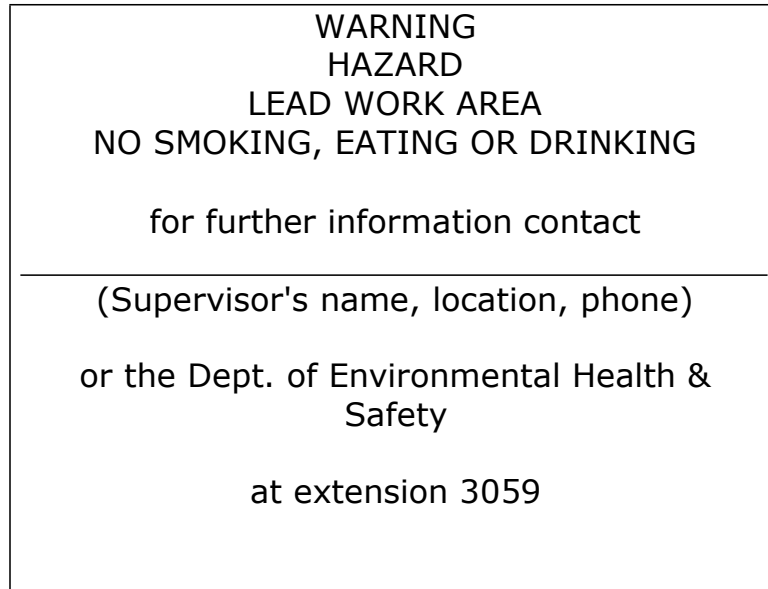
12.4.2 This bulletin will contain the general scope of work to be done, dates for the start and proposed completion of the work, and the precautions which will be employed to protect building occupants.

12.4.5 This bulletin will also alert staff to the increased hazard that lead contamination may present for pregnant or nursing women.

12.4.6 Based on a determination by the Project Manager in consultation with Environmental Health & Safety, further measures to reduce potential lead exposure, will be taken if necessary.

12.5 Signage

12.5.1. Warning signs will be posted at each job site where the employees exposure to lead is above the PEL. Where an exposure assessment has not been completed, signs will be posted until the results are known. The signs will consist of the following wording:



### 13.0 Work Practices

13.1 Work practices have been divided into 3 categories:

13.1.1 Operations and Maintenance (O&M) tasks that have been assessed and do not require any precautions and/or protective measures.

13.1.2. Operations and Maintenance (O&M) tasks that have not been assessed and may require precautions and/or protective measures.

13.1.3 Operations and Maintenance (O&M) tasks that may require other precautions and/or protective measures. (Exhibit 12-3, NIBS Work Practices).

13.2 Acceptable Practices (Do's)

13.2.1 If the condition of an interior or exterior surface (e.g. walls, trim, ceiling, doors, etc.) does not require sanding or scraping prior to repainting, and the surface is in good condition, the surface may be painted even if the paint has not been tested to determine its lead content.

13.2.2 Doors or other building components which can be removed without disturbing the painted surface can be removed without the use of any special protection or requirements. The disposal of these items if found to contain lead must be disposed of according to the requirements specified in the Waste Disposal Section.

13.2.3 If air monitoring has not been performed to characterize the job, it should be performed at the start of the job.

13.2.4 If a lead-based painted surface is flaking or peeling, the loose paint may be removed using wet scraping. This involves wetting the surface to be scraped (in addition to the scraping tool) with water during the entire process.

13.2.5 If an interior surface must be scraped, the area will be vacated of all occupants prior to the initiation of any work and all furnishings will be removed from the area or covered with 6 mil plastic, the floor covered with 6 mil plastic and the area secured to limit access . For exterior scraping, windows and doors in the immediate area should remain closed and secured until the preparation and required cleanup is complete.

13.2.6 Window sills and the floor beneath it in residential buildings should be HEPA vacuumed, washed with trisodium phosphate (TSP) and re-vacuumed following any LBP work

13.2.7 When dust or debris from a window or other opening may contaminate an exterior area, 6 mil plastic sheeting must be securely fastened to the ground next to the work area. The ground should be covered and weighted with sheeting at least five (5) feet from the side of the building and extend three (3) feet per story being abated.

13.2.8 Employees involved will wear protective clothing as described in Personal Hygiene Practices.

13.2.9 Return air vents in the room or immediate area will be covered.

13.2.10 Debris and contaminated clothing will be collected, placed in 4-mil plastic bags and disposed according to Waste Management practices. Debris should be sprayed with water prior to sweeping and placed in 4-mil plastic bags. A HEPA vacuum should be used to remove any visible dust from interior/exterior surfaces.

### 13.3 Unacceptable Practices (Don'ts)

13.3.1 Dry sanding.

13.3.2 Allowing dust to become airborne.

13.3.3 Circulating dust through the ventilation system.

13.3.4 Lead contamination of the floor/ground surrounding the work.

### 13.4. Large Scale Interior and Exterior Maintenance

13.4.1 Where the repainting of an interior or exterior area of damaged and/or deteriorated LBP would involve the disturbance of large areas or multiple surfaces, and would be performed by NJIT employees, departments must contact NJDEP to review the scope of work and develop specific protective measures. LBP work cannot be initiated until an agreed upon plan of action specifying work methods, required employee training and occupant protection, and testing requirements are defined and implemented. Where LBP work is contracted out, see Contact Work below.

### 13.5 Contract Work

13.5.1 All specifications for work associated with LBP to be performed by contractors will be reviewed by Facilities Management and EH&S.

13.5.2 Departments responsible for proposing LBP associated work must forward the draft specifications to Facilities Management in advance of requesting proposals from contractors to ensure LBP requirements are included in the requests.

## 14.0 OSHA Recordkeeping

14.1 In accordance with OSHA 29 CFR 1910.20, 1910.1025, and 1926.62, the following records must be kept by NJDEP for at least 30 years:

14.1.1 Exposure assessments and monitoring;

14.1.2 A description of the sampling and analytical methods used;

14.1.3 The type of respiratory protective devices worn; and,

14.1.4 Name, social security number, and job classification of the employee monitored.

14.1.5 For respiratory protection fit testing tests, refer to the university's Respiratory Protection Program

14.2 In addition, the following medical records must be kept by the university physician and Human Resources for employees subject to medical surveillance for at least 30 years:

14.2.1 name, social security number, and description of the duties of the employee;

14.2.2 A copy of the physician's written opinions;

14.2.3 Results of any airborne exposure monitoring done on or for that employee and provided to the physician; and,

14.2.4 Any employee medical complaints related to exposure to lead.

- 14.3 In addition, Occupational Health Unit must keep the following medical records for at least 30 years:
- 14.3.1 A copy of the medical examination results including medical and work history required under OSHA 1926.62 (j);
  - 14.3.2 A description of the laboratory procedures and a copy of any standards or guidelines used to interpret the test results or references to that information;
  - 14.3.3 A copy of the results of biological monitoring.
- 14.4 If the employee was removed from lead work under the medical removal provisions, the following records must be maintained by the university physician and Human Resources for at least the duration of the employee's employment:
- 14.4.1 The name and social security number of the employee;
  - 14.4.2 The date of each occasion that the employee was removed from current exposure to lead as well as the corresponding date on which the employee was returned to his or her former job status;
  - 14.4.3 A brief explanation of how each removal was or is being accomplished;
  - 14.4.4 A statement with respect to each removal indicating whether or not the reason for the removal was an elevated lead level.
- 14.5 Other information, such as ongoing maintenance and renovation activities, wipe tests, air sampling and lead paint surveys, conducted on campus by other groups, will be kept by Facilities Management.

## **15.0 Waste Disposal Requirements**

15.1 All disposal of lead-contaminated waste is handled by NJDEP. This section describes the segregation, packing, labeling, and management of these waste materials generated by work on University property.

### **15.2 Identification of Hazardous Materials**

15.2.1 The following materials will be managed as lead-contaminated hazardous waste for disposal:

- 15.2.1.1 Lead paint chips, flakes and dusts removed by the contractor;
- 15.2.1.2 Large-scale polyethylene material and masking tape;
- 15.2.1.3 Lead-contaminated miscellaneous disposable tools, brushes, wipes, etc.;
- 15.2.1.4 Lead-contaminated miscellaneous disposable personal protective equipment;
- 15.2.1.5 Lead-contaminated paint remover compound (with material safety data sheet for identification);
- 15.2.1.6 Lead-contaminated paint remover neutralizer (with material safety data sheet for identification);
- 15.2.1.7 Lead contaminated paint rinse water;
- 15.2.1.8 Lead-contaminated paint drop cloths to collect lead contaminated material;
- 15.2.1.9 Lead contaminated caulking or glazing compounds.

### **15.3 Packaging**

15.3.1 The University will provide approved drums, drum liners, containers, and labels required for the proper disposal of hazardous materials. Contractors will provide the plastic bags to contain the hazardous material.

15.3.2 The Contractor will be responsible for the pickup and delivery of DOT approved containers for each job site.

15.3.3 Packaging material will be available for pickup at the NJIT Facilities Services Building between the hours of 8:30 a.m. and 4:00 p.m., Monday through Friday (except on University holidays).

15.3.4 The Contractor will inform Environmental Services Facility personnel what type of waste the Contractor will be generating to obtain the proper containers and labels.

15.3.5 The Contractor will insure that all hazardous material is packaged and segregated according to the following parameters:

15.3.6 Removed abatement compounds, including cloth and paint, will be placed in a plastic bag(s) meeting the following requirements:

15.3.7 Hazardous material, e.g., lead paint chips, will be placed in an approved DOT drum and drum liner provided by the University.

15.3.8 Each drum will be filled to capacity with two (2) inches of head space and sealed by installing a gasket and locking ring.

15.3.9 Drums containing hazardous waste may be moved from job site to job site on campus until filled.

15.3.10 The Contractor is prohibited from transporting the drum off University roads to public roads without the approval of the supervisor of the Project Manager for the project(s).

15.3.11 Liquid material (neutralizer and contaminated rinse water) will be placed in a DOT approved container provided by the University, filled to capacity and sealed with drum bung.

15.3.12 Contaminated personal protective equipment, polyethylene material, and miscellaneous tools will be bagged and placed in a container provided by the University. Placing these items in a container with removed abatement compounds is prohibited.

15.3.13 The Contractor will properly seal and keep the hazardous material container sealed during storage, except when it is necessary to add or remove hazardous material.

15.3.14 The mixture of municipal waste, i.e., food packaging and beverage containers, and hazardous materials is prohibited.

#### 15.4 Labeling

15.4.1 The University will provide appropriate label(s) for hazardous material containers. 15.4.2 The label(s) will be affixed to the side of the container when the hazardous material is first placed in the container and the label(s) will be affixed so that they are within three inches of each other.

#### 15.5 Marking

15.5.1 The Contractor will be responsible for the proper marking of each hazardous material container according to the following:

15.5.1.1 Hazardous Waste Markings

15.5.1.2 The Contractor will place the date in the designated area on the hazardous waste label when the hazardous material was placed in the container.

15.5.1.3 The Contractor will place the Proper Shipping Name, listed below, in the designated area on the label according to the following:

- Lead Paint Solids - Hazardous Waste Solid, N.O.S. / 9 / NA 3077/ PG III (D008)
- Peel-Away Solids - Hazardous Waste Solid, N.O.S. / 9 / NA 3077/ PG III (D008)
- Liquid Paints - Waste Paint Related Material / 3 / UN 1263 / PG II
- Paint Rinsate - Waste Caustic Alkali Liquids, N.O.S. / 8 / UN 1719/ PG II / (D002, D008)
- Lead Paint Chips & Soil - Hazardous Waste Solid, N.O.S. / 9 / NA 3077/ PG III (D008)
- Miscellaneous Equipment Contaminated with Lead - Hazardous Waste Solid, N.O.S. / 9 / NA 3077/ PG III (D008)

#### 15.5.2 NJIT Project Information

15.5.2.1 The university's Project Number will be placed on the hazardous waste label in the upper of right hand corner with a permanent marker.

15.5.2.2 The university's Contract Number will be placed on the hazardous waste label in the upper of right hand corner with a permanent marker.

15.5.2.3 The university's Contract User/Agency (e.g., "Residential Facilities") will be placed on the hazardous waste label in the upper of right hand corner with a permanent marker.

#### 15.6 Security and Temporary Storage

15.6.1 The Contractor may temporary store the hazardous material container at the job site, provided that the Contractor complies with the following: Fulfills the requirements in Section A through Section E of this subsection;

15.6.2 Ensures that all required labels and markings can be visually seen from a distance or without moving the container;

15.6.3 Provides security of the hazardous material container to prevent the disturbance and physical contact of the waste by unknowing or unauthorized persons or livestock; and



15.6.4 Removes and delivers the hazardous material container to the Environmental Services Facility within three (3) days of the container reaching its capacity or the completion of the project.

15.7 Transportation of Waste Material

15.7.1 Hazardous material generated from a NJIT project will be transported to the Environmental Services Facility, via the paths on the University campus.

15.7.2 The transportation of hazardous material on a non-university owned road or thoroughfare is prohibited.

15.8 Back charges

15.8.1 The university reserves the right to back charge the Contractor time and materials should the hazardous materials are not handled in a manner consistent with this specification. The segregation, packaging, labeling, and marking of hazardous materials will comply with appropriate Federal and State regulations.

15.9 Environmental Protection

15.9.1 The Contractor agrees to indemnify, hold harmless and defend the New Jersey Institute of Technology (the "Indemnities") from and against any and all liabilities, claims, penalties, forfeitures, suits, and the costs and expenses incident thereto (including cost of defense, settlement and attorneys' fees), which the Indemnities, or any on of them, may hereinafter incur, become responsible for or pay as a result of death or bodily injury to any person, destruction or damage to any property, contamination of or adverse effects on the environment, or any violation of governmental laws, regulations or orders to the extent that such damage was caused by: (i) the Contractor's breach of any term or provision of this contract; (ii) the failure of any warranty of the Contractor to be true, accurate and complete; and (iii) any negligent, intentional or willful act or omission of the Contractor, the Contractor's subcontractors or the employees or agents of any of them.

15.9.2 In addition, with respect to any liabilities, claims, penalties, forfeitures, suits or threatened suits, and the cost and expenses incident thereto relating to services under this contract and arising without regard to the fault of the Contractor, its subcontractors, their employees or agents, or one or more of the Indemnities, the Contractor will indemnify the New Jersey Institute of Technology and the Indemnities for their costs, including cost of defense, settlement and reasonable attorney's fees. Without limitation, the foregoing sentence will apply to any governmentally imposed or privately negotiated Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) response costs and related expenses.

## **16.0 NJDEP Notification**

16.1 For residential buildings, prior to the initiation of any abatement work which will disturb lead-based paint, the New Jersey Department of Environmental Protection must be notified. For abatement work performed by campus personnel, it will be the responsibility of the Project Manager to coordinate notification to NJDEP through the Department of Environmental Health & Safety. For all contract work, the specifications require the contractor to notify NJDEP.

## **17.0 Program Evaluation**

17.1 The Lead Management Plan is designed to minimize exposure to lead. This information will be reviewed periodically and updated as necessary.

## Exhibit S-4-13 A

# Definitions

**Abatement:** A set of measures designed to eliminate or reduce lead-based paint hazards in residential, public, or commercial buildings, bridges, or other structures or superstructures in accordance with standards established by the New Jersey Department of Environmental Protection (NJDEP) which may include: (a) the removal of lead-based paint and lead-contaminated dust, the containment or encapsulation of lead-based paint, the replacement or demolition of lead-painted surfaces or fixtures, and the removal or covering of lead-contaminated soil; and (b) all preparation, cleanup, disposal, and post-abatement clearance testing activities associated with these measures.

**Accreditation:** Recognition by NJDEP that a contractor, supervisor, inspector, risk assessor, or training provider is in compliance with the applicable requirements of working with lead-based paint.

**Action level (AL):** Employee exposure, without regard to the use of respirators, to an airborne concentration of lead of 30 micrograms per cubic meter of air ( $30 \mu\text{g}/\text{m}^3$ ) calculated as an 8-hour time-weighted average (TWA).

**Exposure Assessment:** The initial determination to find if any employee may be exposed to lead at or above the action level. Until the assessment is completed, employees will assume that the exposure is above the PEL, but not more than ten times the PEL. Employee protective measures will be implemented, including respiratory, other personal protective equipment, change areas, hand washing facilities, biological monitoring, and training.

**HEPA:** High Efficiency Particulate Air. A filtering system capable of trapping and retaining at least 99.97 percent of all monodispersed particles of 0.3 micron in diameter or larger.

**Large Scale Interior and Exterior Maintenance:** The repainting of an interior or exterior area that involves the disturbance of large areas of lead-based paint or multiple surfaces containing lead.

**Lead-based paint (LBP) :** any paint, plaster, or other surface encapsulation material containing more than 0.50 percent lead by weight calculated as lead metal in the dried solid, or more than 0.7 milligram per square centimeter.

**Lead-contaminated dust:** Dust with a lead content equal to or greater than: (a) 200 micrograms per square foot ( $\mu\text{g}/\text{ft}^2$ ) in dust collected from a floor; (b)  $500 \mu\text{g}/\text{ft}^2$  in dust collected from a window sill; or (c)  $800 \mu\text{g}/\text{ft}^2$  in dust collected from a window well (trough).

**Lead-free:** Applies to building condition assessments only. Work may require exposure monitoring even if the lead based paint is below the LBP definition. Means (except for factory-applied coatings on metal components) contains no lead-based paint; or meeting all of the following conditions:

- a. All interior surfaces of the affected property contain no LBP;
- b. All exterior surfaces of the affected property coated with LBP that were chipping, peeling, or flaking have been restored without lead-based paint;
- c. No exterior surfaces of the affected property coated with LBP are chipping, peeling, or flaking;  
and

- d. The owner of an affected property submits to MDE, every two years, a certification by an accredited lead paint inspection contractor that no exterior painted surface containing LBP is chipping, peeling, or flaking.

**Lead paint maintenance and repainting:** In-place management or interim control of a lead-containing substance including, but not limited to, the following activities:(a) removal of loose, chipping, or peeling paint; (b) limited replacement or repair of defective components or other substrates; (c) the removal and replacement of windows and related trim; or (d) other measures to prepare lead paint for recoating with a lead-free product, encapsulation, or enclosure.

**Lead paint removal and demolition:** A service that involves the stripping or other removal of a lead-containing substance from a coated surface, or the removal or demolition of components coated with a lead-containing substance, excluding steel structures.

**Medical Removal Protection:** The removal of an employee from exposure to lead when the employee's blood lead level is at or above 50 micrograms per deciliter of blood ( $\mu\text{g}/\text{dl}$ ).

**Permissible Exposure Limit (PEL):** The OSHA limit for lead exposure. It is  $50 \mu\text{g}/\text{m}^3$ , averaged over an 8-hour workday, commonly referred to as the Time-Weighted Average, or TWA.

**Project Manager:** A person in Facilities Maintenance or AEC who manages large scale projects and is responsible for ensuring that the contractor conforms to all applicable NJDEP and NJDOL regulations including, but not limited to, Lead Based Paint.

**Residential building:** A privately or publicly owned structure, including a house, apartment building, rooming house, hotel, motel, or hospital, which may serve as a permanent or temporary domicile.

**Shoe Mold:** Strips off quarter round wood commonly used where baseboards meet the floor.

**$\mu\text{g}/\text{dl}$ :** Micrograms per deciliter. A deciliter is 10 milliliters or 10 cubic centimeters.

**XRF:** X-Ray Fluorescence analyzer. A device that measures the lead content in paint and other materials. Readings are expressed in milligrams of lead per square centimeter ( $\text{mg}/\text{cm}^2$ ).

**Lead-Based Paint (LBP)  
DeMinimus Activities**

1. Removal of nails, screws, picture hangers, or other fasteners, etc. from a painted wall surface.
2. Removal of cover plates, switch covers, etc. from a painted surface.
3. Removal of hinge pins or painted door hinges.
4. Removal of lock hardware, closers, or other hardware accessories from a painted door.
5. Wet sanding drywall compound or spackle using a sponge.
6. Separating and removing shoe mold (base shoe) from a painted baseboard.
7. Planning painted wood with manual tools.
8. Drilling or preparing a painted door from installation of new door hardware (lock set, closers, kick plates, etc.)
9. Renailing or refastening loose building trim, moldings or panels.
10. Reglazing of window glass.
11. Removal of painted phone line or electrical wire.
12. Freeing an inoperable window.
13. Housekeeping including emptying trash, vacuuming carpets, dust mopping hallways, cleaning water fountains, buffing floors, disinfecting bathrooms.
14. Maintenance including replacing air filters, replacing toilet flush valve, replacing light bulbs, checking and repairing shower valves, unclogging a shower drain using a "snake", mechanical repair of an air-conditioning unit, and repairing a shower leak.
15. Carpentry activities including removing wooden windows to measure to make screens, sweeping out the carpentry shop, planning the edge of a door and re-install the hinges, re-hang the door, removing outside entrance door, removing the kick plate, and removing the screws.
16. Carpentry activities including removing door hinges and lockset and replacing.
17. Carpentry activities including sanding floor with "stand-behind" power disc sander, scraping floor near corner, clean-up of debris and placing debris in container.
18. Carpentry activities including wet hand scraping and wet sanding a column
19. Carpentry activities including removing wooden baseboards, cut and pull up wall-to-wall carpeting, scrape walls near baseboard, scrape carpet adhesive residue from floor, sweep floor.
20. Carpentry activities including removing window casing and wooden molding, removing the window sash, heating the glazing, scraping and removing the softened glazing, re-installing the sash, rehanging the window, and installing the wooden molding.
21. Removing old plaster and re-plastering, manually sanding new plaster.
22. Maintenance activities including wet scraping of window and door.
23. Plumber activities including manually removing old lead and oakum from around shower drains, heating lead in an open ladle using a propane torch, pouring the molten lead from the ladle into the cavity surrounding the drain, rapidly cooling the unused hot lead using cooling water from a sink faucet
24. Chipping and sanding plaster.
25. Painter activities including spreading plastic material around the hot-water radiator and wet scraping old paint from hot-water radiator, folding up the plastic on the floor, broom sweeping the floor.

## Exhibit S- 4-13 C

### Non - Assessed Tasks Operations and Maintenance Tasks on Lead Based Paint That May Require Precautions And/Or Protective Measures. (National Institute of Building Sciences (NIBS) Work Practices)

For example, where a task is performed many times during a shift, such as drilling multiple holes to install screening on multiple windows.

- Cleaning Damaged or Deteriorated LBP Surfaces
- Removing LBP Chips and Debris
- Removing Small Areas of LBP
- Wet Sanding of LBP
- Penetrating LBP
- Removing Components from LBP Surfaces
- Attaching to a LBP Surface
- Applying Coatings to LBP Surfaces
- Installing Materials Over LBP Surfaces
- Enclosing a LBP Surface
- Patching a LBP Surface
- Exposing LBP Contaminated Cavities
- LBP Door and Window Maintenance
- Changing Filters and Waste Bags in LBP Contaminated HEPA Vacuums
- Cleaning Lead Dust Contaminated Carpet
- Landscaping in Soil Containing Elevated Levels of LBP

Each Work Practice comes with three levels of protection, depending on the scope of the task, how long the work will continue, and especially the condition of the LBP and substrate which will be disturbed. The higher the Level of activity, the higher the level of preparation and worker protection required.

- Level 1 is described as those activities requiring a minimal amount of preparation and worker protection because a negligible amount of lead dust may be generated or disturbed.
- Level 2 consists of activities producing moderate amounts of dust and debris.
- Level 3 are activities which could generate substantial quantities of dust and debris.

Complex activities not specifically described in the work practices can usually be performed by modifying and combining various parts of several different work practices. For example, to replace a metal fireplace unit might require the following combination of work practices:


- Removing LBP Chips and Debris
- Removing Components from LBP Surfaces
- Attaching to a LBP Surface
- Patching a LBP Surface
- Exposing LBP Contaminated Cavities

Complete information on these work practices is available in the "Lead-Based Paint Operations & Maintenance Work Practices Manual for Homes and Buildings", published by the National Institute of Building Sciences (NIBS), 1090 Vermont Avenue, NW, Suite 700, Washington, DC 20005-4905, 202-289-7800. Web address: <http://www.nibs.org/pubslead.html>.

## **Exhibit S- 4-13 D**

### **Guidance Documents On Lead**

- National Institute of Building Sciences, Lead-Based Paint Operations and Maintenance Work Practices Manual.
- Department of Housing and Urban Development (HUD), Guidelines for the Evaluation and Control of Lead-Based Paint Hazards

	UNIVERSITY SAFETY ENVIRONMENTAL MANAGEMENT SYSTEM University Heights Newark, New Jersey 07102	<b>Document Control No.</b> <b>USEMS SOP S - 4 - 14</b>
	<b>Benzene Control Plan</b> <b>29CFR 1910.1048</b>	

## 1.0 Scope and Application

- 1.1 This plan applies to all University employees who are exposed or potentially exposed to Benzene, its solutions, and materials that release Benzene.
- 1.2 The University is dedicated to providing safe and healthful work facilities for students and employees, and complying with federal and State occupational health and safety standards. Engineering controls should be instituted to the maximum extent feasible to maintain exposures below permissible limits, followed by other control methods including work and hygienic practices, including the use of personal protective equipment such as eye, face, skin, and respiratory protection. Administrators, managers, faculty, staff and students all share responsibility for minimizing their exposure to Benzene

## 2.0 Responsibilities

- 2.1 Department of Environmental Health & Safety (EH&S) will:
- Develop and distribute a written Benzene Management Plan;
  - Provide or coordinate training for employees who are exposed to Benzene at or above an 8-hour average exposure of 0.1 parts per million (ppm). Employees who require training will be identified through exposure monitoring. Employees who require training will be identified through exposure monitoring;
  - Conduct exposure monitoring and notify employees in writing of monitoring results within 15 days of receipt;
  - Maintain records of all training, exposure monitoring, and respirator fit testing;
  - Provide consultative technical guidance to personnel at all levels of responsibility concerning Benzene, hazard evaluation, hazard control and hazard information; and
  - Annually review the Benzene Management Plan for effectiveness and revise as necessary.
- 2.2 Human Resources
- Coordinate and direct all required or recommended medical surveillance for employees with Benzene exposure;
  - Provide medical consultations and examinations for workers who have been overexposed or believe they may have been overexposed to Benzene; and
  - Maintain medical records relating to consultations, examinations and medical surveillance as required by the Plan.
- 2.3 Department Environmental Health & Safety Officers (EH&SHO)
- Assist to identify locations where Benzene is used or where building materials contain or may reasonably be expected to off-gas Benzene.



2.4 Department Heads, Supervisors and Principle Investigators will:

- Assure that all employees who have potential for exposure to Benzene are evaluated by EH&S and made aware of the hazards associated with Benzene; and
- Insure control measures and personal protective equipment are appropriate for the situation.
- Assure employees understand the elements of the Benzene Plan when it is determined by EHS& through surveys and monitoring that there is occupational exposure.
- Assure that employees are aware of the potential hazards associated with working with Benzene and receive appropriate training.
- Notify EH&S when new research or processes are used that might result in Benzene exposure and arrange for exposure monitoring through EH&S where needed to document exposure levels.
- Initiate medical surveillance for any employee who has Benzene exposure in excess of regulated limits as determined by EH&S, who develops signs and symptoms of overexposure to Benzene, or who is exposed to Benzene in emergencies.
- Report any problem associated with implementation of the Benzene Management Plan to EH&S.

2.5 Individuals will:

- Comply with the provisions of the Benzene Management Plan and work practices instituted by the Supervisor; and
- Report to their supervisor if they develop signs and symptoms of overexposure to Benzene, or who are exposed to Benzene in the course of an emergency.

### **3.0 Benzene Assessment and Monitoring**

3.1 The following processes or work operations may result in Benzene exposure:

- 3.1.1 Any process that uses Benzene for tissue preservation.
- 3.1.2 Any operation that involves grinding, sanding, sawing, cutting, crushing, screening, sieving, or any other manipulation of a material that contains urea-Benzene resin and generates Benzene-bearing dust, for example, working with some particle boards, plywoods, decorative laminates, textiles, paper, and foundry sand molds.
- 3.1.3 Any processes where there have been employee complaints or symptoms indicative of exposure to Benzene.
- 3.1.4 Any liquid or spray process involving Benzene.
- 3.1.5 Any process that involves the heating of a Benzene-bearing resin.
- 3.1.6 Disposing or processing Benzene waste.

3.2 To conduct Benzene assessments, EH&S requires an inventory of locations where Benzene is used. This may be accomplished by:

- 3.2.1 Reviewing manufacturers information on particle board and plywood fabrication.
- 3.2.2 Reviewing material safety data sheets (MSDS).
- 3.2.3 Reviewing Benzene chemical waste inventories.
- 3.2.4 Checking historical use data.
- 3.2.5 Conducting walkthroughs of laboratories where there is Benzene tissue preservation.
- 3.2.6 Reviewing laboratory signage data.
- 3.2.7 Any other type of pertinent data, including Human Resources notifications and employee complaints.

3.3 Upon identification, EH&S will identify operations where Benzene is used in a manner such that it may be released into the workplace atmosphere or contaminate the skin.

## 4.0 Exposure Assessment Methods

- 4.1 EH&S will use appropriate methods to assess Benzene levels, which include:
- 4.1.1 Use of objective data. (i.e., previously documented information that confirms or rebuts Benzene exposures at regulated concentrations).
  - 4.1.2 Appropriate workplace contaminant sampling methods.

## 5.0 Monitoring Strategy

- 5.1 When there are different processes where employees may be exposed to Benzene, EH&S will select a maximum risk employee. This will be accomplished by observing the worksite.
- 5.2 If measurements show exposure to Benzene at or above the action level or the STEL, then all employees identified in the same group will be monitored.
- 5.3 TWA's are usually determined for an 8-hour work shift. A personal sampling pump is affixed 5.3.1 to the employee and is collected at the end of the shift. The sample is then analyzed for Benzene. STEL assessments are 15-min samples taken during periods of maximum expected concentrations. Multiple STEL measurements may be collected per shift, and only the highest concentration is used to represent the employee's STEL. Employee exposures determine the need for compliance with provisions of the regulation and the Benzene Management Plan.

Exposure scenario	Require monitoring activity
Below the AL and at or below the STEL	No 8-hour TWA or STEL monitoring required
Below the AL and above the STEL	No 8-hour TWA monitoring required; monitor STEL exposures every three months
At or above the AL, at or below the TWA, and at or below the STEL	Monitor 8-hour TWA exposures every six months and monitor STEL exposures every three months
At or above the AL, at or below the TWA, and above the STEL	Monitor 8-hour TWA exposures every six months and monitor STEL exposures every three months
Above the TWA and at or below the STEL	Monitor 8-hour TWA exposures every three months. <sup>1</sup>
Above the TWA and above the STEL	Monitor 8-hour TWA exposures and STEL exposures every three months

- 5.4 The employer may decrease the frequency of 8-hour TWA exposure monitoring to every six months when at least two consecutive measurements taken at least seven days apart show exposures to be at or below the 8-hour TWA PEL. The employer may discontinue the periodic 8-hour TWA monitoring for employees where at least two consecutive measurements taken at least seven days apart are below the AL. The employer may discontinue the periodic STEL monitoring for employees where at least two consecutive measurements taken at least 7 days apart are at or below the STEL.
- 5.5 Monitoring results determine the need and extent of employee training, hygiene procedures, personal protective equipment, follow-up monitoring, and medical surveillance.
- 5.6 The Benzene Requirements Matrix (Appendix A) summarizes institutional and supervisory responsibilities for employees meeting the specified criteria.

- 5.7 Department heads, supervisors, or users may contact EH&S to initiate exposure monitoring in their worksites.

## 6.0 Training

- 6.1 All employees with any potential exposure to Benzene must receive training to provide an understanding of hazards and protection methods. This training is a component of the Chemical Hygiene Program in laboratories, and is addressed by the Hazard Communication Program in all other worksites. Please review these programs if Benzene is present in your workplace.
- 6.2 Employees who are assigned to workplaces where exposure to Benzene has been documented at or above the AL, they will be informed of:
- 6.2.1 A discussion of the contents of OSHA 29 CFR 1910.1048, Benzene;
  - 6.2.2 An explanation of the specific material safety data sheet (MSDS) used in the work area;
  - 6.2.3 The purpose for and a description of the medical surveillance program including:
  - 6.2.4 A description of the potential health hazards associated with exposure to Benzene and a description of the signs/symptoms of Benzene exposure, and
  - 6.2.5 Instructions to immediately report to the Supervisor any adverse signs or symptoms that the employee suspects is attributable to Benzene exposure;
  - 6.2.6 Description of operations in the work area where Benzene is present and an explanation of the safe work practices appropriate to limit exposure to Benzene in each job;
  - 6.2.7 The purpose for, proper use of, and limitations of personal protective clothing and equipment;
  - 6.2.8 Instructions for the handling of spills and emergencies;
  - 6.2.9 An explanation of the importance of engineering and work practice controls for employee protection and any necessary instruction in the use of these controls;
  - 6.2.10 A review of emergency procedures including the specific duties or assignments of each employee in the event of an emergency; and
  - 6.2.11 Information as to the location and availability of written training materials.
- 6.3 Employees will receive information and training at the time of initial assignment, and whenever there is a change in procedure that may result in a new exposure. EH&S will provide the training annually to each affected employee.

## 7.0 Labels and Regulated Areas

### 7.1 Labels

- 7.1.1 The chemical manufacturer, importer, or distributor will ensure that each container is labeled according to the University's Hazard Communication Program. This includes:
- 7.1.1.1 All mixtures or solutions composed of greater than 0.1 % Benzene; and
  - 7.1.1.2 Materials capable of releasing Benzene into the air, under reasonably foreseeable conditions of use, at concentrations reaching or exceeding 0.1 ppm.
- 7.1.2 Labels will include:
- 7.1.2.1 The identity of the hazardous chemical;
  - 7.1.2.2 Appropriate hazard warning; and
  - 7.1.2.3 Name and address of the manufacturer, importer, or distributor.
- 7.1.3 It is the responsibility of the user to ensure that containers remain labeled with the identity and appropriate hazard warnings.
- 7.1.4 Temporary containers require only the identity of the material if it is intended for immediate use (within one work shift) by an employee and must be returned to a container with appropriate warnings by the end of the work shift.

- 7.1.5 Materials capable of releasing Benzene at levels between 0.1 ppm and the action level will also be labeled with the following additional information:
  - 7.1.5.1 Identified as containing Benzene;
  - 7.1.5.2 Name and address of the person responsible for the material; and
  - 7.1.5.3 State that physical and health hazard information can be found on the material safety data sheet.
- 7.1.6 For the materials listed above capable of releasing Benzene at levels above the action level, labels will also:
  - 7.1.6.1 Address all hazards as defined in OSHA 29 CFR 1910.1200 (d), Hazard Determination;
  - 7.1.6.2 Address Appendices A and B, 29 CFR 1910.1200, including respiratory sensitization; and
  - 7.1.6.3 Contain the words "Potential Cancer Hazard".

7.2 Signage

- 7.2.1 Areas where the concentration of airborne Benzene exceeds either the PEL or STEL will be established as regulated areas. All entrances and access ways will be posted with a sign bearing the following information:

**DANGER**  
**BENZENE**  
**IRRITANT AND POTENTIAL CANCER HAZARD**  
**AUTHORIZED PERSONNEL ONLY** for further information contact  
 (Supervisor's name, location, phone) or the Dept. of Environmental Health & Safety x

**8.0 Medical Surveillance**

- 8.1 A medical surveillance program will provide annual examinations for all employees who:
  - 8.1.1 Are exposed to Benzene at or above the action level or the STEL.
  - 8.1.2 Develop signs and symptoms of overexposure to Benzene and for all employees exposed to Benzene in emergencies. (When determining whether an employee may be experiencing signs and symptoms of possible overexposure to Benzene, the employer may rely on the evidence that signs and symptoms will occur only in exceptional circumstances when airborne exposure is less than 0.1 ppm and when Benzene is present in material in concentrations less than 0.1 percent.)

Note: Medical examinations will be provided as soon as possible to all employees exposed in an emergency.
- 8.2 The following information will be provided to the university physician by the Supervisor:
  - 8.2.1 A description of the affected employee's job duties as they relate to the employee's exposure to Benzene;
    - 8.2.1.2 The representative exposure level for the employee's job assignment;
    - 8.2.1.3 Information concerning any personal protective equipment and respiratory protection used or to be used by the employee;
    - 8.2.1.4 Information from previous medical examinations of the affected employee within the control of the employer; and
    - 8.2.1.5 In the event of a non-routine examination because of an emergency exposure to Benzene, the supervisor will provide to the physician as soon as possible a description of how the emergency occurred and the exposure the victim may have received.
- 8.3 All medical procedures will be performed by or under the supervision of a licensed physician and will be provided without cost to the employee, without loss of pay, and at a reasonable time and place. The details of the medical examination can be found in OSHA 29 CFR 1910.1048 (l).
- 8.4 For each examination required under medical surveillance, the employer will obtain a written opinion from the university physician. This written opinion will contain the results of the medical examination except that it will not reveal specific findings or diagnoses unrelated to occupational exposure to Benzene.

8.5 A physician may authorize medical removal from exposure to Benzene when an employee reports significant irritation of the mucosa of the eyes/upper airways, respiratory sensitization, dermal irritation, or dermal sensitization attributed to workplace Benzene exposure if the physician determines that the exposure was caused by Benzene.

8.7 After consulting with the university physician regarding the determination of medical removal from exposure to Benzene or any restrictions involved, the employee may designate a second physician to review any findings, determinations, or recommendations of the initial physician and have the second physician conduct examinations, consultations, and laboratory tests as necessary to evaluate the effects of Benzene exposure and to facilitate the review.

## 9.0 Personal Hygiene Practices

9.1 Employees who are required to change from work clothing into protective clothing to prevent skin contact with Benzene will be provided change rooms by their department.

9.2 Conveniently located quick drench showers will be used where employees' skin may become splashed with solutions containing 1 percent or greater Benzene (including provisions for equipment failure or improper work practices) and employees must be aware of the location of the shower and required to use it immediately.

9.3 Eyewash facilities must be placed within the immediate work area for emergency use if there is any possibility that an employee's eyes may be splashed with solutions containing 0.1 percent or greater of Benzene.

### 9.4 Protective Equipment and Clothing

9.4.1 Employers will comply with the provisions of OSHA 29 CFR 1910.132 (Personal Protective Equipment), 29 CFR 1910.133 (Eye and Face Protection) and the NJIT's Personal Protective Equipment Program.

9.4.2 Personal protective equipment and clothing will be selected based on the form of Benzene encountered, the conditions of use, and the hazard presented.

9.4.3 All eye and skin contact with liquids containing 1% or more of Benzene will be prevented by the use of chemical protective clothing made of material impervious to Benzene and the use of other personal protective equipment, such as goggles and face shields, as appropriate to the operation. Clothing selection will be made using chemical clothing resistance guides found in manufacturer's literature.

9.4.4 Where a face shield is worn, chemical safety goggles are also required if there is a danger of Benzene reaching the eye.

9.4.5 Full body protection will be worn for entry into areas where concentrations exceed 100 ppm and for emergency entry into areas of unknown concentration.

### 9.5 Maintenance of Protective Equipment and Clothing

9.5.1 The employer will assure that protective equipment and clothing contaminated with Benzene are cleaned and laundered before reuse.

9.5.2 When ventilating Benzene-contaminated clothing and equipment, the employer will establish a storage area so that employee exposure is minimized.

Containers for contaminated clothing/ equipment and storage areas will have labels and signs containing the following information: 9.5.3

<p><b>DANGER</b> <b>BENZENE-CONTAMINATED [CLOTHING] EQUIPMENT</b> <b>AVOID INHALATION AND SKIN CONTACT</b></p>
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9.6 The employer will inform any person who launders, cleans, or repairs such clothing or equipment of Benzene's potentially harmful effects and of procedures to safely handle the clothing and equipment.

9.7 Housekeeping and Preventative Maintenance

9.7.1 For operations involving Benzene solutions or gas, the employer will implement a program to detect leaks and spills, including regular visual inspections.

9.7.2 Preventative maintenance of equipment, including surveys for leaks, will be undertaken at regular intervals. In work areas where spillage may occur, the employer will make provisions to contain the spill, to decontaminate the work area, and to dispose of the waste.

9.8 Respirators

9.8.1 Whenever feasible engineering and work practice controls (for example, local exhaust ventilation) cannot reduce employee exposure below the PEL or STEL, the employer will continue to apply these controls to reduce employee postures to the maximum extent feasible and will supplement them with respirators when required.

9.8.2 Respirators must be used:

9.8.2.1 When exposures meet or exceed the PEL,

9.8.2.2 During periods necessary to install or implement feasible engineering controls,

9.8.2.3 When work operations, such as maintenance and repair activities or vessel cleaning, for which the employer establishes that engineering and work-practice controls are not feasible,

9.8.2.4 In work operations for which feasible engineering and work practice controls are not yet sufficient to reduce employee exposure below the PEL, or

9.8.2.5 During emergencies.

9.8.2.6 The use of respiratory protection will be in accordance with the NJIT Respiratory Protection Program. All workers must be medically evaluated by the university physician to determine the ability of the worker to perform the work while wearing a respirator.

9.8.2.7 Training in the care and use respirators and fit-testing will be conducted by EH&S for only those employees who are authorized by Occupational Health to wear a respirator.

9.8.2.8 Any worker who is not authorized by the Occupational Health Unit will be prohibited from engaging in activities which may expose the worker to airborne Benzene at or above the PEL.

9.8.2.9 If air-purifying chemical cartridge respirators are used, the following must be followed:

9.8.2.9.1 If the cartridge contains a NIOSH-approved end-of service life indicator (ESLI), replace the cartridge when breakthrough occurs.

9.8.2.9.2 If the cartridge does not contain an ESLI, replace the cartridge after three (3) hours of use or at the end of the work shift, whichever occurs first.

9.8.2.9.3 If the cartridge does not contain an ESLI, replace canisters used in atmospheres up to 7.5 ppm (10 times the PEL) every four hours or at the end of the work shift, whichever occurs first.

9.9 Appropriate respirators must be selected based upon employee exposure levels.

The following types of respirators are appropriate for the indicated exposures:

Benzene exposure (ppm)	Minimum respirator required <sup>1</sup>
Up to 7.5 ppm (10 X PEL)	Full face piece with cartridges or canisters specifically approved for protection against Benzene. <sup>2,3</sup>
Up to 75 ppm (100 X PEL)	Full-face mask with canister especially approved for protection against Benzene, Type C supplied air respirator, demand type, or continuous flow type, with full face piece, hood, or helmet.
Above 75 ppm or unknown.	Self-contained breathing apparatus (SCBA) with positive pressure full face piece.

(Emergencies), 100 X PEL	Combination supplied-air, full face piece positive pressure respirator with auxiliary self-contained air supply
Firefighting	SCBA with positive pressure full face-piece
Escape	SCBA in demand or pressure demand mode. Full face mask with canister approved for protection against Benzene.

1. Respirators specified for use at higher concentrations may be used at lower concentrations.
2. A half-mask respirator with cartridges specifically approved for protection against Benzene can be substituted for the full face piece respirator providing that effective gas-proof goggles are provided and used in combination with the half-mask respirator.
3. The employer must provide a powered air-purifying respirator adequate to protect against Benzene exposure to any employee who has difficulty using a negative-pressure respirator.

## 10.0 Record Keeping

- 10.1 EH&S maintains all documents relating to Benzene exposure including exposure assessments, air sampling data, respirator fit testing documentation and waste disposal manifests.
- 10.2 Human Resources retains the medical records relating to the medical surveillance program.
- 10.3 All records are kept indefinitely.

## Exhibit S-4-14 A

# Definitions

**Action Level (AL):** A concentration of Benzene of 0.5 parts Benzene per million parts of air (0.5 ppm) calculated as an 8- hour time-weighted average (TWA) concentration.

**Authorized Person:** Any person required by work duties to be present in regulated areas, or authorized to do so by NJIT.

**ESLI:** End-of service life indicator.

**Benzene:** The chemical substance, HCHO, Chemical Abstracts Service Registry No. 50-00-0. The precise hazards associated with exposure depend both on the form (solid, liquid, or gas) of the material and the concentration present. 37-50% solutions of Benzene used in preserving specimens present a much greater hazard to the skin and eyes due to splashes than solutions containing less than 1 %. Benzene is also found in urea-Benzene resins (e.g., glues used in plywood and particle board) and can generate Benzene-bearing dust when cut, sanded, drilled, or broken.

**Initial Monitoring:** Identification of all employees who may be exposed at or above the action level or at or above the STEL and accurately determine the Benzene exposure of each employee so identified. Initial monitoring will be repeated each time there is a change in production, equipment, process, personnel, or control measures which may result in new or additional exposures to Benzene.

**Methods of Compliance:** Engineering and work practices implemented to reduce and maintain employee exposures to Benzene at or below the TWA and the STEL.

**PPM:** Parts per million.

**Permissible Exposure Limit (PEL):** The allowable exposure that an employee can be exposed to over an 8-hour Time-Weighted Average (TWA). For Benzene, the limit is 0.75 parts per million (ppm).

**Periodic Monitoring:** Employees shown by initial monitoring to be at or above the action level or at or above the STEL will be periodically monitored. If the last monitoring showed the employee exposure at or above the action level, then repeat monitoring of the employee will be performed at least once a year under worst-case conditions.

**Short Term Exposure Limit (STEL):** A limit of 2 ppm of Benzene, averaged over a 15-minute period.

**Regulated Areas:** Areas where the concentration of airborne Benzene exceed the PEL or STEL. All entrances and access ways will be posted with a sign as indicted in this Plan.

**Time-weighted average (TWA):** The average exposure to Benzene an individual receives for a full eight-hour day.



**Exhibit S-4-14 B**

<b>Benzene Requirements Matrix</b>											
	< 0.1 ppm exposure	0.1 ppm	0.5 ppm	.75 ppm	2 ppm STEL	> 100 ppm or unknown	≥1% vol	≥ 0.1% vol	Symptoms of Exposure <sup>2</sup>	Eye hazard	At any conc.
Awareness Training <sup>8</sup>	x						x				
Comprehensive Training		x	x	x	x						
Respirator <sup>3</sup>				x	x						
Med. Surv.			x	x	x				x		
Signs				x	x						
Regulated Area				x	x						
Waste Disposal <sup>1</sup>	x	x	x	x	x		x	x			x
Record keeping	x	x	x	x	x						
Work Practices		x	x	x	x						
Hygiene Practices				x	x						
Engineering Controls				x	x						
Protective Clothing							x				
Contaminated PPE laundering, signage, labeling, containers											x
Full body protection						x					
Chemical goggles										x	
Emergency Eyewash								x		x	
Emergency Shower								x			
Labels <sup>5</sup>		x	x	x	x						
MSDS	x	x	x	x	x		x	x			x
Initial monitoring <sup>6</sup>											x
Periodic monitoring <sup>7</sup>			x	x	x						
Preventative Maintenance and leak surveys											x
Housekeeping and leak detection inspections											x
Spill containment, decontamination											x
Medical Removal <sup>4</sup>									x		
Written Hazcom Program <sup>8</sup>											x

1. Waste from spills will be placed in sealed containers and labeled. Preserved tissue may be incinerated. Contact Environmental Affairs for specific information.

2. Only if airborne exposure is more than 0.1 ppm and Benzene concentration is more than 0.1 %.

3. Include EH&S medical surveillance, training, and fit testing.


4. Does not apply in cases of dermal irritation or sensitization when less than 0.05 % Benzene.

5. For materials capable of releasing Benzene above 0.5 ppm, labels will address all hazards as defined in 29 CFR 1910.1200 (d) and Appendices A and B, including respiratory sensitization, and contain the words "Potential Cancer Hazard". Does not apply if the laboratory falls under 29 CFR 1910.1450. Then see Chemical Hygiene Plan.

6. Unless it can be shown by objective data that there will be no exposure at or above the action level or STEL under foreseeable conditions of use.

7. Repeat every 6 months if at or above the action level. If above STEL, repeat every year. Monitoring may be discontinued if results from 2 consecutive samples taken at least 7 days apart are below the action level and the STEL.

8. For laboratories falling under 29 CFR 1910.1450, they will use the Chemical Hygiene Plan for compliance.

	UNIVERSITY SAFETY ENVIRONMENTAL MANAGEMENT SYSTEM University Heights Newark, New Jersey 07102	<b>Document Control No.</b> <b>USEMS SOP S - 4 - 15</b>
	<b>Methylene Chloride Control Plan</b> <b>29CFR 1910.1052</b>	

## 1.0 Scope and Application

- 1.1 This plan applies to all University employees who are exposed or potentially exposed to methylene chloride, its solutions, and materials that release methylene chloride.
- 1.2 The University is dedicated to providing safe and healthful work facilities for students and employees, and complying with federal and State occupational health and safety standards. Engineering controls should be instituted to the maximum extent feasible to maintain exposures below permissible limits, followed by other control methods including work and hygienic practices, including the use of personal protective equipment such as eye, face, skin, and respiratory protection. Administrators, managers, faculty, staff and students all share responsibility for minimizing their exposure to methylene chloride.

## 2.0 Responsibilities

Department of Environmental Health & Safety (EH&S) will:

- Develop and distribute a written Methylene chloride Management Plan;
- Provide or coordinate training for employees who are exposed to methylene chloride at or above an 8-hour average exposure of 12.5 parts per million (ppm).
- Employees who require training will be identified through exposure monitoring;
- Conduct exposure monitoring and notify employees in writing of monitoring results within 15 days of receipt;
- Maintain records of all training, exposure monitoring, and respirator fit testing;
- Provide consultative technical guidance to personnel at all levels of responsibility concerning methylene chloride, hazard evaluation, hazard control and hazard information; and
- Annually review the Methylene Chloride Management Plan for effectiveness and revise as necessary.

Human Resources

- Coordinate and direct all required or recommended medical surveillance for employees with methylene chloride exposure;
- Provide medical consultations and examinations for workers who have been overexposed or believe they may have been overexposed to methylene chloride; and
- Maintain medical records relating to consultations, examinations and medical surveillance as required by the Plan.
- Department Environmental Health & Safety Officers (EH&S)
- Assist to identify locations where methylene chloride is used or where building materials contain or may reasonably be expected to off-gas methylene chloride.
- Department Heads, Supervisors and Principle Investigators will:
  - Assure that all employees who have potential for exposure to methylene chloride are evaluated by EH&S and made aware of the hazards associated with methylene chloride; and
  - Insure control measures and personal protective equipment are appropriate for the situation.

- Assure employees understand the elements of the Methylene chloride Plan when it is determined by EHS& through surveys and monitoring that there is occupational exposure.
- Assure that employees are aware of the potential hazards associated with working with methylene chloride and receive appropriate training.
- Notify EH&S when new products or processes are used that might result in methylene chloride exposure and arrange for exposure monitoring through EH&S where needed to document exposure levels.
- Initiate medical surveillance for any employee who has methylene chloride exposure in excess of regulated limits as determined by EH&S, who develops signs and symptoms of overexposure to methylene chloride, or who is exposed to methylene chloride in emergencies.
- Report any problem associated with implementation of the Methylene Chloride Management Plan to EH&S.

Employees and Staff will:

- Comply with the provisions of the Methylene Chloride Management Plan and work practices instituted by the Supervisor; and
- Report to their supervisor if they develop signs and symptoms of overexposure to methylene chloride, or who are exposed to methylene chloride in the course of an emergency.

### **3.0 Methylene Chloride Assessment and Monitoring**

3.1 The following processes or work operations may result in methylene chloride exposure:

- 3.1.1 Any process that uses methylene chloride.
- 3.1.2 Any processes where there have been employee complaints or symptoms indicative of exposure to methylene chloride.
- 3.1.3 Any liquid or spray process involving methylene chloride, including spraying adhesive, paint removal or plastic fabrication and cleaning.
- 3.1.4 Disposing or processing methylene chloride waste.
- 3.1.5 To conduct methylene chloride assessments, EH&S requires an inventory of locations where methylene chloride is used. This may be accomplished by:
  - 3.1.5.1 Reviewing material safety data sheets (MSDS).
  - 3.1.5.2 Reviewing methylene chloride chemical waste inventories.
  - 3.1.5.3 Checking historical use data.
  - 3.1.5.4 Conducting walkthroughs of laboratories and other facilities where methylene chloride is used.
  - 3.1.5.5 Reviewing laboratory signage data.
  - 3.1.5.6 Any other type of pertinent data, including Complaint to department supervisors, human resources, unit notifications and employee complaints.
- 3.1.6 Upon identification, EH&S will identify operations where methylene chloride is used in a manner such that it may be released into the workplace atmosphere or contaminate the skin.

### **4.0 Exposure Assessment Methods**

4.1 EH&S will use appropriate methods to assess methylene chloride levels, which include:

- 4.1.1 Use of objective data, i.e., previously documented information that confirms or rebuts methylene chloride exposures at regulated concentrations.
- 4.1.2 Appropriate workplace contaminant sampling methods.

## 5.0 Monitoring Strategy

- 5.1 When there are different processes where employees may be exposed to methylene chloride, EH&S will select a maximum risk employee. This will be accomplished by observing the worksite.
- 5.2 If measurements show exposure to methylene chloride at or above the action level or the STEL, then all employees identified in the same group will be monitored.
- 5.3 TWA's are usually determined for an 8-hour work shift. A personal sampling pump is affixed to the employee and is collected at the end of the shift. The sample is then analyzed for methylene chloride. STEL assessments are 15-min samples taken during periods of maximum expected concentrations. Multiple STEL measurements may be collected per shift, and only the highest concentration is used to represent the employee's STEL. Employee exposures determine the need for compliance with provisions of the regulation and the Methylene Chloride Management Plan.

Exposure scenario	Require monitoring activity
Below the AL and at or below the STEL	No 8-hour TWA or STEL monitoring required
Below the AL and above the STEL	No 8-hour TWA monitoring required; monitor STEL exposures every three months
At or above the AL, at or below the TWA, and at or below the STEL	Monitor 8-hour TWA exposures every six months and monitor STEL exposures every three months
At or above the AL, at or below the TWA, and above the STEL	Monitor 8-hour TWA exposures every six months and monitor STEL exposures every three months
Above the TWA and at or below the STEL	Monitor 8-hour TWA exposures every three months. <sup>1</sup>
Above the TWA and above the STEL	Monitor 8-hour TWA exposures and STEL exposures every three months

5.4 The PI may decrease the frequency of 8-hour TWA exposure monitoring to every six months when at least two consecutive measurements taken at least seven days apart show exposures to be at or below the 8-hour TWA PEL. The PI may discontinue the periodic 8-hour TWA monitoring for employees where at least two consecutive measurements taken at least seven days apart are below the AL. The PI may discontinue the periodic STEL monitoring for employees where at least two consecutive measurements taken at least 7 days apart are at or below the STEL.

5.5 Monitoring results determine the need and extent of employee training, hygiene procedures, personal protective equipment, follow-up monitoring, and medical surveillance.

5.6 The methylene chloride Requirements Matrix (Appendix A) summarizes institutional and supervisory responsibilities for employees meeting the specified criteria.

5.7 Department heads, supervisors, or users may contact EH&S to initiate exposure monitoring in their worksites.

## 6.0 Training

6.1 All employees with any potential exposure to methylene chloride must receive training to provide an understanding of hazards and protection methods. This training is a component of the Chemical Hygiene Program in laboratories, and is addressed by the

Hazard Communication Program in all other worksites. Please review these programs if methylene chloride is present in your workplace.

6.2 Employees who are assigned to workplaces where exposure to methylene chloride has been documented at or above the AL, they will be informed of:

- 6.2.1 The requirements of 29 CFR 1910.1052, Methylene chloride, and information available in its Appendices;
- 6.2.2 The quantity, location, manner of use, release, and storage of methylene chloride;
- 6.2.3 The specific operations in the workplace that could result in exposure, noting where exposures may be greater than the PEL or STEL.
- 6.2.4 Employees will receive information and training at the time of initial assignment, and whenever there is a change in procedure that may result in a new exposure.
- 6.2.5 Affected employees will be re-trained as necessary to ensure that each employee exposed above the AL or the STEL maintains competency in the principles of safe use and handling of methylene chloride at the worksite.

## **7.0 Labels and Regulated Areas**

### **7.1 Labels**

7.1.1 The chemical manufacturer, importer, or distributor will ensure that each container is labeled according to the University's Hazard Communication Program.

7.1.2 Materials containing methylene chloride will also list the following health hazards:

- Cancer
- Cardiac effects (including elevation of carboxyhemoglobin)
- Central nervous system effects
- Liver effects
- Skin and eye irritation.

7.1.3 An example of a label that would satisfy this requirement would be:

- Danger
- Contains Methylene chloride.
- Potential Cancer Hazard. May worsen heart disease because methylene chloride is converted to carbon monoxide in the body.
- May cause dizziness, headache, irritation of the throat and lungs, loss of consciousness and death at high concentrations (for example, if used in a poorly ventilated room).
- Avoid skin contact. Contact with liquid causes skin and eye irritation.

7.1.4 It is the responsibility of the user to ensure that containers remain labeled with the identity and appropriate hazard warnings. Temporary containers require only the identity of the material if it is intended for immediate use (within one work shift) by an employee and must be returned to a container with appropriate warnings by the end of the work shift.

### **7.2 Regulated Areas**

7.2.1 Areas where the concentration of airborne methylene chloride exceeds either the PEL or STEL will be established as regulated areas. Regulated areas will be demarcated from the rest of the workplace in any manner (such as yellow barrier tape or signs) that adequately establishes and alerts employees to the boundaries minimizes the number of authorized employees exposed to methylene chloride within the regulated area..

7.3 Access will be limited to authorized employees. The employer will supply a respirator to each person who enters a regulated area and it will be worn whenever methylene chloride exposures are likely to exceed the PEL or STEL.

## 8.0 Medical Surveillance

- 8.1 A medical surveillance program will provide annual examinations for all employees who:
- 8.1.1 Are exposed to methylene chloride at or above the action level on 30 days or more per year or above the 8-hour TWA PEL or the STEL on 10 or more days per year;
  - 8.1.2 Above the 8-hour TWA PEL or STEL for any time period where an employee has been identified by the EH&S as being at risk from cardiac disease or from some other serious methylene chloride health condition and such employee requests inclusion in the medical surveillance program; and
  - 8.1.3 During an emergency.
- 8.2 Initial medical surveillance will be provided on or before the time of initial assignment.
- 8.3 Periodic medical surveillance will be provided as follows:
- 8.3.1 For employees 45 years and older, within 12 months of the initial surveillance.
  - 8.3.2 For employees younger than 45 years of age, within 36 months of the initial surveillance.
  - 8.3.3 When an employee terminates employment or is reassigned to an area where exposure to methylene chloride is consistently at or below the AL and STEL, medical surveillance will be made available if six months or more have elapsed since the last surveillance.
  - 8.3.4 Additional medical surveillance will be performed when recommended by the university physician.
- 8.4 The following information will be provided Human Resources by the Supervisor:
- 8.4.1 A copy of OSHA 29 CFR 1910.1052 (j)(8) including its applicable appendices;
  - 8.4.2 A EH&S description of the affected employee's past, current and anticipated future duties as they relate to the employee's methylene chloride exposure;
  - 8.4.3 The employee's former or current exposure levels or, for employees not yet occupationally exposed to methylene chloride, the employee's anticipated exposure levels and the frequency and exposure levels anticipated to be associated with emergencies;
  - 8.4.4 Information concerning any personal protective equipment and respiratory protection used or to be used by the employee; and
  - 8.4.5 Information from previous medical examinations of the affected employee within the control of NJIT.
- 8.5 All medical procedures will be performed by or under the supervision of a licensed physician and will be provided without cost to the employee, without loss of pay, and at a reasonable time and place. The details of the medical examination can be found in OSHA 29 CFR 1910.1052 (j)(5).
- 8.6 For each examination required under medical surveillance, the employer will obtain a written opinion from the university physician. This written opinion will contain the results of the medical examination except that it will not reveal specific findings or diagnoses unrelated to occupational exposure to methylene chloride.
- 8.7 The written opinion will be limited to:
- 8.7.1 Whether exposure to methylene chloride may contribute to or aggravate the employee's existing cardiac, hepatic, neurological or dermal disease;
  - 8.7.2 Whether any employee's health would be at increased risk of material impairment from exposure to methylene chloride;
  - 8.7.3 Any limitations upon the employee's exposure to methylene chloride, including removal from exposure, the use of respirators, and other protective equipment; and
  - 8.7.4 A statement that the employee has been informed that methylene chloride is a potential occupational carcinogen, of risk factors for heart disease, and the potential exacerbation of underlying heart disease by exposure to methylene chloride through its metabolism to carbon monoxide.

- 8.8 After consulting with Human Resource regarding the determination of medical removal from exposure to methylene chloride or any restrictions involved, the employee may designate a second physician to review any findings, determinations, or recommendations of the initial physician and have the second physician conduct examinations, consultations, and laboratory tests as necessary to evaluate the effects of methylene chloride exposure and to facilitate the review.

## **9.0 Personal Hygiene Practices**

### **9.1 Protective Equipment and Clothing**

- 9.1.1 Where needed to prevent methylene chloride-induced skin or eye protection, employers will comply with the provisions of OSHA 29 CFR 1910.132 (Personal Protective Equipment), 29 CFR 1910.133 (Eye and Face Protection) and NJIT Personal Protective Equipment Program.
- 9.1.2 Personal protective equipment and clothing which is resistant to methylene chloride will be selected. The employer will clean, launder, repair and replace all protective clothing and equipment as needed to maintain their effectiveness.

### **9.2 Eye washes and Showers**

- 9.2.1 If there is a chance that employees' skin may contact solutions containing 0.1 percent or greater methylene chloride, then washing facilities capable of removing methylene chloride will be conveniently located.
- 9.2.2 If there is a chance that employees' eyes may contact solutions containing 0.1 percent or greater methylene chloride, then eyewash facilities will be located within the immediate work area for emergency use.

### **9.3 Leak Detection and Preventative Maintenance**

- 9.3.1 For operations involving methylene chloride, the employer will implement a program to detect leaks and spills, including regular visual inspections.
- 9.3.2 Preventative maintenance of equipment, including surveys for leaks, will be undertaken at regular intervals. In work areas where spillage may occur, the employer will make provisions to contain up the spill, to decontaminate the work area, and to dispose of the waste.

### **9.4 Respiratory Protection**

- 9.4.1 Whenever feasible engineering and work practice controls (for example, local exhaust ventilation ) cannot reduce employee exposure below the PEL or STEL, the employer will continue to apply these controls to reduce employee exposures to the maximum extent feasible and will supplement them with respirators when required.
- 9.4.2 Respirators must be used:
- 9.4.2.1 When exposures meet or exceed the PEL,
  - 9.4.2.2 During periods necessary to install or implement feasible engineering controls,
  - 9.4.2.3 When work operations, such as maintenance and repair activities or vessel cleaning, for which the employer establishes that engineering and work-practice controls are not feasible,
- 9.4.3 In work operations for which feasible engineering and work practice controls are not yet sufficient to reduce employee exposure below the PEL, or during emergencies.
- 9.5 The use of respiratory protection will be in accordance with the NJIT Respiratory Protection Program, SOP S-5-6.
- 9.5.1 All workers must be medically evaluated by the University physician to determine the ability of the worker to perform the work while wearing a respirator.



9.5.2 Training in the care and use respirators and fit-testing will be conducted by EH&S for only those employees who are authorized by Occupational Health to wear a respirator. Any worker who is not authorized by the Occupational Health Unit will be prohibited from engaging in activities which may expose the worker to airborne methylene chloride at or above the PEL.

9.5.3 Appropriate respirators must be selected based upon employee exposure levels

9.5.4 The following types of respirators are appropriate for the indicated exposures:

Methylene chloride exposure (ppm)	Minimum respirator required <sup>1</sup>
Up to 625 ppm (24 X PEL)	Continuous flow supplied air respirator, hood or helmet.
Up to 1250 ppm (50 X 8-TWA PEL)	(1) Full face piece supplied-air respirator operated in negative (demand) mode, or (2) Full face piece self-contained breathing apparatus (SCBA) operated in negative pressure (demand) mode.
Unknown concentration, or above 5000 ppm (Greater than 200 X 8-hour TWA PEL)	(1) Continuous flow supplied-air respirator, full face piece , or (2) Pressure demand supplied-air respirator, full face piece , or (3) Positive pressure full face piece SCBA.
Firefighting	Positive pressure full face piece SCBA.
Emergency escape	(1) Any continuous flow or pressure demand SCBA, or (2) Gas mask with organic vapor canister.

(1. Respirators specified for use at higher concentrations may be used at lower concentrations.)

## 10.0 Record Keeping

10.1 EH&S maintains all documents relating to Methylene Chloride exposure including exposure assessments, air sampling data, respirator fit testing documentation and waste disposal manifests.

10.2 Human Resources retains the medical records relating to the medical surveillance program. All records are kept indefinitely.

## Definitions

**Action Level (AL):** A concentration of methylene chloride of 12.5 parts methylene chloride per million parts of air (12.5 ppm) calculated as an 8- hour time-weighted average (TWA) concentration.

**Authorized Person:** Any person required by work duties to be present in regulated areas, or authorized to do so by the NJIT.

**Methylene chloride:** The chemical substance, CH<sub>2</sub>Cl<sub>2</sub>, Chemical Abstracts Service Registry No. 75-09-2. Methylene chloride is used as a solvent, especially where high volatility is required. It is a solvent for oils, fats, waxes, resins, rubber, and cellulose acetate. It is used as a laboratory reagent, in paint removers, in propellant mixtures for aerosol containers, as a solvent for plastics, as a degreasing agent, and as an extracting agent in laboratories and as a blowing agent in polyurethane foams, and in adhesives that require quick curing times. Its solvent property is sometimes increased by mixing with methanol, petroleum naphtha, or tetrachloroethylene.

**Initial Monitoring:** Identification of all employees who may be exposed at or above the action level or at or above the STEL and accurately determine the methylene chloride exposure of each employee so identified. Initial monitoring will be repeated each time there is a change in production, equipment, process, personnel, or control measures which may result in new or additional exposures to methylene chloride.

**Permissible Exposure Limit (PEL):** The allowable exposure that an employee can be exposed to over an 8-hour Time-Weighted Average (TWA). For methylene chloride, the limit is 25 parts per million (ppm).

**Periodic Monitoring:** The monitoring of employees shown by initial monitoring to be at or above the action level or at or above the STEL. The monitoring program will follow the table listed under Monitoring Strategy.

**PPM:** Parts per million.

**Short Term Exposure Limit (STEL):** A limit of 125 ppm of methylene chloride, averaged over a 15-minute period.

**Regulated Areas:** Areas where the concentration of airborne methylene chloride exceed the PEL or STEL. All entrances and access ways will be demarcated from the rest of the workplace in any manner that adequately establishes and alerts employees to the boundaries of the area and minimizes the number of authorized employees exposed within the regulated area.

**Time-weighted average (TWA):** The average exposure to methylene chloride an individual receives for a full eight-hour day.

Exhibit S- 4- 15 B

Methylene Chloride Requirements Matrix									
	12.5 ppm AL	25 ppm PEL <sup>2</sup>	125 ppm STEL	< 625 ppm	Unknown concentration.	0.1% or greater concentration.	Symptoms of Exposure	Eye Hazard	At any Level
Hazard Communication Training <sup>8,15</sup>	x	x	x	x		x			
Site-specific Training <sup>12,13</sup>	x	x	x	x	x				
Respirator <sup>3</sup>		x	x	x <sup>a</sup>	x <sup>b</sup>				
Med. Surv. <sup>10,11</sup>	x	x	x				x		x
Signs <sup>9</sup>		x	x						
Regulated Area <sup>9</sup>		x	x						
Waste Disposal <sup>1</sup>	x	x	x						x
Record keeping	x	x	x						x
Work Practices		x	x						
Hygiene Practices		x	x						
Engineering Controls		x	x						
Protective Clothing <sup>14</sup>									x
Contaminated PPE laundering <sup>14</sup>									x
Eye/ Face Protection <sup>14</sup>									x
Emergency Eyewash						x		x	
Emergency Shower						x			
Labels <sup>5</sup>									x
MSDS <sup>15</sup>									x
Initial monitoring <sup>6</sup>									x
Periodic monitoring <sup>7</sup>	x	x	x						
Preventative Maintenance and leak surveys									x
Housekeeping and leak detection inspections									x
Spill containment, decontamination									x
Medical Removal <sup>4</sup>	x								x
Written Hazcom Program <sup>8</sup>						x <sup>c</sup>			


1. Contact EH&S for more information.
2. Or exceeds the American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Value (TLV) of 50 ppm.

3. Includes medical surveillance, training, and fit testing.
4. If the employee is not exposed above the PEL, the physician will cite specific medical evidence rebutting the exposure. If clear medical evidence shows effects, the employee must be removed from exposure. If evidence is not sufficient, the employee does not have to be removed. When the physician's evidence shows methylene chloride exposure at any level may aggravate the employees existing cardiac, hepatic, neurological, or skin disease, the employee will be removed.
5. Labels will comply with Hazard Communication, 29 CFR 1910.1200(f). Also, the labels will contain hazards such as cancer, cardiac effects (including elevation of caboxyhemoglobin), central nervous system effects, liver effects, and skin and eye irritation. An example of a label that would meet the requirements would be

**"Danger. Contains Methylene chloride. Potential Cancer Hazard. May worsen heart disease because methylene chloride is converted to carbon monoxide in the body. May cause dizziness, headache, irritation of the throat and lungs, loss of consciousness and death at high concentrations (for example, if used in a poorly ventilated room). Avoid skin contact. Contact with liquid causes skin and eye irritation".**

For laboratories falling under 29 CFR 1910.1450, see the University's Chemical Hygiene Plan.

6. Unless it can be shown by objective data that there will be no exposure at or above the action level or STEL under foreseeable conditions of use.
7. Repeat every 6 months if at or above the action level. If above STEL, repeat every year. Monitoring may be discontinued if results from 2 consecutive samples taken at least 7 days apart are below the action level and the STEL.
8. For work sites falling under Haz Com, refer to 1910.1200(g)(2)(i)(C)(1) for applicability. For laboratories falling under 29 CFR 1910.1450, refer to the University's Chemical Hygiene Plan.
9. Demarcate from the rest of the workplace in any manner that adequately establishes and alerts employees to the boundaries of the area and minimizes the number of authorized employees exposed within the regulated area.
10. At or above the action level on 30 or more days per year, or above the PEL or STEL on 10 or more days per year, or above the PEL or STEL for any time period where an employee has been identified by a licensed physician as being at risk from cardiac disease or from some other serious methylene chloride-related health condition and such employee requests inclusion in the medical surveillance program.
11. Provide annually from initial for employees >45 years old, if < 45 years old, provide every 36 months from initial. When employee terminates, or is no longer exposures at or below the action level and STEL, provide if six months have elapsed since last surveillance. Additional surveillance will be provided if in written medical opinion.
12. If exposure could be above the action level, the University will inform each affected employee of the quantity, location, manner of use, release, and storage of methylene chloride and the specific operations in the workplace that could result in exposure, noting where exposures may be > than the PEL or STEL.
13. Re-training will be provided as necessary to ensure each employee exposed above the action level or the STEL maintains the requisite understanding of the principles of safe use and handling of methylene chloride in the workplace.
14. Where needed to prevent methylene chloride-induced skin or eye irritation.
15. See 1910.1200(g)(2)(i)(C)(1) for applicability.
  - a. Continuous flow supplied-air respirator, hood or helmet.
  - b. Positive pressure full face piece SCBA or full face piece pressure demand supplied-air respirator with an auxiliary self-contained air supply.
  - c. For materials that have been determined to be health hazards, where the concentration is  $\geq 0.1$  % methylene chloride, and there is evidence that methylene chloride could be released in concentrations which would exceed the PEL or the American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Value (TLV), or could present a health risk to employees.

	<b>UNIVERSITY SAFETY ENVIRONMENTAL MANAGEMENT SYSTEM</b> University Heights Newark, New Jersey 07102	<b>Document Control No. USEMS SOP S - 4 - 16</b>
	<b>Document Title: Cadmium Control Plan 29CFR 1910.19(k) and 29CFR 1910.1027</b>	

## 1.0 Scope and Application

- 1.1 This plan applies to all University employees who are exposed or potentially exposed to Cadmium, its solutions, and materials that release Cadmium.
- 1.3 The University is dedicated to providing safe and healthful work facilities for students and employees, and complying with federal and State occupational health and safety standards. Engineering controls should be instituted to the maximum extent feasible to maintain exposures below permissible limits, followed by other control methods including work and hygienic practices, including the use of personal protective equipment such as eye, face, skin, and respiratory protection. Administrators, managers, faculty, staff and students all share responsibility for minimizing their exposure to Cadmium

## 2.0 Responsibilities

- 2.1 Department of Environmental Health & Safety (EH&S) will:
- Develop and distribute a written Cadmium Management Plan;
  - Provide or coordinate training for employees who are exposed to Cadmium. Employees who require training will be identified through exposure monitoring.
  - Conduct exposure monitoring and notify employees in writing of monitoring results within 15 days of receipt;
  - Maintain records of all training, exposure monitoring, and respirator fit testing;
  - Provide consultative technical guidance to personnel at all levels of responsibility concerning Cadmium, hazard evaluation, hazard control and hazard information; and
  - Annually review the Cadmium Management Plan for effectiveness and revise as necessary.
- 2.2 Human Resources
- Coordinate and direct all required or recommended medical surveillance for employees with Cadmium exposure;
  - Provide medical consultations and examinations for workers who have been overexposed or believe they may have been overexposed to Cadmium; and
  - Maintain medical records relating to consultations, examinations and medical surveillance as required by the Plan.
- 2.3 Department Environmental Health & Safety Officers (EH&SHO)
- Assist to identify locations where Cadmium is used or where building materials contain or may reasonably be expected to create Cadmium dust.
- 2.4 Department Heads, Supervisors and Principle Investigators will:
- Assure that all employees who have potential for exposure to Cadmium are evaluated by EH&S and made aware of the hazards associated with Cadmium; and
  - Insure control measures and personal protective equipment is appropriate for the situation.

- Assure employees understand the elements of the Cadmium Plan when it is determined by EHS& through surveys and monitoring that there is occupational exposure.
- Assure that employees are aware of the potential hazards associated with working with Cadmium and receive appropriate training.
- Notify EH&S when new research or processes are used that might result in Cadmium exposure and arrange for exposure monitoring through EH&S where needed to document exposure levels.
- Initiate medical surveillance for any employee who has Cadmium exposure in excess of regulated limits as determined by EH&S, who develops signs and symptoms of overexposure to Cadmium, or who is exposed to Cadmium in emergencies.
- Report any problem associated with implementation of the Cadmium Management Plan to EH&S.

#### 2.5 Individuals will:

- Comply with the provisions of the Cadmium Management Plan and work practices instituted by the Supervisor; and
- Report to their supervisor if they develop signs and symptoms of overexposure to Cadmium, or who are exposed to Cadmium in the course of an emergency.

### **3.0 Cadmium Assessment and Monitoring**

#### 3.1 The following processes or work operations may result in Cadmium exposure:

- 3.1.1 Any process that uses Cadmium.
- 3.1.2 Any operation that involves grinding, sanding, sawing, cutting, crushing, screening, sieving, or any other manipulation of a material that contains Cadmium and generates Cadmium-bearing dust.
- 3.1.3 Any processes where there have been employee complaints or symptoms indicative of exposure to Cadmium.
- 3.1.4 Any process that involves the heating of Cadmium.
- 3.1.6 Disposing or processing Cadmium waste.

#### 3.2 To conduct Cadmium assessments, EH&S requires an inventory of locations where Cadmium is used. This may be accomplished by:

- 3.2.1 Reviewing manufacturer's information.
- 3.2.2 Reviewing material safety data sheets (MSDS).
- 3.2.3 Reviewing Cadmium chemical waste inventories.
- 3.2.4 Checking historical use data.
- 3.2.5 Conducting walkthroughs of laboratories where there is Cadmium inventoried.
- 3.2.6 Reviewing laboratory signage data.
- 3.2.7 Any other type of pertinent data, including Human Resources notifications and employee complaints.

#### 3.3 Upon identification, EH&S will identify operations where Cadmium is used in a manner such that it may be released into the workplace atmosphere or contaminate the skin.

### **4.0 Exposure Assessment Methods**

#### 4.1 EH&S will use appropriate methods to assess Cadmium levels, which include:

- 4.1.1 Use of objective data. (i.e. previously documented information that confirms or rebuts Cadmium exposures at regulated concentrations).
- 4.1.2 Appropriate workplace contaminant sampling methods.

## 5.0 Monitoring Strategy

- 5.1 When there are different processes where employees may be exposed to Cadmium, EH&S will select a maximum risk employee. This will be accomplished by observing the worksite.
- 5.2 If measurements show exposure to Cadmium at or above the action level or the STEL, then all employees identified in the same group will be monitored.
- 5.3 TWA's are usually determined for an 8-hour work shift. A personal sampling pump is affixed to the employee and is collected at the end of the shift. The sample is then analyzed for Cadmium. STEL assessments are 15-min samples taken during periods of maximum expected concentrations. Multiple STEL measurements may be collected per shift, and only the highest concentration is used to represent the employee's STEL. Employee exposures determine the need for compliance with provisions of the regulation and the Cadmium Management Plan.

Exposure scenario	Require monitoring activity
Below the AL and at or below the STEL	No 8-hour TWA or STEL monitoring required
Below the AL and above the STEL	No 8-hour TWA monitoring required; monitor STEL exposures every three months
At or above the AL, at or below the TWA, and at or below the STEL	Monitor 8-hour TWA exposures every six months and monitor STEL exposures every three months
At or above the AL, at or below the TWA, and above the STEL	Monitor 8-hour TWA exposures every six months and monitor STEL exposures every three months
Above the TWA and at or below the STEL	Monitor 8-hour TWA exposures every three months. <sup>1</sup>
Above the TWA and above the STEL	Monitor 8-hour TWA exposures and STEL exposures every three months

- 5.4 NJIT may decrease the frequency of 8-hour TWA exposure monitoring to every six months when at least two consecutive measurements taken at least seven days apart show exposures to be at or below the 8-hour TWA PEL. NJIT may discontinue the periodic 8-hour TWA monitoring for employees where at least two consecutive measurements taken at least seven days apart are below the AL. NJIT may discontinue the periodic STEL monitoring for employees where at least two consecutive measurements taken at least 7 days apart are at or below the STEL.
- 5.5 Monitoring results determine the need and extent of employee training, hygiene procedures, personal protective equipment, follow-up monitoring, and medical surveillance.
- 5.6 Department heads, supervisors, or users may contact EH&S to initiate exposure monitoring in their worksites.

## 6.0 Training

- 6.1 All employees with any potential exposure to Cadmium must receive training to provide an understanding of hazards and protection methods. This training is a component of the Chemical Hygiene Program in laboratories and is addressed by the Hazard Communication Program in all other worksites. Please review these programs if Cadmium is present in your workplace.

- 6.2 Employees who are assigned to workplaces where exposure to Cadmium has been documented at or above the AL, they will be informed of:
- 6.2.1 A discussion of the contents of OSHA 29 CFR 1910.1027, Cadmium;
  - 6.2.2 An explanation of the specific material safety data sheet (MSDS) used in the work area;
  - 6.2.3 The purpose for and a description of the medical surveillance program including:
  - 6.2.4 A description of the potential health hazards associated with exposure to Cadmium and a description of the signs/symptoms of 19(k) and 1910.1027 exposure, and
  - 6.2.5 Instructions to immediately report to the Supervisor any adverse signs or symptoms that the employee suspects is attributable to Cadmium exposure;
  - 6.2.6 Description of operations in the work area where Cadmium is present and an explanation of the safe work practices appropriate to limit exposure to Cadmium in each job;
  - 6.2.7 The purpose for, proper use of, and limitations of personal protective clothing and equipment;
  - 6.2.8 Instructions for the handling of spills and emergencies;
  - 6.2.9 An explanation of the importance of engineering and work practice controls for employee protection and any necessary instruction in the use of these controls;
  - 6.2.10 A review of emergency procedures including the specific duties or assignments of each employee in the event of an emergency; and
  - 6.2.11 The location and availability of written training materials.
- 6.3 Employees will receive information and training at the time of initial assignment, and whenever there is a change in procedure that may result in a new exposure. EH&S will provide the training annually to each affected employee.

## **7.0 Labels and Regulated Areas**

### **7.1 Labels**

- 7.1.1 The chemical manufacturer, importer, or distributor will ensure that each container is labeled according to the University's Hazard Communication Program. This includes:
- 7.1.1.1 All mixtures or solutions composed of greater than 0.1 % Cadmium; and
  - 7.1.1.2 Materials capable of releasing Cadmium into the air, under reasonably foreseeable conditions of use, at concentrations reaching or exceeding 0.1 mg/m<sup>3</sup>.
- 7.1.2 Labels will include:
- 7.1.2.1 The identity of the hazardous chemical;
  - 7.1.2.2 Appropriate hazard warning; and
  - 7.1.2.3 Name and address of the manufacturer, importer, or distributor.
- 7.1.3 It is the responsibility of the user to ensure that containers remain labeled with the identity and appropriate hazard warnings.
- 7.1.4 Temporary containers require only the identity of the material if it is intended for immediate use (within one work shift) by an employee and must be returned to a container with appropriate warnings by the end of the work shift.
- 7.1.5 Materials capable of releasing Cadmium at levels between 0.1 mg/m<sup>3</sup> and the action level will also be labeled with the following additional information:
- 7.1.5.1 Identified as containing Cadmium;
  - 7.1.5.2 Name and address of the person responsible for the material; and
  - 7.1.5.3 State that physical and health hazard information can be found on the material safety data sheet.
- 7.1.6 For the materials listed above capable of releasing Cadmium at levels above the action level, labels will also:



- 7.1.6.1 Address all hazards as defined in OSHA 29 CFR 1910.1200 (d), Hazard Determination;
- 7.1.6.2 Address Appendices A and B, 29 CFR 1910.1200, including respiratory sensitization; and
- 7.1.6.3 Contain the words "Potential Cancer Hazard".

## 7.2 Signage

7.2.1 Areas where the concentration of airborne Cadmium exceeds either the PEL or STEL will be established as regulated areas. All entrances and access ways will be posted with a sign bearing the following information:

**DANGER**  
**CADMIUM**  
**IRRITANT AND POTENTIAL CANCER HAZARD**  
**AUTHORIZED PERSONNEL ONLY** for further information contact  
(Supervisor's name, location, phone) or the Dept. of Environmental Health & Safety 3059

## 8.0 Medical Surveillance

8.1 A medical surveillance program will provide annual examinations for all employees who:

- 8.1.1 Are exposed to Cadmium at or above the action level or the STEL.
- 8.1.2 Develop signs and symptoms of overexposure to Cadmium and for all employees exposed to Cadmium in emergencies. (When determining whether an employee may be experiencing signs and symptoms of possible overexposure to Cadmium, the employer may rely on the evidence that signs and symptoms will occur only in exceptional circumstances when airborne exposure is less than 0.01 mg/m<sup>3</sup> and when Cadmium is present in material in concentrations less than 0.1 percent.)

Note: Medical examinations will be provided as soon as possible to all employees exposed in an emergency.

8.2 The following information will be provided to the university physician by the supervisor:

- 8.2.1 A description of the affected employee's job duties as they relate to the employee's exposure to Cadmium;
  - 8.2.1.2 The representative exposure level for the employee's job assignment;
  - 8.2.1.3 Information concerning any personal protective equipment and respiratory protection used or to be used by the employee;
  - 8.2.1.4 Information from previous medical examinations of the affected employee within the control of the employer; and
  - 8.2.1.5 In the event of a non-routine examination because of an emergency exposure to Cadmium, the supervisor will provide to the physician as soon as possible a description of how the emergency occurred and the exposure the victim may have received.

8.3 All medical procedures will be performed by or under the supervision of a licensed physician and will be provided without cost to the employee, without loss of pay, and at a reasonable time and place. The details of the medical examination can be found in OSHA 29 CFR 1910.1027.

8.4 For each examination required under medical surveillance, the employer will obtain a written opinion from the University Health Center Occupational Health Unit. This written opinion will contain the results of the medical examination except that it will not reveal specific findings or diagnoses unrelated to occupational exposure to Cadmium.

8.5 A physician may authorize medical removal from exposure to Cadmium.

8.7 After consulting with the university physician regarding the determination of medical removal from exposure to Cadmium or any restrictions involved, the employee may designate a second physician to review any findings, determinations, or recommendations of the initial physician and have the second physician conduct examinations, consultations, and laboratory tests as necessary to evaluate the effects of Cadmium exposure and to facilitate the review.

## 9.0 Personal Hygiene Practices

- 9.1 Employees who are required to change from work clothing into protective clothing to prevent skin contact with Cadmium will be provided change rooms by their department.
- 9.2 Conveniently located sinks and quick drench showers will be used where employees' skin may become soiled. Employees must be aware of the location of the sink and shower and required to use it immediately.
- 9.3 Eyewash facilities must be placed within the immediate work area for emergency use if there is any possibility that an employee's eyes may be splashed with Cadmium.
- 9.4 Protective Equipment and Clothing
  - 9.4.1 Employees will comply with the provisions of OSHA 29 CFR 1910.132 (Personal Protective Equipment), 29 CFR 1910.133 (Eye and Face Protection) and the NJIT's Personal Protective Equipment Program.
  - 9.4.2 Personal protective equipment and clothing will be selected based on the form of Cadmium encountered, the conditions of use, and the hazard presented.
  - 9.4.3 All eye and skin contact with Cadmium will be prevented by the use of protective clothing made of material impervious to Cadmium and the use of other personal protective equipment, such as goggles, face shields and respirators, as appropriate to the operation. Clothing selection will be made using clothing resistance guides found in manufacturer's literature.
  - 9.4.4 Where a face shield is worn, chemical safety goggles are also required if there is a danger of Cadmium reaching the eye.
- 9.5 Maintenance of Protective Equipment and Clothing
  - 9.5.1 The PI will assure that protective equipment and clothing contaminated with Cadmium are cleaned and laundered before reuse.
  - 9.5.2 When ventilating Cadmium-contaminated clothing and equipment, the PI will establish a storage area so that employee exposure is minimized.
  - 9.5.3 Containers for contaminated clothing/ equipment and storage areas will have labels and signs containing the following information:

<p><b>DANGER</b> <b>CADMIUM-CONTAMINATED [CLOTHING] EQUIPMENT</b> <b>AVOID INHALATION AND SKIN CONTACT</b></p>
--

- 9.6 The PI will inform any person who launders, cleans, or repairs such clothing or equipment of Cadmium's potentially harmful effects and of procedures to safely handle the clothing and equipment.
- 9.7 Housekeeping and Preventative Maintenance
  - 9.7.1 For operations involving Cadmium solutions, the PI will implement a program to detect leaks and spills, including regular visual inspections.
  - 9.7.2 Preventative maintenance of equipment, including surveys for leaks, will be undertaken at regular intervals. In work areas where spillage may occur, the PI will make provisions to contain the spill, to decontaminate the work area, and to dispose of the waste.

## 9.8 Respirators

9.8.1 Whenever feasible engineering and work practice controls (for example, local exhaust ventilation) cannot reduce employee exposure below the PEL or STEL, the PI will continue to apply these controls to reduce employee exposures to the maximum extent feasible and will supplement them with respirators when required.

9.8.2 Respirators must be used:

9.8.2.1 When exposures meet or exceed the PEL,

9.8.2.2 During periods necessary to install or implement feasible engineering controls,

9.8.2.3 When work operations, such as maintenance and repair activities or vessel cleaning, for which the employer establishes that engineering and work-practice controls are not feasible,

9.8.2.4 In work operations for which feasible engineering and work practice controls are not yet sufficient to reduce employee exposure below the PEL, or

9.8.2.5 During emergencies.

9.8.2.6 The use of respiratory protection will be in accordance with the NJIT Respiratory Protection Program. All workers must be medically evaluated by the university physician to determine the ability of the worker to perform the work while wearing a respirator.

9.8.2.7 Training in the care and use respirators and fit-testing will be conducted by EH&S for only those employees who are authorized by a physician to wear a respirator.

9.8.2.8 Any worker who is not authorized will be prohibited from engaging in activities which may expose the worker to airborne Cadmium at or above the PEL.


9.9 Appropriate respirators must be selected based upon employee exposure levels.

## 10.0 Record Keeping

10.1 EH&S maintains all documents relating to Cadmium exposure including exposure assessments, air sampling data, respirator fit testing documentation and waste disposal manifests.

10.2 Human Resources retains the medical records relating to the medical surveillance program.

10.3 All records are kept indefinitely.

	<p style="text-align: center;">UNIVERSITY SAFETY ENVIRONMENTAL MANAGEMENT SYSTEM University Heights Newark, New Jersey 07102</p>	
		<p style="text-align: center;"><b>Document Control No. USEMS SOP S - 4- 17</b></p>
<p><b>Document Title: Asbestos Safety</b></p>		

## 1.0 Scope and Purpose

- 1.1 It is the policy of The New Jersey Institute of Technology to comply with the regulations of the State of New Jersey, the Public Entities Occupational Safety and Health Act (PEOSHA) and the United States Environmental Protection Agency (USEPA) that pertain to asbestos in the work place and environment. All contracted asbestos work (removal, disposal or laboratory) will be approved and supervised by the Facilities Department. All work activities involving the management of asbestos at the University must adhere to the guidelines set forth in the NJIT Asbestos Management Program and all applicable rules and regulations.
- 1.2 This program is for the specific purpose of controlling and managing Asbestos Containing Material (ACM) and potential exposures to employees and contractors working at NJIT. Employees of the university and designated supervisors of outside employees whose work may involve existing ACM on the NJIT Campus must be informed of the Asbestos Management Policy and the associated guidelines in the Asbestos Management Program prior to commencement of work. Outside employers are required to follow the guidelines contained herein. Copies of the Policy and Program can be obtained from the Department of Environmental Health and Safety and Facilities.
- 1.3 Please refer to Standard operating Procedure E – 5 – 1 Asbestos for guidelines on environmental requirements pertaining to asbestos.

## 2.0 Federal and State Laws

- 2.1 Federal, state, and local government regulations govern removal of ACM within the State of New Jersey. OSHA Standard 29 CFR 1910.1001 addresses asbestos from the occupational health standpoint, by specifying limitations of workers' exposure through engineering controls, protective equipment, monitoring and training. The OSHA standard also provides requirements for the specifications and posting of caution signs and labels and respiratory protection guidelines. The USEPA regulates the emission standard for asbestos (40 CFR Part 61, Subpart M) and addresses the requirements for the manufacturing, application, removal, and disposal of asbestos. The sections of the USEPA regulations that pertain to the University are those which govern removal from renovation or demolition areas and the disposal of asbestos.

## 3.0 Responsibilities

- 3.1 Director of Environmental Health and Safety
- The Director of Environmental Health and Safety will review project sites as deemed necessary for the purpose of determining NJDOL / OSHA compliance.
  - The University's Safety Manager will ensure that all outside employers hired for asbestos work possess appropriate credentials.
  - Conduct Asbestos Awareness training for any employee that may be potentially exposed.
  - Ensure the issuance of appropriate Personal Protective Equipment (PPE) to all potentially exposed university personnel prior to commencement of asbestos work.

### 3.2 NJIT Project Managers, Maintenance and Custodian Managers and Supervisors

- NJIT Project Managers, Maintenance Supervisors, Custodial Supervisors are required to contact the Department of Environmental Health and Safety for a determination of "asbestos project" status.
- This notification must occur prior to work commencing.
- Managers and supervisors must notify The University Safety and Director of Environmental Affairs immediately upon discovery of material suspected of containing asbestos which would be disturbed by work activity.

### 3.3 Facilities Department

- Assure all bid packages contain information on the location Asbestos Containing Material.
- The Facilities Department will designate the "competent person" for all in-house asbestos projects.

### 3.4 Employees and Staff

- Employees and staff of the university must notify their supervisor immediately upon discovery of material suspected of containing asbestos which would be disturbed by work activity.

### 3.4 Outside Contractors

- Outside asbestos contractors must notify the Director of Environmental Affairs and the Director of Environmental Health and Safety with the name of the designated "competent person" for each university asbestos project.
- The "competent person" person will serve as the responsible, on-site party and assume regulatory responsibility for all asbestos work performed.
- Employees of contractors must notify their supervisor immediately upon discovery of material suspected of containing asbestos which would be disturbed by work activity.

## 4.0 Asbestos Projects

4.1 An Asbestos Project, for the purpose of this program, is defined as any activity that may result in the disturbance of Asbestos Containing Material (ACM), even if unintentionally. This could involve projects whose main focus is not ACM, but which are undertaken in an area where ACM is present and may be disturbed.

### 4.2 Asbestos Work Performed by Outside Employers

4.2.1 All outside contractors are required to state their Asbestos Qualifications which will reviewed by the Director of Environmental Health and Safety prior to asbestos work commencing.

4.2.2 All outside employers performing asbestos work must notify the Director of Environmental Health and Safety or delegate with the name of the designated "competent person" for each University asbestos project.

## 5.0 Identification of Asbestos

5.1 An accredited inspector identified installed asbestos on campus. All related records and reports resulting from the identification are maintained by the Facilities Environmental shop. Records and information on ACM will be kept for as long as the University owns the building.

5.2 NJIT conducted building assessments that determined the presence, location and quantity of ACM. In the event of a project involving demolition of all or a portion of a structure in which ACM is present, a building survey will be conducted by a DOL certified worker, prior to commencement of work. Risk assessments were completed and recorded as part of the building survey.

5.3 NJIT has demonstrated that Presumed Asbestos Containing Material (PACM) did not contain asbestos by taking samples and performing laboratory tests. Such tests included analysis of bulk samples collected in

the manner described in 40 CFR 763.86. The tests, evaluation and sample collection were conducted by an accredited inspector.

## **6.0 Asbestos Monitoring**

6.1 An initial exposure assessment in areas containing ACM will be conducted before the start of a planned asbestos project. This assessment will evaluate potential releases may of the permissible exposure limit (PEL) and will be conducted by a certified industrial hygienist. Initial monitoring is not required if objective data exists to demonstrate that asbestos will not be released in excess of the PEL. Monitoring services will be hired and supervised by the Director of Environmental Health and Safety.

## **7.0 Notifications**

7.1 Three forms of notice regarding asbestos work are required. They are:

- Employee;
- Discovery, and
- Regulatory.

7.2 Employee Notice

7.2.1 University housekeeping employees working in buildings with installed ACM who may be potentially exposed, will receive Asbestos Awareness training, conducted by the Director of Environmental Health and Safety.

7.2.2 This training will be provided upon hire and minimally contains the following elements:

- Health effects of asbestos
- Locations of ACM or PACM in the building
- Recognition of ACM/PACM damage or deterioration
- PEOSHA / OSHA Standard requirements related to housekeeping
- Proper response to fiber release episodes

7.2.3 In accordance with the Right To Know and Hazard Communication Programs and 29 CFR 1910.1200(e)(2), asbestos related information will be provided to outside employers whose employees may be potentially exposed to ACM. Outside employers are defined as employers, who are not employees of NJIT, yet perform a job or a service on university operated property. This will be accomplished by including information all bid packages.

7.3. Discovery Notice

7.3.1 Employees of the university and employees of contractors must notify their supervisor immediately upon discovery of material suspected of containing asbestos which would be disturbed by work activity. Such work activity includes, but is not limited to: cutting or sawing, drilling, sanding, grinding, or stripping.

7.3.2 University supervisors must immediately notify the University safety and Director of Environmental Affairs upon discovery. Outside contractor supervisors must immediately notify the university Project Manager, who will then contact the University Safety and Director of Environmental Affairs.

7.3.3 Any work already begun which could disturb the PACM and cause it to become airborne must be immediately terminated. All such work will be postponed until authorization to proceed has been issued by the Director of Environmental Health and Safety.

#### 7.4 Regulatory Notice

- 7.4.1. Notice to regulatory authorities is required if the university or its contractor proposes to conduct an asbestos project involving quantities of ACM in excess of specified thresholds. The Director of Environmental Health and Safety will notify the appropriate regulatory offices when required. One copy of the notification will be sent to University Safety and Environmental Program Director.

### 7.0 Labeling and Signage

- 7.1 The Director of Environmental Health and Safety will ensure that required labeling and signs are deployed at the university.

#### 7.2 Regulated Areas

- 7.2.1 Warning signs must identify all regulated areas, which are defined as having airborne concentrations of asbestos which exceed or there is a reasonable possibility that exposures may exceed the PEL. Regulated areas may also include areas in and adjacent to which certain classes of work (29 CFR 1926.1101(b)) involving the actual or likely disturbance of ACM is conducted. Only certified asbestos workers who have appropriate PPE may enter regulated areas.

#### 7.3 Warning Labels

- 7.3.1 Warning labels must be affixed to all raw materials, mixtures, scrap, waste, debris and other products containing asbestos fibers or to their containers.
- 7.3.2 These labeling requirements do not apply where the asbestos fibers have been modified by a binding agent, coating, binder or other material, provided that during their reasonably foreseeable use handling, storage, disposal, processing or transportation, no airborne concentrations of fibers of asbestos in excess of the PEL and/or excursion limit will be released.
- 7.3.3. The requirements also do not apply to products with an asbestos concentration of less than one percent (1%).

#### 7.4 Installed ACM/PACM Labeling

- 7.4.1. The following labeling requirements are required on campus.
- Installed asbestos products must bear a visible label where feasible.
  - A color-coded system will be used on linear asbestos materials (i.e. pipe runs).
  - Blue color-coding will indicate asbestos-free insulation and yellow color-coding will indicate asbestos containing material.
  - The entrance to mechanical rooms or areas that contain thermal system insulation and surfacing ACM are posted with a sign identifying this.
  - Placing labels on ACM floor, ceiling and wall tiles and unexposed ACM may not be feasible. These areas will have a small sticker placed on the doorjamb of the space indicating installed ACM.
  - Information about ACM surfacing materials can be found in the building's asbestos binder or by contacting the Director of Environmental Health and Safety.

## 7.5 Label and Sign Specifications

7.5.1 Labels must conform to current USEPA specifications and shall be printed in letters of sufficient size and contrast as to be readily visible and legible. Warning signs must bear the following information:

**DANGER ASBESTOS**  
**CANCER AND LUNG DISEASE HAZARD**  
**AUTHORIZED PERSONNEL ONLY**  
**RESPIRATORS AND PROTECTION CLOTHING ARE REQUIRED IN THIS AREA**

7.5.2 Labels on Asbestos Containing Material must bear the following:

**DANGER**  
**CONTAINS ASBESTOS FIBERS**  
**AVOID CREATING DUST**  
**CANCER AND LUNG DISEASE HAZARD**

## 7.6 Transportation and Disposal of Waste

- 7.6.1 Contractors that remove ACM from the premises of the university must comply with all federal, state and local regulations regarding the proper handling and disposal of the waste containing asbestos.
- 7.6.2 ACM waste generated at the university by university activities will be collected by qualified person for transportation by qualified waste haulers with valid NJDEP permits. Copies of all related permits must be provided to the Director of Environmental Affairs at the time of contract.
- 7.6.3 ACM waste at greater than 20% solids will be disposed of in a permitted by NJDEP.
- 7.6.4 The Director of Environmental Affairs will ensure that all contractors and disposal sites are regularly reviewed and are appropriately permitted.

## 8.0 Custodial Activities

- 8.1 The following guidelines must be incorporated into ACM flooring material care Standard Operating Procedures (SOPs) for custodial staff.
- 8.2 These guidelines must also be followed by outside employers hired by the University to perform ACM flooring material care.
- 8.3 Custodial supervisors are responsible for supplying proper equipment and supplies;
- 8.4 The Director of Environmental Health and Safety is responsible for providing and documenting training; and ensuring procedures are adhered to.
  - 8.4.1 All ACM floors must be stripped and scrubbed by wet methods (water with detergent or stripper).
  - 8.4.2 Floor machines must use low abrasion pads and operate at 300 rpm or less. Buffing and burnishing activities must include the use of low abrasion pads.
  - 8.4.3 Only floors with at least three coats of wax finish may be burnished.



## 9.0 Asbestos Emergencies

9.1 In the event an emergency situation mandates that work be performed that involves ACM, the following special procedures will apply:

- A. All work must be halted and potentially exposed individuals removed from the area until permission to return is given by the Director of Environmental Health and Safety or designee.
- B. During regular working hours, the employee or outside employer will notify the university Project Manager and the Director of Environmental Health and Safety or designee. After regular working hours, the employee or contractor must notify the Public Safety Office. In any event, the Director of Environmental Health and Safety shall be immediately contacted for regarding the situation.
- C. Any unexpected or uncontrolled release of friable asbestos above the reportable quantity of one (1) pound must be immediately reported to Director of Health and Safety Compliance
- D. Assurance who will notify the National Response Center. Any release which goes off-site must also be reported to NJ DEP by the Director of Environmental Health and Safety.
- E. Based on the nature of the emergency, the Director of Environmental Health and Safety will then go to the emergency scene and will grant or deny permission to conduct the requested work.
- F. If permission to conduct the work is denied, the procedures outlined in Sections 4.0 -7.0 will apply.
- G. If permission to proceed is granted, job parameters will be set and monitored by the Director of Environmental Health and Safety
- H. Emergency notification to the regulatory agencies will be made, when appropriate, by the Director of Environmental Health and Safety as soon as practical after identification of the project.

## 10.0 Training

10.1 Training and appropriate personal protective equipment (PPE) are essential to limiting exposure to asbestos fibers.

10.2 All applicable rules and regulations related to both items must be strictly followed by all employees at the University.

10.3 The Occupational Safety and Health Administration (OSHA) has categorized work performed by asbestos workers into four classes.

10.4 Ordinarily, NJIT employees will not be asked to perform asbestos abatement projects.

10.5 Certifications must be verified by the Director of Environmental Health and Safety and be current and available for inspection during work on the project.

10.6 Class IV asbestos jobs will be conducted by employees trained in the University's Asbestos Awareness program.

- a. University asbestos policy and program;
- b. Responsibility for reporting asbestos incidents;
- c. Occupational health pertaining to asbestos; and
- d. Occupational safety and environmental health regulations (DOL, OSHA, USEPA).

10.7 New Facilities employees will receive this training within 60 days after hire.

10.8 All related university training records will be maintained by the Department of Environmental Health and Safety

## 11.0 Personal Protective Equipment

- 11.1 The Director of Environmental Health and Safety will ensure the issuance of appropriate Personal Protective Equipment (PPE) to all potentially exposed university personnel prior to commencement of asbestos work.
- 11.2 PPE must be used and maintained as directed during in-service training.
- 11.3 PPE must be worn throughout the asbestos project until the ACM waste has been double bagged and sealed.
- 11.4 While performing work, if an employee needs to remove PPE, they must first leave the asbestos work area to the decontamination area. Reentry to the work site is permitted only after the worker has donned the required PPE.
- 11.5 The Director of Environmental Health and Safety will ensure that all Facilities Department personnel who are required to perform asbestos abatement work will:
- A. Receive periodic in-service training pertaining to safe asbestos handling and procedures such as glove bagging and the proper use of personal protective equipment, including fit-test for respirators.
  - B. Have baseline and annual medical examinations conducted and work/medical histories performed.
- 11.6 The Director of Environmental Health and Safety will maintain all related documentation. Facilities Department personnel must wear PPE whenever the Director of Environmental Health and Safety deems it necessary.
- 11.7 All personnel refusing or neglecting to wear the required equipment will be subject to appropriate disciplinary action.
- 11.8 PPE may include (but, not limited to) any or all of the following: protective clothing (Tyvek suit) and boots, appropriate gloves, respirator, and safety goggles/glasses.

**Definitions**

**AC**  
**M:**  
(asbe

stos containing material), any material containing more than 1% asbestos (by weight)

**AIHA:** American Industrial Hygiene Association

**asbestos:** any naturally occurring hydrated mineral silicate separable into commercially usable fibers, including chrysotile (serpentine), amosite (cummingtontonite-grunerite), crocidolite (riebeckite), tremolite, anthrophyllite and actinolite

**asbestos project:** work undertaken which involves the removal, encapsulation, enclosure or disturbance of friable asbestos or any handling of asbestos material that may result in the release of asbestos fiber

**CIH:** certified industrial hygienist

**competent person:** the responsible, on-site person who assumes regulatory responsibility for work performed

**NJDEP:** New Jersey Department of Environmental Protection

**NJDOL:** New Jersey Department of Labor

**USEPA:** United States Environmental Protection Agency

**friable:** the condition of crumbled, pulverized, powdered, crushed or exposed asbestos which is capable of being released into the air by hand pressure

**OSHA:** Occupational Safety and Health Administration


**outside employer:** employers, who are not employees of NJIT, yet perform a job or a service on University-operated property

**PACM:** presumed ACM; thermal insulation, sprayed on or troweled on surfacing material and debris in work areas where such material is present

**PEL:** permissible exposure limit; 0.1 fibers/cubic centimeter for asbestos

**PEOSHA:** Public Entities Occupational Safety and Health Act

**surfactant:** a chemical wetting agent added to water to improve its penetration

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		<b>Document Control No.  USEMS SOP S – 4 - 18</b>
<b>Document Title: Welding Cutting and Burning Control Plan  29CFR 1910.252-257</b>		

## 1.0 Scope and Application

- 1.1 New Jersey Institute of Technology academic and research laboratories As well as operations including Facilities Management and outside contractors are often involved in welding, cutting, and burning using an open torch, brazing or similar operations of *Hot Work* during daily activities.
- 1.2 The Director of Environmental Health and Safety is responsible for coordinating an effective fire safety management program for university facilities. The primary objective is to protect human health and the environment and ensure compliance with university, local, state, and federal regulations. Hot work operations may create hazardous conditions and fire danger. To adequately address hazards all personnel involved in Hot Work operations must follow this guideline. This will help ensure compliance of applicable codes and regulations, and promote a safe environment.

## 2.0 Responsibilities

### Director of Environmental Health and Safety

- Responsible for reviewing activities and issuing hot work permits for activities conducted by university department employees as well as contractors.
- Provides reviews of ongoing Hot Work areas for annual permits.
- Identifies at-risk job tasks, conducting employee exposure assessments, exposure monitoring, designing/evaluating engineering controls and safe work practices, defining regulated areas, personal protective equipment requirements, conducting respirator fit testing, waste disposal, training, and record keeping.
- Coordinates the disposal of regulated materials.
- Periodically reviews and updates this guideline.
- Provides staff training on Hot work Permits and related fire safety.

### Department Safety and Environmental Health Officers (DESHO)

- Responsible for understanding Hot Work Permit requirements.
- Confirms a Hot work permit exists for work involving opening torch burning, welding, cutting, brazing, use of propane heaters is conducted.

### Principle Investigator

- Responsible for Obtaining Hot work Permits for research areas.
- Maintains fire prevention practices consistent with the requirements of this SOP and prevents uncontrolled fires from occurring. Notifies the DESHO of unusual conditions or changes in work practices that would compromise an existing Hot Work Permit.

#### Department Supervisors

- Understand the requirements of the Hot Work Permit program.
- Assures that all employees performing Hot Work participate in the required education programs.
- Assures the department maintains fire prevention practices consistent with the requirements of this SOP and prevents uncontrolled fires from occurring. Notifies the DESHO of unusual conditions or changes in work practices that would compromise an existing Hot Work Permit.
- Pre-assesses the status of the workspace prior to requesting a Hot Work Permit Inspection from EH&S.
- Wears the required personal protective equipment while welding, cutting, burning or brazing.

#### Employees and Staff

- It is the responsibility of the welders, cutters, and their supervisors to ensure the following fire protection and prevention procedures are applied to all Hot Work operations.
- Participate in Hot Work and Welding safety training as required.
- Reports changes in conditions that impact the status of the Hot Work Permit and fire safety.

#### Contractors

- The contractor will apply to the NJIT Department of Environmental Health and Safety (EH&S) for application to conduct all hot work. Application will be filed for all work in addition to any permits that are required by other agencies; city, state, and local.
- Application will be made prior to any work beginning. If required, the fire alarm and detection system(s) will be disabled by the Facilities Department prior to the time work begins. All shutdowns must be scheduled through the NJIT Public Safety and EH&S offices
- The contractor will follow all necessary precautions as indicated on the permits and provide proper training and resources to safely complete all assigned duties.
- All work will be fully explained during the application process and additional precautions may be specified by the NJIT EH&S Director at that time.

### **3.0 Requirements**

#### 3.1 Fire Protection and Prevention

- 3.1.1 It is the responsibility of the welders, cutters, and their supervisors to ensure the following fire protection and prevention procedures are applied to all Hot Work operations.
- 3.1.2 Remove all sources of ignition (combustible and flammable materials) from the work area/hazard zone. If all fire hazards cannot be removed, then appropriate shielding will be provided to prevent sparks, slag, or heat from igniting the fire hazards.
- 3.1.3 A fire watch will be provided during Hot Work activities and will continue for a minimum of 30 minutes after the conclusion of the operation. Individuals designated for the fire watch will have fire-extinguishing equipment readily available and must be trained in use and capabilities of such equipment.

### **4.0 Hot Work Area**

- 4.1 A Hot Work Area includes but is not limited to: brazing, cutting, grinding, soldering, thawing pipes, torch applied roofing, welding, the use of propane heaters, and the use of any pyrotechnic device.
- 4.2 A Hot Work Permit is not required in locations that have been identified by the Department of Environmental Health and Safety (EHS) as designated hot work areas.
- 4.3 Designated hot work areas are locations, such as, welding shops, or permanent work stations where hot work is a regular part of the process. Hot work permits will be issued in these areas on an annual basis, following a successful annual inspection. The area that will be exposed to sparks, hot slag, radiant or convective heat as a result of the Hot Work must be

- inspected prior to starting work to ensure the following:
- 4.3.1 Proper safety precautions/measures are taken to prevent fire danger. Inspection must confirm the Hot Work area is free of debris and that flammable liquids or vapors, lint, dust, or combustible materials/storage are not at risk of ignition from sparks or hot metal.
  - 4.3.2 Openings or cracks in walls, floors, ducts or shafts must be tightly covered to prevent passage of sparks or slag.
  - 4.3.3 A minimum of 2-A, 20BC fire extinguisher must be readily available (contractors must provide their own fire extinguishers which must be compliant with NFPA standard).
  - 4.3.4 Hot work equipment to be used will be in satisfactory operating condition and in good repair.
  - 4.3.5 Make sure welding and cutting is not taking place in flammable atmospheres, near large quantities of exposed readily ignitable materials, or in areas not authorized by management or the contractor's permit.
  - 4.3.6 Check that floors are free of combustibles for a radius of 35 feet. If the floor itself is a combustible material, it should be kept wet or otherwise protected. Where floors have been wet down, personnel operating arc welding or cutting equipment will be protected from possible shock.
  - 4.3.7 Any combustibles within 35 feet of the welding or cutting site should be protected with flame proofed covers or metal guards or curtains.
  - 4.3.8 Openings or cracks in walls, floors, or ducts will be tightly covered with fire retardant or noncombustible material if within 35 feet of the work to prevent the passage of sparks to adjacent areas.
  - 4.3.9 Conveyor systems that might carry sparks to distant combustibles will be shielded.
  - 4.3.10 If hot work is to be done on a wall, partition, ceiling or roof, precautions will be taken to prevent ignition of combustibles on the other side by relocating combustibles. If this is impractical, a fire watch on the other side of the work will be provided.
  - 4.3.11 Cutting or welding on pipes or other metal that is in contact with combustible walls, partitions, ceilings, or roofs will not be performed if close enough to cause ignition by heat conduction.
  - 4.3.12 The appropriate charged and operable fire extinguisher should be readily available.
  - 4.3.13 If hot work is done in close proximity to a sprinkler head, the sprinkler head will be protected from accidental discharge by an approved method. Once hot work is completed, the sprinkler head must be put back in service.

## **5.0 Hot Work Equipment**

- 5.1 Hot work equipment includes but not limited to, oxygen/fuel gas welding and cutting, ARC welding and cutting, and metal cutting equipment.
  - 5.1.1 Hot Work equipment must be inspected by the operator prior to use.
  - 5.1.2 Portable oxygen/fuel gas welding and cutting equipment located inside of a building must be stored in a well-ventilated dry location at least 20 feet from combustible materials and away from elevators, stairs, or means of egress.
  - 5.1.3 Emergency disconnects must be provided, e.g., a switch or circuit breaker must be provided to ARC welding equipment (the disconnect will be labeled "Emergency Disconnect" and must be visible).

## **6.0 Health/Safety Protection and Ventilation**

- 6.1 Contamination and exposure provisions must be established to monitor the work area conditions of the following:
  - 6.1.1 The material used to perform work has the potential of producing fumes that may pose exposure conditions to personnel. Must read and review Material Safety Data Sheets on products used for operation.

- 6.1.2 The dimension of the space vertically or horizontally confines movement of operation or restricts egress.
- 6.1.3 Number of Hot Work equipment and personnel performing the operation confine movement of operation or limit egress.
- 6.1.4 Inadequate ventilation for work area.
- 6.1.5 Whenever the area is considered a confined space. (Must follow NJIT SOP S-5-6 Confined Space Entry).

**Exhibit S 4 – 18 A**

**Sample Hot Work Permit**

**New Jersey Institute of Technology  
Department of Environmental Health and Safety**

Microsoft Office Word 2003.Ink **HOT WORKS PERMIT**

Before any job, task or operation associated with the following (producing heat, sparks, open flames and or smoke), this hot work permit is required to be filled out and signed by the operation supervisor who will be competent with regard to Hot Work. This permit must be posted at the operation site. If for any reason, the permit can not be fully completed or the precautions listed under this permit can not be met, hot work is prohibited.


Hot Work Done by:	Company/Contractor Name: <input type="text"/>	
<input type="checkbox"/> Contractor <input type="checkbox"/> Facilities Management		
Date:	<input type="text" value="09/01/2012"/>	
Work Order Number:	<input type="text"/>	
Enter Building where work will occur:	<input type="text"/>	
Enter Floor or Room where work will occur:	<input type="text"/>	
Nature of Work:	<input type="text"/>	
Hot Work Operator Name(s):	<input type="text"/>	
<b>I verify the information on this hot work permit is correct and, furthermore, that the above location has been examined for the precautions listed on this permit to prevent fire.</b>		
Name of Operations Supervisor:	First <input type="text"/>	Last <input type="text"/>
Contact No: <input type="text"/>	Fax: <input type="text"/>	Email: <input type="text"/>
Permit Request Effective Date:	<input type="text"/> (i.e. 09/09/12) Today is 09/01/12.	
Permit Request Estimated Start Time:	<input type="text"/> (i.e. 9:30)	



Permit Request Expiration Date:	(i.e. 09/09/12)
Permit Request Estimated Completion Time:	(i.e. 9:30)
<p><b>Final approval of this permit takes place ONLY after a supervisor has observed the location, signed and posted the permit. No hot work can take place until the Hot WORK Permit is signed..</b></p> <p><b>Questions or comments regarding this permit can be directed to the Director of Environmental Health and Safety.</b></p> <p style="text-align: center;"><b>IN CASE OF FIRE, DIAL 3111</b></p>	

***You must agree to adhere to the following precautions by checking each item.***

<input type="checkbox"/>	All equipment to be used has been inspected and is in good repair.
<input type="checkbox"/>	Floors and surrounding area are clear of combustible materials within 35 feet of the work area.
<input type="checkbox"/>	Materials that cannot be moved are protected with noncombustible material or cover.
<input type="checkbox"/>	Floor openings within 35 feet are tightly covered.
<input type="checkbox"/>	A responsible fire watcher has been assigned to watch for dangerous sparks in area, as well as floors above and below and will remain on the job site for 30 minutes after completion of hot work.
<input type="checkbox"/>	Appropriate fire extinguishing equipment is within 10 ft. of work site. (company/contractor provides their own fire extinguishing equipment)
<input type="checkbox"/>	The sprinkler system, where provided, is in service.
<input type="checkbox"/>	Appropriate arrangements have been made with Public Safety and Facilities to prevent the accidental activation of fire detection and alarm systems.
<input type="checkbox"/>	There are no flammable liquids, vapors, dusts, lint OR equipment containing such materials in the work area.

	UNIVERSITY SAFETY ENVIRONMENTAL MANAGEMENT SYSTEM University Heights Newark, New Jersey 07102	
		<b>Document Control No.  USEMS SOP S - 4- 19</b>
<b>Document Title: Powered Tools  29CFR 1910. 241, 242, 243 and 244</b>		

## 1.0 Scope and Application

- 1.1 Hand and power tools enable users to apply additional force and energy to accomplish a task. These tools improve efficiency and make better products. Because of the increased force of hand and power tools, the potential for injury increases.
- 1.2 NJIT has developed the Power Tool Safety program to help prevent such injuries from occurring when using hand and power tools. The program contains a [power tool inventory worksheet used to identify tools used in the various shops throughout the university.

## 2.0 Responsibilities

- 2.1 Department Supervisors, Faculty and Principal Investigator
- Periodically inspect the safe condition of tools and equipment used by employees, including tools and equipment which may be furnished by employees and students.
  - Ensure proper personal protective equipment and have employees wear it (e.g. safety glasses, hand and arm protection, hearing protection, etc.).
  - In general, all tools and blades must be in a good condition and have the appropriate guarding. Blades of a fan must be guarded when less than 7 feet off the floor or work level.
  - Retain all safe operating literature provided when new tools and equipment is purchased and delivered.
  - Ensure appropriate preventative maintenance is provided and follows the frequency specified by the manufacturer.
  - Train employees to select the right tools for each job.
  - Train employees and students on how to use the equipment safely.
- 2.2 Employees
- Participate in training programs as required.
  - Use the proper tool for the job at hand.
  - Use tools and equipment safely and according to manufacturer's instructions.
  - Wear appropriate personal protective equipment when using tools and equipment.
  - Inspect the tools prior to use and ensure it is in good condition.
  - Report any defects or problems to the supervisor.
- 2.3 Director of Environmental Health and Safety
- Assist departments to develop and implement
    - Employee education programs
    - Equipment inspection checklists

## 3.0 Procedures


- 3.1 Use the correct tool for the job. Do not use a tool or attachment for something it was not designed to do.

- 3.2 Select the correct bit, blade, cutter, or grinder wheel for the material at hand. This precaution will reduce the chance for an incident and improve the quality of your work.
- 3.3 Keep all guards in place. Cover exposed belts, pulleys, gears, and shafts that could cause injury.
- 3.4 Always operate tools at the correct speed for the job at hand. Working too slowly can cause an injury as easily as working too fast.
- 3.5 Watch your work when operating power tools. Stop working if something distracts you.
- 3.6 Do not rely on strength to perform an operation. The correct tool, blade, and method should not require excessive strength. If undue force is necessary, you may be using the wrong tool or have a dull blade.
- 3.7 Before clearing jams or blockages on power tools, disconnect from power source. Do not use your hand to clear jams or blockages, use an appropriate tool.
- 3.8 Never reach over equipment while it is running.
- 3.9 Never disable or tamper with safety releases or other automatic switches.
- 3.10 When the chance for operator injury is greatest, use a push stick to move material through a machine.
- 3.11 Disconnect power tools before performing maintenance or changing components.
- 3.12 Keep a firm grip on portable power tools. These tools tend to "get away" from operators and can be difficult to control.
- 3.13 Remove chuck keys or adjusting tools prior to operation.
- 3.14 Keep bystanders away from moving machinery.
- 3.15 Do not operate power tools when you are sick, fatigued, or taking strong medication.
- 3.16 When possible, secure work pieces with a clamp or vise to free the hands and minimize the chance of injury. Use a jig for pieces that are unstable or do not lie flat.
- 3.17 Compressed air shall not be used for cleaning purposes except where pressure is reduced to less than 3.18 30psi, and then only with safety glasses with side shields.
- 3.18 Tools must be equipped with appropriate safety switches (type is dependent on blade shank or wheel size) and must not be loaded until just prior to the intended firing time (e.g. nail gun).
- 3.19 In general, all tools and blades must be in a good condition and have the appropriate guarding. Blades of a fan must be guarded when less than 7 feet off the floor or work level.

## **4.0 Inspections**

- 4.1 Before using a tool, the operator shall inspect it to determine that all operating moving parts operate and that it is clean.
- 4.2 Any tool that is malfunctioning shall be immediately removed from service and the supervisor should be informed.
- 4.3 Any tool that has a damaged electrical cord or missing ground prong shall be immediately removed from service and the supervisor should be informed.

- 4.4 The supervisor should remove the tool from service, cut the cord off and dispose of it, or red tag the article and ship it off to be repaired.
- 4.5 Tools shall be inspected at regular intervals and shall be repaired in accordance with the manufacturers' specification.

	<b>UNIVERSITY SAFETY ENVIRONMENTAL MANAGEMENT SYSTEM</b> University Heights Newark, New Jersey 07102	
		<b>Document Control No. USEMS SOP S - 4- 20</b>
<b>Document Title: Industrial Powered Vehicles 29CFR 1910. 1978</b>		

## 1.0 Scope and Purpose

- 1.1 The purpose of NJIT Powered Industrial Vehicle Safety policy and program is to prevent accidents resulting from unsafe operation of the vehicles. NJIT's policy and program shall follow the provisions of Occupational Safety and Health Administration's General Industry Safety Standard, 29CFR 1910.178
- 1.2 This policy and program applies to all applicable employees of NJIT including full time, part time, temporary and student employees. Other persons doing work at NJIT and using university equipment, shall provide documentation from their employer that they have had current Powered Industrial Truck Training in accordance with the OSHA Powered Industrial Truck Standard.
- 1.3 Applications
- 1.3.1 Any mobile, power-driven vehicle used to carry, push, pull, lift, stack, or tier material or just travel. Vehicles that are commonly referred to as high lift trucks, counterbalanced trucks, rider trucks, forklift trucks, low lift trucks, low lift platform trucks, rough terrain forklift trucks, motorized hand trucks, pallet jack trucks, narrow aisle rider trucks, golf carts and club cars.
- 1.3.2 Rough Terrain Forklift Truck A wheeled-type truck which is designed primarily as a fork truck that has a vertical mast or pivoted boom, or both, which has variable fixed length reach and which may be equipped with attachments and that is intended for operation on unimproved natural terrain as well as the disturbed terrain of construction sites.
- 1.3.3 Vehicles primarily used for earth moving, snow removal, salting, man-lifts, or over-the-road haulage are not included in this program

## 2.0 Responsibilities

- 2.1 Department Supervisor, Principal Investigator
- Identify potential users of the powered vehicles and ensure the driver participates in the required driver training program.
  - Assure that no modification of equipment occurs without prior approval of EH&S and the manufacturer.
  - Assure that daily checks are being performed each shift the vehicle is being used.
  - At the end of the month, will send check sheets to EH&S.
  - Obtain and maintain signage at battery charging areas that no smoking is allowed.
  - Assure that eyewash stations are available if employee is servicing batteries.
  - Observe that vehicles are being operated safely.
  - Obtain an operators manual and keep it on file on each vehicle being used.
- 2.2 Employee:
- Operate only the vehicles for which they are certified.
  - Report an impairment of any physical qualification:
    - Vision problems that cannot be corrected by glasses or contacts.

- Impairment to one or more limbs.
- Insufficient height to operate the controls and have an unobstructed view over the controls and dashboard.
- Neurological disorders that affect balance or consciousness
- Lack of coordination between eyes, hands, and feet
- Taking medication that affects perception, vision, or physical abilities.

Note: The operator does not have to inform the supervisor of specific details regarding their condition, only that their ability to operate the PIT may be impaired.

- Verify, or complete, a PIT checklist at the beginning of each shift that the vehicle will be used.
- Verify load is within load limits of PIT.
- Perform repairs to PIT only if qualified.
- Board an over-the-road truck and trailer with a PIT (including powered pallet trucks) only if the truck and trailer has its brakes set and not less than 2 wheels blocked (chocked).
- Secure a dockboard before traveling over it.
- Visually inspect travel path for obstacles, grease, oils, ice, or other hazardous conditions. Employee may have to clean items from travel path before proceeding.
- Report all accident involving injury to an employee, or damage to buildings and equipment to the supervisor.
- Maintain clear access to fire aisles, to stairways and fire equipment when depositing loads.

#### 2.3 Environmental Safety and Emergency Management:

- Assist all departments in conducting initial, retesting and refresher training.
- Maintain training and inspection records for 3 years.
- Conduct random inspections of trucks, driving skills, daily checklists and equipment.

### 3.0 Operator Training

3.1 Only trained and authorized operators shall be permitted to operate a powered Industrial truck at NJIT.

3.2 An operator must be 18 years of age.

3.3 An operator must carry a valid US driver's license (copy to be provided to EH&S prior to training).

3.4 After demonstrating competency, as demonstrated by successful completion of the training evaluation Environmental Health and Safety will issue an operator's permit.

3.5 Training shall consist of a combination of:

- 3.5.1 Formal classroom instruction (e.g., lecture, discussion, interactive computer learning written material.) based on the OSHA Standard.
- 3.5.2 Practical training of the operator in the workplace by the supervisors or designee.
- 3.5.3 Trainees may operate a PIT without a permit for a period of 30 days under the direct supervision of a person who has the knowledge and experience in PIT operations. Such training will take place in a location that does not endanger the trainee or other employees.


3.6 Refresher training is required when the operator is observed:

- Performing an unsafe operation
- Involved in an accident or near-miss

- Evaluation indicates need
- Different type of equipment is introduced
- Workplace conditions change

3.7 Testing and Evaluation:

- 3.7.1 Evaluation of operator driving skill and performance on each type of trucks he or she could be expected to operate.
- 3.7.2 Evaluation of the operator's knowledge and skills by written and/or verbal testing
- 3.7.3 Each applicable employee shall meet the minimum requirements and shall be retested not less than every 3 years.
- 3.7.4 Documentation of Training: Permits shall be provided to employees who successfully complete the training to indicate that they have been trained and their skills have been evaluated. The permit shall be carried by the operator or be available upon request at all times during their working shift.

	UNIVERSITY SAFETY ENVIRONMENTAL MANAGEMENT SYSTEM University Heights Newark, New Jersey 07102	
		<b>Document Control No.  USEMS SOP S - 4- 21</b>
<b>Document Title: Laser Safety  29CFR 1910. General Duty</b>		

## 1.0 Scope and Purpose

- 1.1 The New Jersey Institute of Technology Laser Safety Program is intended to provide staff, researchers, students and visitors with a safe laser use environment.
- 1.2 This policy applies to all faculty, staff, students and visitors at the University that use lasers.
- 1.3 The Laser Safety Program was developed in accordance with a charge from the Senior Vice President of Administration and Treasurers office.

## 2.0 Responsibilities

### 2.1 Laser Safety Committee

- The NJIT Laser Safety Committee (LSC) sets NJIT laser safety policy and is responsible for laser safety enforcement.
- The committee reports directly to the Senior Vice President for Research
- The main functions are to identify and resolve safety concerns associated with laser use.
- The LSC is responsible for oversight of the program and coordinating with the Laser Safety Officer to assure compliance with all applicable laws and regulations.

### 2.2 Laser Safety Officer

- The Laser Safety Officer (LSO) reports to the Radiation Safety Officer (RSO) and is responsible for Laser Safety Program development, program implementation, and program compliance.
- The LSO is the technical advisor to the LSC regarding laser safety and regulatory affairs.
- The LSO is required to inform the committee of any safety concerns associated with the use of lasers.
- The LSO must investigate and approve all Laser Use Registrations (LUR).
- The LSO is required to:
  - Classify all constructed or modified laser systems;
  - Prepare and approve all LURs;
  - The LSO is authorized to conduct unannounced inspections.
  - Investigate laser incidents, and
  - Maintain all records associated with the Laser Safety Program.

### 2.3 Department Chairs

- Department Chairs are responsible for assuring their Principal Investigators that use lasers operate those lasers safely and implement the Laser Safety Program.

### 2.4 Principal Investigator (PI)

- Principal Investigators (PIs) are directly responsible for implementing the Laser Safety Program including:



- Implementation of specified hazard controls;
- Oversight and management of non-laser hazards;
- Informing the LSO of any changes that affect the laser users;
- Ensure that all laser users operating under his or her LUR have met the training requirements set forth by the Laser Safety Program.
- Wear appropriate personal protective equipment;
- Attend training;
- Train others that work in their laboratory;
- Develop a Laser Operation Procedure for their particular laser and conducting laser activities in a safe manner;
- Assure all laser users under their supervision conduct laser activities in a safe manner, and
- Assure that appropriate warning information is included on the sign that is required at the entry to the laboratory.

## 2.5 Laser Users

- Laser users are responsible for their own safety and the safety of others working in the laser facility.
- All users must meet the laser safety-training requirement within 30 days of joining the LUR (using the laser).
- All laser users are responsible for following the LUR specific hazard controls and notification requirements.
- Laser users are responsible for wearing appropriate personal protective equipment,
- Following the PI's written Laser Operation Procedure and conducting laser activities in a safe manner.
- Each registered user of a Class 3b or Class 4 laser is responsible for obtaining a laser eye exam.

## 2.6 Director of Environmental Health and Safety

- The DHSCA inspects lasers stations for compliance with this guideline and personnel safety.
- The DHSCA assists lasers users to select the correct eye protection.
- The DHSCA schedules eye exams for registered laser users per Section 4.2.2 of this guide.

## 3.0 Laser Use Registration (LUR)

- 3.1 The Laser Use Registration (LUR) is initiated by the Principal Investigator (PI) completing a LUR form (see Exhibit 23-1).
- 3.2 The completed form is sent to the LSO who contacts the PI to discuss the laser system and application.
- 3.3 The LSO has evaluates the LUR and provides the LUR to the Chair of the LSC for review.
- 3.4 After review, a copy of the LUR is sent to the PI.
- 3.5 LUR's are reviewed annually.
- 3.6 Modification of a LUR is usually done at the request of the PI. Under special circumstances, the LSC may modify a LUR.
- 3.7 Termination of a LUR is usually done at the request of the PI. Under special circumstances, the LSC may choose to terminate a LUR.
- 3.8 The LUR may be suspended by order of the LSC if the health or safety of staff is in immediate danger.
- 3.9 Documentation of all changes to a LUR are maintained by the LSO or his designee.

## 4.0 Procedures

### 4.1 Laser Safety Manual

4.1.1 NJIT has a written Laser Safety Manual describing the programs in detail and is regularly updated.

### 4.2 Eye Exams

4.2.1 The LSC establishes criteria for eye examinations (found in Exhibit 23-2). A baseline eye exam establishes a baseline against which ocular damage may be measured.

- 4.2.2 Laser eye exams are required for all Class 3b and 4 laser users within 60 days of first joining the LUR.
- 4.2.3 Additionally, laser eye exams will be performed after any suspected eye injury.
- 4.2.4 These examinations are performed by, or under the supervision of an ophthalmologist. Eye examinations are also required for laser workers when they leave the university. In the event of any accidental or suspected eye exposure to laser radiation, a thorough eye examination is conducted.

#### 4.3 Laser Inventory and Registration

- 4.3.1 All lasers and users must be registered with Laser Safety Officer.

#### 4.4 Hazard Controls

- 4.4.1 Applicable hazard controls are described in the Laser Safety Manual, depending upon the laser classification and operating conditions. All users are required to abide by the safety procedures and controls set out in the Laser Safety Manual.

#### 4.5 Beam Management

- 4.5.1 Laser beams must be restricted to the immediate location of use.
- 4.5.2 Beams should be enclosed whenever practical.
- 4.5.3 Beam blocks must be used to terminate beams.
- 4.5.4 The use of shutters, collimators, curtains, and other beam control devices are strongly encouraged.
- 4.5.5 It is the responsibility of the PI to verify through survey that appropriate beam management is being practiced.

#### 4.6 Laser Operation Procedures

- 4.6.1 Prior to acquiring or constructing a laser system, the Principal Investigator or faculty member will create and publish a Laser Operations Procedure (see Exhibit 23-3).

#### 4.7 Laser Warning Signs

- 4.7.1 All access points to the laser facility must be marked with the ANSI standard laser hazard signs that provide safety information to visitors and housekeeping personnel.
  - 4.7.2 Laser enclosures must be labeled to alert users to laser hazards as per the ANSI standard.
  - 4.7.3 Labels, laser hazard signs, and advice on their use are available from EH&S. Refer to Exhibit 23-4) for the LSC approved ANSI laser warning sign.
- The entry to each laboratory must have a room sign 4.7.2 Class 3 and 4 laser labs must also have signs that meet ANSI Z136.1-2000 requirements.
- 4.7.3 The principal investigator is responsible for assuring that appropriate warning information is included on the sign.

#### 4.8 Access Control

- 4.8.1 Whenever the laser is in operation, access to laser facilities is restricted to laser users or persons being escorted by laser users.
- 4.8.2 Access control must be maintained by positive means such as locked or interlocked doors. Laser warning signs alone are not considered sufficient to control access.

## 5.0 Laser Safety Training

- 5.1 All laser users must read the Laser Safety Manual, the Laser Safety Training Supplement, and the specific LUR.
- 5.2 Laser users must certify in writing that they have done so. The training certification document can be found in the Laser Safety Training Supplement.
- 5.3 Completed training certificates are sent to the LSO for review.
- 5.4 The LSO is responsible for maintaining a file of the training certificates.
- 5.5 Formal laser safety training presentations are available from the LSO upon request.
- 5.6 The LSC may direct a PI to obtain a formal laser safety training presentation for his/her users.
- 5.7 The LSO maintains documentation on all formal training presentations.

- 5.8 The PI shall also provide and document that all laser users operating under his/her LUR have received specific hands-on instruction in use of the laser system, safety precautions associated with the laser, any standard operating procedures (SOPs) relating to the laser, and proper use of laser protective eyewear.

## **7.0 Laser Inspections**

- 7.1 Periodically, all laser facilities are inspected by the LSO or his/her designee to assure that the lasers are being operated in a safe manner (see Exhibit 23-5).
- 7.2 Copies of the inspection reports are provided to the PI for his/her review.
- 7.3 The LSO maintains records of all inspections performed.
- 7.4 The PI is responsible to correct unsafe conditions in a timely manner.
- 7.5 The LSO or his/her designee will re-inspect the laser facility within 30 days to verify the correction of unsafe conditions.
- 7.6 The LSO informs the LSC of any uncorrected unsafe conditions. If a PI is unable to correct unsafe conditions in a timely manner, he/she may be asked to attend a LSC meeting to brief the LSC on the situation.

## **8.0 Personal Protective Equipment**

- 8.1 The PI shall provide his/her laser users with the appropriate laser protective eyewear (see Exhibit 23-6).
- 8.2 Laser protective eyewear must be used for beam alignments if the viewed beam exceeds the ANSI Z136.1 MPE (maximum permissible exposure) value.
- 8.3 Intra-beam viewing of lasers are not permitted on the NJIT campus. Exemptions from these policies may be only granted by the LSC.
- 8.4 Some ultraviolet (UV) laser uses may require the use of skin protection. Any need for skin protection will be identified by the LSO and communicated to the PI.

## **9.0 Laser Incidents**

- 9.1. The LSO and PI must be informed immediately of any suspected laser incidents. See Exhibit 23-7 for emergency procedures and emergency contacts.
- 9.2. Following the incident, the PI is responsible for filing an Employees Report of Injury form with the Human Resources office.
- 9.3 The LSO is responsible for investigating laser incidents, providing a report to the PI and the LSC, and maintaining records on incidents.

## **10.0 Recordkeeping**

- 10.1 Training records, inventory and registration documentation, incident reports, and inspection reports are maintained by the PI.
- 10.2 Records of individual eye exams are maintained by the PI and Human Resources.

## EXHIBIT S- 4- 21 A

### Definitions

**Accessible exposure limit (AEL)** - The maximum allowed power within a given laser classification.

**American National Standards Institute (ANSI)** - The technical body which releases the Z136.1 Standard for the Safe Use of Lasers. The secretariat for the Z136.X standard series is the Laser Institute of America (LIA).

**Average power** - The average power of a pulsed laser is the product of the energy per pulse (J/pulse) and the pulse repetition frequency (Hz or pulses/sec). The average power is expressed in Watts (J/sec).

**Coherent radiation** - Radiation whose waves are in-phase. Laser radiation is coherent and therefore very intense.

**Continuous wave (CW)** - A term describing a laser that produces a continuous laser beam while it is operating (verses a pulsed laser beam).

**Diffuse reflection** - When an incident radiation beam is scattered in many directions, reducing its intensity. A diffusely reflecting surface will have irregularities larger than the wavelength of the incident radiation beam. See specular reflection.

**Director of Environmental Health and Safety (DHSCA)** - The department responsible for the implementation of the Laser Safety Program.

**Intrabeam exposure** - Exposure involving direct on-axis viewing of the laser beam. Looking into the laser beam would constitute intrabeam exposure. NOTE: Intrabeam viewing of lasers is not permitted on campus.

**Infrared (IR) radiation** - Invisible radiation with a wavelength between 780 nm and 1 mm. The near infrared (IR-A) is the 780 to 1400 nm band, the mid infrared (IR-B) is the 1400 to 3000 nm band, and the far infrared (IR-C) is the 3000 nm to 1 mm band.

**Irradiance** - The power being delivered over the area of the laser beam. Also called power density, irradiance applies to CW lasers and is expressed in W/cm<sup>2</sup>.

**Laser** - Light Amplification by Stimulated Emission of Radiation. A monochromatic, coherent beam of radiation not normally believed to exist in nature.

**Laser user** - Any person who uses a laser for any purpose on the NJIT campus.

**Laser Safety Manual** - A document defining the NJIT Laser Safety Program. Copies are available from the Office of Radiation Safety.

**Laser Use Registration (LUR)** - The mechanism used by the Office of Radiation Safety to track lasers on campus. The LUR details the safety requirements for each Class 3a, 3b, and 4 laser.

**Laser Safety Committee (LSC)** - The campus academic committee that makes laser safety policy and oversees the Laser Safety Program.

**Laser Safety Officer (LSO)** - A member of the ORS staff, the LSO is responsible for implementation of the Laser Safety Program.

**Maximum permissible exposure (MPE)** - The maximum level of radiation which human tissue may be exposed to without harmful effect. MPE values may be found in the ANSI Z136.1 Standard.

**(Material) Safety Data Sheet (MSDS)** - A document, required by law, which is supplied by the manufacturer of a chemical. The (M)SDS details the hazards and protective practices required for protection from those hazards, as well as other information.

**Nominal hazard zone (NHZ)** - The area surrounding an operating laser where access to direct, scattered or reflected radiation exceeds the MPE.

**Optical density (OD)** - Also called transmission density, the optical density is the base ten logarithm of the reciprocal of the transmittance (an OD of 2 = 1% transmittance).

**Peak power** - The highest instantaneous power level in a pulse. The peak power is a function of the pulse duration. The shorter the pulse, the greater the peak power.

**Principal investigator (PI)** - The person directly responsible for the laser and its use. The PI has direct responsibility for all aspects of safety associated with his/her research and/or teaching.

**Radiant exposure** - The energy being delivered over the area of the laser beam. Also called energy density, radiant exposure applies to pulsed lasers and is expressed in J/cm<sup>2</sup>.

**Specular reflection** - Results when an incident radiation beam is reflected off a surface whose irregularities are smaller than the radiation wavelength. Specular reflections generally retain most of the power present in the incident beam. Exposure to specular reflections of laser beams is similar to intrabeam exposure. See diffuse reflection and intrabeam exposure.

**Standard operating procedure (SOP)** - A procedure that explains a standard procedure or practice. For lasers, SOPs usually deal with alignment procedures.

**Ultraviolet (UV) radiation** - Invisible radiation with a wavelength between 10 nm and 400 nm. The near ultraviolet (UV-A) is the 315 to 400 nm band, the mid ultraviolet (UV-B) is the 280 to 315 nm band, the far ultraviolet (UV-C) is the 100 nm to 280 nm band, and the extreme ultraviolet is the 10 to 100 nm band. Note: Wavelengths below 200 nm are absorbed in the atmosphere and are known as the vacuum ultraviolet.

**Visible Light** - Radiation that can be detected by the human eye. These wavelengths are between 400 and 780 nm. The colors (with approximate wavelengths) are: Violet (400 - 440 nm), Blue (440 - 495 nm), Green (495 - 545 nm), Yellow (545 - 575 nm), Orange (575 - 605 nm), and Red (605 - 780 nm).

**Exhibit S-4-21B**

**NJIT Laser Use Registration (LUR) Form**

(Submit this form to the Laser Safety Officer  
and send a copy to the Director of Environmental Health and Safety)

Date: \_\_\_\_\_ page: \_\_\_\_\_ of \_\_\_\_\_  
Name of Principal Investigator \_\_\_\_\_ phone #: \_\_\_\_\_  
Name of Laboratory Contacts \_\_\_\_\_ phone #: \_\_\_\_\_  
Names of Laser Users \_\_\_\_\_  
Department of Principal Investigator: \_\_\_\_\_

Laser Research Funding source (circle one) DOE other  
Building and Room Location of Laser: \_\_\_\_\_  
Make/Model of Laser: \_\_\_\_\_  
Laser Serial Number: \_\_\_\_\_ Type of Lasing Medium: \_\_\_\_\_

**LASER INFORMATION**

Laser Classification Marked on Laser (circle one) 3a 3b 4 none  
CW Pulsed  
Wavelength(s): \_\_\_\_\_(nm) Wavelength(s): \_\_\_\_\_(nm)  
Max. Op. Power: \_\_\_\_\_(W) Pulse durations: \_\_\_\_\_(sec)  
Avg. Op. Power: \_\_\_\_\_(W) Pulse frequency: \_\_\_\_\_(Hz)  
Max. Op. Energy: \_\_\_\_\_  
Avg. Op. Energy: \_\_\_\_\_

Beam Diameter at aperture: \_\_\_\_\_(mm)  
Beam Divergence: \_\_\_\_\_(mrad)

Laser Use (describe briefly):  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Please check all items that apply:

- |                                   |                               |
|-----------------------------------|-------------------------------|
| Use of Cryogenics _____           | Use of Pumping Laser _____    |
| Use of Compressed Gases _____     | Beam focusing Optics _____    |
| High Voltage Power Supplies _____ | Fabricated Laser _____        |
| High Voltage > 30 kVp _____       | Modified Laser _____          |
| Dye Laser _____                   | Freq. Doubling Crystals _____ |
| Exposed Beam Paths _____          | Tunable Laser _____           |
| High Noise Levels _____           | Invisible Beam _____          |
| Laser Cutting/Welding _____       |                               |

## **Exhibit S -4-21C**

# **NJIT Laser Eye Examination Policy and Procedure**

### **Statement of Policy**

Laser eye examinations are performed to identify those laser users which may have a predisposition for vision related injury and to meet the medical monitoring requirements of the ANSI Z136.1 Standard for the Safe Use of Lasers.

### **Requirement for Examinations**

Those laser users who have a reasonable potential of eye exposure to Class 3b or Class 4 laser beams are required to have eye examinations within 60 days of joining the Laser Use Registration (LUR). Eye examinations will also be performed on NJIT staff whenever a laser eye injury is suspected.

### **Responsibilities**

The Laser Safety Committee is responsible for developing and periodically reviewing the laser eye examination policy.

The Laser Safety Officer is responsible for implementing the laser eye examination policy. The LSO is responsible for identifying those laser users who are required to have examinations and providing a list of those users to the Principal Investigator (PI).

The Laser Safety Officer is responsible for maintaining a database of laser users and when they receive the examinations.

The PI is responsible for assuring that laser users identified by the LSO make appointments with their own doctor. If the laser user does not wish to use their vision care insurance to cover the cost of an examination, the PI is responsible for covering the cost.

### **Eye Examination Criteria**

Eye examinations include the following:

- Medical history of the eye and photosensitivity
- Visual acuity (far and near) for both eyes
- Macular function (Amsler grid)
- Color vision assessment
- Dilated retinal examination of both eyes
- Retinal photographs of both eyes (while dilated)

Examinations will be performed by professionally qualified personnel. Patients whose results fall outside of acceptable criteria will be referred for a comprehensive examination.

### **Procedure**

The LSO works with the PI to identify the laser users who need eye examinations and provides the PI with a written list of those users.

The PI informs the identified laser users and works with them to assure they schedule their eye examinations.  
The private practitioner performs the examination and completes the approved forms which are then returned to NJIT.  
The LSO maintains a database of users identified and when they had their examinations.

**Records**

Medical records and forms returned from private practitioners are maintained by NJIT. Results of examinations are the property of the person examined.  
The Office of Health & Environmental Safety maintains a database of laser users and the dates on which they received examinations.



**EXHIBIT S- 4-21D**

**EYE EXAM FORM (sample)  
OCULAR EXAM FOR LASER USERS**

(The form offered by the medical professional should be used.)

*Patient Note: If you have had a laser exam in the past year, it may satisfy the NJIT medical surveillance requirements. Have your eyecare practitioner complete this form, which summarizes the results of your eye examination. The Section II procedures are required to be completed by your examining doctor. The Section III procedures are not required, but are recommended.*

*Section I: To be filled out by laser user*

Name: \_\_\_\_\_ Birth date: \_\_\_\_\_

Address:

\_\_\_\_\_

Laser type and class: \_\_\_\_\_

*Section II: To be filled out by the examining doctor – (Required Procedure)*

Examination Date: \_\_\_\_\_ Today's Date: \_\_\_\_\_ Last eye exam: \_\_\_\_\_

**HISTORY**

*Chief Complaint:*

\_\_\_\_\_  
\_\_\_\_\_

*Personal Ocular History:*

\_\_\_\_\_  
\_\_\_\_\_

*Family Ocular History:*

\_\_\_\_\_  
\_\_\_\_\_

*Personal systemic health history:*

\_\_\_\_\_  
\_\_\_\_\_

*Medications/Allergies:*

\_\_\_\_\_

Visual Acuity:    With/Without                      eyeglasses/CLs                      (circle one)

Distance:            OD 20/                      OS 20/

Near:                    OD                              OS

Current eyeglasses OD \_\_\_\_\_  
OS \_\_\_\_\_  
Refraction OD \_\_\_\_\_ 20/  
OS \_\_\_\_\_ 20/  
Add \_\_\_\_\_

**Amsler Grid** (describe and/or enclose)

OD normal/abnormal \_\_\_\_\_  
OS normal/abnormal \_\_\_\_\_

**Color Vision**

Method D-15/100Hue/other \_\_\_\_\_  
Result OD \_\_\_\_\_  
OS \_\_\_\_\_

**Binocular vision summary** \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**Anterior segment anomalies** \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**Fundoscopy (with pupil dilation)**

Optic nerve OD \_\_\_\_\_  
OS \_\_\_\_\_  
Maculae OD \_\_\_\_\_  
OS \_\_\_\_\_  
Periphery OD \_\_\_\_\_  
OS \_\_\_\_\_

**Retinal photography (35mm - enclose)** \_\_\_\_\_  
\_\_\_\_\_

---

**Section III - Optional procedures**

**Contrast sensitivity testing**

Method \_\_\_\_\_

Result OD \_\_\_\_\_

OS \_\_\_\_\_

**Macular photostress (in seconds to recover 1 line above max VA)**

OD \_\_\_\_\_

OS \_\_\_\_\_

---

**Section IV Please list cause if applicable:**

Vision decrease \_\_\_\_\_

\_\_\_\_\_

Amsler grid anomaly \_\_\_\_\_

\_\_\_\_\_

Color vision defect \_\_\_\_\_

\_\_\_\_\_

Any other anomalies noted \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_  
Examining doctor's signature OD/MD

**LASER SYSTEM**  
**STANDARD OPERATING PROCEDURES GUIDELINES**

**1. BASIC GUIDANCE**

- a. The written SOP must discuss beam alignment and normal operation for each laser system. It is advisable to include non-beam hazard management and servicing in the SOP.
- b. To insure the SOP is read and used, the document should not be lengthy.
- c. The primary intent of the SOP is to institutionalize good safety practices.
- d. The Laser Use Registration, Laser Safety Manual, and Laser Safety Training Supplement have information that may be useful in developing the SOP.
- e. The Office of Health & Environmental Safety will be happy to review and comment on the draft SOP. If you need help contact the Laser Safety Officer at 3059.

**2. BEAM ALIGNMENTS (ADDRESS THESE SAFETY AREAS IN THE SOP)**

- a. SECURITY - Secure the lab and (to avoid distractions) mark the door with the following sign: "NOTICE - Laser Alignment in Progress - DO NOT ENTER - EYE PROTECTION REQUIRED."
- b. PREPARATION - Locate all equipment and materials needed to perform the alignment prior to beginning the procedure.
- c. BEAM CHARACTERISTICS - Is the beam visible or invisible? Is special equipment needed to view the beam? If the beam is pulsed, can you fire a single pulse at a time to limit the exposure hazard?
- d. BEAM VIEWING - Intrabeam viewing is prohibited on the campus and a remote viewing camera should be used if intrabeam viewing is required to align the beam. Only diffuse reflections should be viewed directly. Use a low power alignment laser (Class 2 or 3a) or if none is available; always use the lowest beam power that will allow viewing of an image with protective eyewear.
- e. PERSONAL PROTECTIVE EQUIPMENT - Use laser protective eyewear with a low enough OD to allow viewing of the diffuse reflection (contact ORS if you need information on alignment eyewear). Use skin covers (lab coat, gloves, and UV face shield) to protect users from UV laser beam scatter.
- f. PERSONNEL - Whenever possible, the "buddy" system should be used during alignments. If another person is not available to be in the room, let someone else know where you are and check in with them on a regular basis.
- g. EXPOSURE PRECAUTIONS - Keep the optical table clear of objects that may cause unwanted specular reflections. Always close the laser shutter while adjusting optics or when entering the beam path. After making adjustments, assure the optics are secured prior to opening the shutter.

h. REPLACE BEAM CONTROLS - Insure all beam blocks, enclosures, and beam barriers are replaced when the alignment is complete.

i. CHECK DOOR SIGNS - Verify that the "NOTICE - Laser Alignment in Progress - DO NOT ENTER - EYE PROTECTION REQUIRED" sign is removed from the room entrance and that the regular ANSI laser warning sign is in place and correct.

### **3. NORMAL OPERATION OF THE LASER (ADDRESS THESE SAFETY AREAS IN THE SOP)**

a. SECURITY - Do not rely upon a closed door as adequate security. Always use key locks or activate the door interlocks (if required by the LUR) on the laser facility.

b. OPERATIONAL PREPARATIONS - Indicate the location of the Laser Safety Guidelines posting. Indicate the equipment needed to perform the (laboratory specific) experiment.

c. PERSONAL PROTECTIVE EQUIPMENT - Have the appropriate (laboratory specific) safety equipment on hand. Specify what is needed and its use.

d. START-UP PROCEDURE - Insert key, turn on water, turn on power supply, close shutter, activate laser, etc. as specific to the laboratory.

e. EXPERIMENTAL PROCEDURE - Specific to the laboratory.

f. EMERGENCY PROCEDURE - Location of "PANIC" shut-down switch. Location of emergency procedure posting. Location of fire extinguisher, safety shower, etc.

g. SHUT-DOWN PROCEDURE - Specific to the laboratory.

h. STORAGE - Remove and store laser activation key, deactivate interlocks (if applicable) and secure door to laser facility.

### **4. NON-BEAM HAZARDS TO ADDRESS**

a. TOXICITY OF LASING MEDIA - Toxic laser dyes should be handled with lab coat, safety glasses, and gloves. Dyes should be mixed in a properly functioning fume hood and transported in sealed, leak proof containers. Dye pumps should sit in a secondary containment tray. Concentrated halogen gases (greater than 5%) should be used and stored in a properly functioning gas cabinet.

b. ELECTRICAL HAZARDS - Only properly trained and PI approved personnel should work on high voltage systems. The "buddy" system should always be used when working on electrical systems and laboratory staff should be trained in CPR as a safety precaution.

c. COMPRESSED GASES - Staff should be trained in the safe management of cylinders and the hazards associated with the specific compressed gases being used.

d. FIRE PROTECTION - Attention should be given to protection against fires and explosions. Flammable solvents are often used for laser dyes and to clean optical components. Fire extinguishers should be well marked and staff should know how to use extinguishers and the fire alarm system.

e. HOUSEKEEPING - Poor housekeeping (on and off the bench) can create physical hazards. Staff may trip over cables that have not been secured and injuries may result from sharp tools that are not properly stored.

## **5. SAFETY ASSOCIATED WITH SERVICING OF THE LASER**

- a. Only PI approved and properly trained personnel should service laser systems. Vendor service staff are required to follow the vendor's laser safety policy. If NJIT staff are assisting the service staff, the NJIT staff must follow campus laser safety policy (eye protection, etc.).
- b. If NJIT staff are to perform the service, a written service procedure with safe practice information must be available for reference (often the manufacturer will supply this information). All enclosures, interlocks, and safety devices (shutters, etc.) must be replaced and verified operational prior to returning the laser to service.
- c. Safety interlocks shall not be permanently disabled without the consent of the Laser Safety Committee.

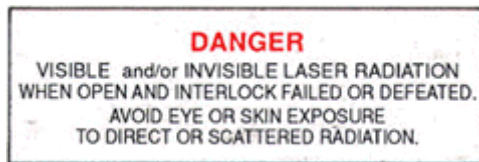
Exhibit S-4-21F

**Laser Warning Signs  
(from ANSI)**

**Laser Safety Signs & Labels (samples)**



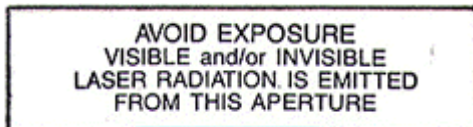
Sticker to mark high voltage hazard power supplies and laser enclosures.



Sticker to mark laser enclosures.



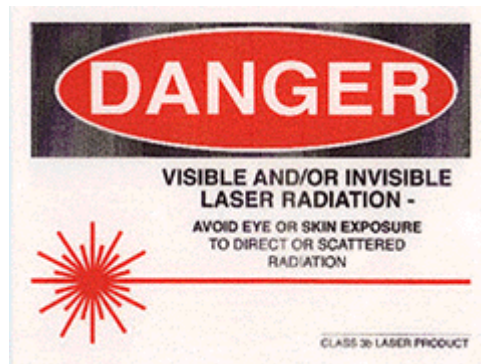
ANSI sign to mark doors to laser labs with Class 4 lasers.



Sticker to mark apertures where laser light is emitted.



ANSI sign to mark doors to laser labs with Class 3a lasers.



ANSI sign to mark doors to laser labs with Class 3b lasers.



Door sign to indicate laser alignment/maintenance.



**Exhibit S-4-21G**

**Laser Inspection Form**

**LASER INSPECTION FORM**

OFFICE OF RADIATION SAFETY

Surveyors Name: \_\_\_\_\_ Date of Inspection: \_\_\_\_\_  
Location of Laser System(s): \_\_\_\_\_  
Name of PI: \_\_\_\_\_ Phone #: \_\_\_\_\_  
Name of Lab Contact: \_\_\_\_\_ Phone #: \_\_\_\_\_  
Applicable LURs: \_\_\_\_\_

**Laser Posting, Labeling and Security Measures**

Entrances properly posted: Y N Comments: \_\_\_\_\_  
Room security adequate: Y N Comments: \_\_\_\_\_  
Door interlock system: Y N Comments: \_\_\_\_\_  
Interlock functioning: Y N Comments: \_\_\_\_\_  
Laser status indicator outside room: Y N Comments: \_\_\_\_\_  
Laser class label in place: Y N Comments: \_\_\_\_\_  
Laser aperture label in place: Y N Comments: \_\_\_\_\_

**Laser Unit Safety Controls**

Protective housing in place: Y N Comments: \_\_\_\_\_  
Interlock on housing: Y N Comments: \_\_\_\_\_  
Interlock on housing functioning: Y N Comments: \_\_\_\_\_  
Beam shutter present: Y N Comments: \_\_\_\_\_  
Key operation: Y N Comments: \_\_\_\_\_  
Laser activation indicator on console: Y N Comments: \_\_\_\_\_  
Beam power meter: Y N Comments: \_\_\_\_\_  
Emergency shutoff available: Y N Comments: \_\_\_\_\_

**Engineering Safety Controls**

Laser secured to table: Y N Comments: \_\_\_\_\_  
Laser optics secured to prevent stray beams: Y N Comments: \_\_\_\_\_  
Laser not at eye level: Y N Comments: \_\_\_\_\_  
Beam is enclosed: Y N Comments: \_\_\_\_\_  
Beam barriers in place: Y N Comments: \_\_\_\_\_  
Beam stops in place: Y N Comments: \_\_\_\_\_  
Remote viewing of beam: Y N Comments: \_\_\_\_\_  
Beam condensed or enlarged: Y N Comments: \_\_\_\_\_  
Beam focused: Y N Comments: \_\_\_\_\_  
Beam intensity reduced through filtration: Y N Comments: \_\_\_\_\_  
Fiber optics used: Y N Comments: \_\_\_\_\_  
Windows in room covered: Y N Comments: \_\_\_\_\_  
Reflective materials kept out of beam path: Y N Comments: \_\_\_\_\_  
Laser user checking for stray beams: Y N Comments: \_\_\_\_\_  
Physical evidence of stray beams: Y N Comments: \_\_\_\_\_  
Class 4 diffuse reflection hazard: Y N Comments: \_\_\_\_\_

**Exhibit S-4-21H**

**Selection of Laser Safety Eyewear  
(FROM ANSI)**

AMERICAN NATIONAL STANDARD Z 136.1-2007

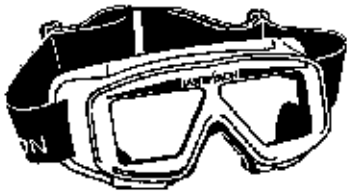
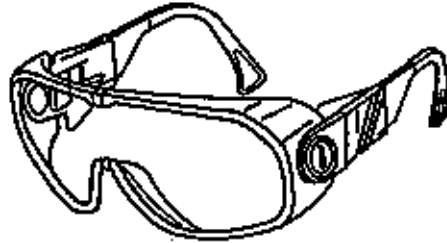
**Table 4. Simplified Method for Selecting Laser Eye Protection for Point Source Viewing (Wavelengths Between 0.400 and 1.400  $\mu\text{m}$ )<sup>†</sup>**

Q-Switched Laser ( $10^{-9}$ - $10^{-2}$ s)		Non-Q-Switched Lasers ( $0.4 \times 10^{-1}$ - $10^{-2}$ s)		Continuous-Wave Lasers Momentary (0.25 - 10 s)		Continuous-Wave Lasers Long-Term Staring (< 1 hr)		Attenuation	
Maximum Output Energy (J)	Max Beam Radiant Exposure ( $\text{J}\cdot\text{cm}^{-2}$ )	Max Laser Output Energy (J)	Max Beam Radiant Exposure ( $\text{J}\cdot\text{cm}^{-2}$ )	Max Power Output (W)	Max Beam Irradiance ( $\text{W}\cdot\text{cm}^{-2}$ )	Max Power Output (W)	Max Beam Irradiance ( $\text{W}\cdot\text{cm}^{-2}$ )	Attenuation Factor	OD
10	20	100	200	$10^5$ *	$2 \times 10^5$ *	100 *	200 *	$10^8$	8
1	2	10	20	$10^4$ *	$2 \times 10^4$ *	10 *	20 *	$10^7$	7
$10^{-1}$	$2 \times 10^{-1}$	1	2	$10^3$ *	$2 \times 10^3$ *	1	2	$10^6$	6
$10^{-2}$	$2 \times 10^{-2}$	$10^{-1}$	$2 \times 10^{-1}$	100 *	200 *	$10^{-1}$	$2 \times 10^{-1}$	$10^5$	5
$10^{-3}$	$2 \times 10^{-3}$	$10^{-2}$	$2 \times 10^{-2}$	10	20	$10^{-2}$	$2 \times 10^{-2}$	$10^4$	4
$10^{-4}$	$2 \times 10^{-4}$	$10^{-3}$	$2 \times 10^{-3}$	1	2	$10^{-3}$	$2 \times 10^{-3}$	$10^3$	3
$10^{-5}$	$2 \times 10^{-5}$	$10^{-4}$	$2 \times 10^{-4}$	$10^{-1}$	$2 \times 10^{-1}$	$10^{-4}$	$2 \times 10^{-4}$	$10^2$	2
$10^{-6}$	$2 \times 10^{-6}$	$10^{-5}$	$2 \times 10^{-5}$	$10^{-2}$	$2 \times 10^{-2}$	$10^{-5}$	$2 \times 10^{-5}$	10	1

<sup>†</sup> Use of this table may result in optical densities (OD) greater than necessary. See Section 4.6.2 for other wavelengths.

\*

Not recommended as a control procedure at these levels. These levels of power could damage or destroy the attenuating material used in the eye protection. The skin also needs protection at these levels.



### **Laser Protective Eyewear for Alignments**

The Director of Environmental Health and Safety receives many requests on selecting laser protective eyewear for alignment purposes. The information below should be helpful. If you have additional questions on laser protective eyewear or any other laser safety issue, please contact ORS at 3059

Even if you are wearing laser protective eyewear, **never look directly into any laser beam**. Intrabeam viewing of lasers is not allowed except with the direct permission of the Laser Safety Committee. Contact the Laser Safety Officer if you feel that aligning your laser requires intrabeam viewing.

- The LUR document for each laser indicates if laser protective eyewear is required for alignment or use of the laser. If laser protective eyewear is required, the LUR specifies the OD (optical

density) at the laser wavelength(s) being used. The OD specified is the minimum OD sufficient to protect the user against a momentary intrabeam or specular reflection exposure.

- For visible lasers, the minimum OD required to protect the user against intrabeam viewing should allow the viewing of a diffuse spot on a light colored surface. If the laser protective eyewear has an OD much larger than the specified minimum OD, it may be impossible to properly view a diffuse beam spot (or even see properly in the laser facility).
- In some instances (visible lasers from 400 - 450 nm and 650 - 700 nm), it may be preferable to reduce the OD below the specified intrabeam minimum OD to better view a diffuse spot. Reducing the OD by 1 or 2 should substantially improve viewing while still offering adequate eye protection (the intrabeam OD has a X10 safety margin calculated into the value which includes the human aversion (blink) response). Reducing the specified OD by a number greater than 2 may reduce the protection factor enough to allow eye injury should a specular reflection be viewed accidentally.
- For invisible lasers, the minimum OD for intrabeam viewing should not be reduced, as OD reduction will not aid in viewing the beam. Instead, the laser protective eyewear should be chosen to allow the wavelength produced by the viewing aid to be transmitted while absorbing the invisible beam. For example: a Nd:YAG beam at 1064 nm is being aligned with the use of an IR sensing card which absorbs some of the 1064 nm radiation and emits radiation at 550 nm. The calculated intrabeam OD for the Nd:YAG is 6.0. A good choice for laser protective eyewear would be a goggle with a UVEX type 06 filter (an OD of 8+ at 1064 nm and an OD of less than 1 at 400 to 700 nm). This goggle has a visible light transmission of 70% and should allow the diffuse spot to be easily viewed while giving excellent protection from the invisible Nd:YAG beam. NOTE: this eyewear would obviously not be a good choice if the Nd:YAG beam was frequency doubled to 532 nm.
- All laser protective eyewear should have a visible light transmission (VLT) sufficient to allow safe operation in the laser facility. ORS recommends a VLT of at least 35%. Laser protective eyewear with a low VLT will generally not be worn by users and so cannot provide any protection.


## **Emergency Contact Listing**

In the event of a laser accident do the following:

- 1) Shut down the laser system.
- 2) Provide for the safety of personnel (first aid, evacuation, etc.) as needed.

**NOTE:** If a laser eye injury is suspected, have the injured person keep their head upright and still to restrict any bleeding in the eye. Laser eye injuries should be evaluated by a physician as soon as possible.

- 3) Obtain medical assistance for anyone who may be injured.  
Call Public Safety - 3111
- 4) If there is a fire, leave the area, pull the fire alarm, and contact Public Safety by calling 3111. Do not fight the fire unless it is very small and you have been trained in fire fighting techniques.
- 5) Inform the Principal Investigator as soon as possible. If there is an injury, the PI must submit an Accident Investigation Report of injury to Risk Management with a copy sent to benefits if the injury involves an employee.
- 6) After an accident, do not resume use of the laser system until the Laser Safety Committee has reviewed the incident.

	UNIVERSITY SAFETY ENVIRONMENTAL MANAGEMENT SYSTEM University Heights Newark, New Jersey 07102	
		<b>Document Control No.  USEMS SOP S - 4- 22</b>
<b>Document Title: Radiation Safety  29CFR 1910.1096</b>		

## 1.0 Scope and Purpose

- 1.1 This policy is designed to ensure that all New Jersey Institute of Technology activities and operations involving the use of radioactive materials/x-rays are performed in such a way as to protect users, staff, patients, and the general public from exposure.
- 1.2 This policy applies to all NJIT employees and students who receive, possess, use, transfer, own, or acquire any source of ionizing radiation or radioactive material.
- 1.3 Radioactive Materials include any material that spontaneously emits ionizing radiation.
- 1.4 Ionizing Radiation is electromagnetic radiation (x-ray and gamma-ray photons) or particulate radiation (beta particles, electrons, positrons, neutrons, and alpha particles) capable of producing ions by direct or secondary processes.
- 1.5 The operating philosophy of the university is to maintain all occupational radiation exposures As Low As Reasonably Achievable (ALARA).
- 1.6 ALARA is achieved through good radiation protection planning and practice, backed by management and user commitment.

## 2.0 Responsibilities

### 2.1 Radiation Safety Committee

- The Radiation Safety Committee (RSC) is a committee responsible for development and administration of the radiation safety program at the University and affiliated institutions.
- The RSC establishes policies and enforces compliance with the program.
- The RSC has the authority and responsibility for approval of all proposals for radionuclide use and x-ray users. The RSC meets on at least a quarterly basis.

### 2.2 Radiation Safety Officer (RSO)

- The RSO is an individual responsible for the daily implementation of the radiation safety program in accordance with directives from the RSC, license provisions, and regulatory requirements.
- As the authorized representative of the Radiation Safety Committee, the RSO supervises all radiation control activities.
- Advise RAM users on radiation safety and regulatory compliance issues.
- The RSO is responsible for ensuring the safe use of radiation and radioactive materials and for meeting ALARA levels.

### 2.3 Department Environmental Health and Safety (EH&S)

- EH&S is the lead office for radiation safety at the university. Details of these duties and responsibilities are described in the appropriate radiation safety manuals (radioisotopes and x-rays).

### 2.4 Individual Lab Workers

- All users of radioactive material are responsible for planning and conducting operations in accordance with the lab License.
- Radiation users conduct personal surveys and monitor workspaces before leaving the laboratory and take any necessary remedial or control measures.

## 3.0 Licensing

3.1 A Licensee is an individual authorized in writing by the RSC to use radioactive materials in laboratory research or class instruction. The official document providing the defined scope of authorization is known as a license (see Section 4.2 for license definition). A licensee is responsible for the radiation control activities under his/her license.

3.2 A Radiation Worker is an individual who works with ionizing radiation and receives radiation safety training. She/he is responsible for following all applicable regulations pertaining to the use of x-rays and/or radioactive materials as presented in the Radiation Safety Manual, in the license, and in notices issued by the RSO.

#### 3.2.1 Student Worker Under Age 18

3.2.1.1 No one under the age of 18 may be employed in areas where RAM is used or stored or where radiation is produced without prior registration and training.

3.2.1.2 No student under the age of 18 may work in areas where RAM is used or stored or where radiation is produced without prior registration and training.

3.2.1.3 Students may handle only H-3, C-14, S-35, or P-33 in quantities of 100 microCuries or less.

3.2.1.4 All work with RAM must be performed under the supervision and in the physical presence of a trained radiation worker.

#### 3.2.2 Pregnant Workers

3.2.2.1 The NRC dose limit to the fetus of declared pregnant women is 500 mrem (10% of the occupational dose limits for adults).

3.2.2.2 If you are pregnant or believe you may be pregnant, contact the Radiation Safety Officer. All inquiries will be kept in confidence. We will take the following steps:

- Provide an opportunity to declare your pregnancy.
- Evaluate your dose history and exposure potential.
- Provide you with information concerning risk.
- Provide suggestions for reducing exposure.
- Monitor your radiation dose with respect to the NRC limits.

### 3.3 Licensees

3.3.1 All use of radioactive material must be done under the supervision of a Licensee who has been approved and licensed by the RSC.

3.3.2 Each Licensee is responsible for the health and safety of persons using RAM under his/her license, assuring that workers are properly trained, and assuring that work is done in accordance with relevant policies and procedures.

3.3.3 Licenses to use radioactive material are typically granted only to faculty members who are principal investigators.

### 3.4 License Approvals

3.4.1 To request License approval, submit complete application includes the Application for Authorization to Use Radioactive Materials (Exhibit 18-1) and a Protocol Summary Form (Exhibit 18-2) for each isotope and protocol and forward it to the Radiation Safety Officer..

### 3.5 License Amendments

- 3.5.1 Changes to existing licenses may be requested by filling out an Application for Amendment to Use Radioactive Materials. (Exhibit 18-3) A Protocol Summary Form is also required if the license change is due to addition of an isotope or an increase in activity being used.

### 3.6 Annual License Reviews

- 3.6.1 Each year, the Radiation Safety Officer will review the use of RAM under your license and send an Annual License Review to Licensees.
- 3.6.2 Licensees should also review the use of RAM in the lab and make any necessary changes to the license.
- 3.6.3 Annual License Reviews should be completed and returned to the Radiation Safety Officer within two weeks of receipt.
- 3.6.4 To complete the Annual License review:
- Dispose of RAM that is no longer useful to your research .
  - Record the disposal date in your inventory log.
  - Record the activity on hand for each radionuclide on your license.
  - Remove or add rooms to your license.
  - Request changes to your licensed limits.
  - Submit Protocol Summary Forms for any new protocols.
  - Add or delete workers. Review their training compliance and attend training as needed.

### 3.7 License Inactivation

- 3.7.1 Licensees not planning to work with RAM for extended periods of time should inactivate their license. This will eliminate the need to keep radiation safety records. Reactivating can be accomplished simply by a phone call or e-mail to the Radiation Safety Officer.
- 3.7.2 A Licensee who remains active must continue to maintain radiation safety requirements including:
- Weekly documentation of "no use" in monitoring records;
  - Quarterly inventory of RAM on hand;
  - Security of any stored material;
  - Completion of EH&S and licensee ALARA training; and
  - Completion of Annual License Review.

### 3.8 License or Room Termination

- 3.8.1 Licensees planning to permanently discontinue RAM work or use of a licensed room must the Radiation Safety Officer in advance to arrange a final survey of the area being vacated.
- 3.8.2 Prior to termination approval, the licensee must:
- Remove all RAM (including waste) from the lab and update inventory records. Each stock vial must have a final disposal date.
  - Perform and document final monitoring. Decontaminate if necessary.
  - Remove all radiation labels from within the lab. EH&S will remove the door sign after the final survey has been completed.
  - Transfer your lab records to the Radiation Safety Officer if the Licensee is leaving NJIT.
  - If an area is being vacated because the lab is relocating within NJIT, refer to the Checklist for Lab Moves for additional instructions (Exhibit 18-4).

### 3.9 Transfers Outside NJIT

- 3.9.1 Any transfer or shipment of RAM to another institution must be approved by EH&S before making the transfer. Contact EH&S in advance for assistance with special packaging, shipment papers, and monitoring requirements.



## 4.0 Procedures

### 4.1 License to Use Radioactive Material

- 4.1.1 All individuals who wish to independently use radioactive material must apply to the RSC for a license.
- 4.1.2 The license evaluations take into consideration the adequacy of facilities and equipment, training and experience of the user, and the operating or handling procedures.
- 4.1.3 The RSC reviews and approves university and affiliated institutions protocols prior to use of the radioactive material.

## 5.0 Posting and Labeling

### 5.1 Posting Requirements

- 5.1.1 Each room that is approved for the use or storage of RAM must be posted with:

***“CAUTION RADIOACTIVE MATERIALS”***

- 5.1.2 Room signs are available from EH&S.

- 5.1.3 Areas or rooms where RAM is used or stored or a central bulletin board within the lab building shall be posted with an NRC form 3, **“Notice to Employees.”**

### 5.2 Labeling Requirements

#### 5.2.1 RAM Work Stations

- 5.2.1.1 When possible, RAM use should be restricted to specific, labeled RAM work stations within the lab that are labeled with:

***“CAUTION RADIOACTIVE MATERIALS”***

- 5.2.1.2 Surfaces and pieces of equipment located within a labeled work area should be considered contaminated until an appropriate survey of the area determines otherwise.

- 5.2.1.3 Individuals working at a labeled work station must wear protective clothing (lab coat and gloves).

#### 5.2.2 Containers

- 5.2.2.1 Individual containers of RAM must be labeled with:

***“CAUTION RADIOACTIVE MATERIALS”***

unless they are being attended by an individual.

#### 5.2.3 Equipment

- 5.2.3.1 The following equipment must be labeled with:

***“CAUTION RADIOACTIVE MATERIALS”***

- “Hot sinks”
- Fume hoods
- refrigerators
- cabinets, etc. used to store RAM

- 5.2.3.2 Centrifuges, pipettes, water baths, etc., that are used for RAM work must be labeled if contaminated

#### 5.2.4 Waste

5.2.4.1 All radioactive waste containers must be labeled with:

***“CAUTION RADIOACTIVE MATERIALS”***

and a label indicating the isotope contained. EH&S will provide labeled waste containers. Make sure that radioactive warning labels are blatantly affixed to any container used for radioactive specimens, waste, sharps containers, etc.

## **6.0 Training**

6.1 All individuals who wish to work with ionizing radiation, including radionuclides or x-rays, receive appropriate instruction in radiation safety.

6.2 The training requirements determined by the Radiation Safety Committee.

### 6.3 New Employee Training

6.3.1 Before beginning work in the lab, individuals who use radioactive material or frequent areas where radioactive material is used or stored must attend EHRS training and receive training from their licensee.

6.3.2. Each calendar year, all persons who work in or frequent labs where RAM is used or stored must attend Annual Radiation Safety Training.

### 6.4 Annual Training Held by Licensee

6.4.1 In addition to EH&S training, each licensee must hold an in-lab training session to review their experimental protocols, work habits, and available safety equipment for adherence to the ALARA policy.

### 6.5 ALARA Training

6.5.1 Documentation of an ALARA training session is required annually. The topics covered, the date, and the names of attendees must be recorded and available in the lab's records. Forms for documenting ALARA training can be obtained from EH&S.

6.5.2 The topics for this training must include, but are not limited to, the following:

- A. Work habits: how to plan procedures
- B. External exposure (time, distance, and shielding) and contamination control: how to shield and handle RAM to minimize personnel exposure and radioactive contamination.
- C. Monitoring: how to properly monitor for contamination and document results.
- D. RAM accountability and control: how to properly order, use, account for and dispose of RAM.

### 6.6 Training for Irradiator Users

6.6.1 Each individual must receive training by the irradiator licensee and by EH&S before using an irradiator. This training is separate from, and in addition to, other radioactive material training.

## **7.0 Surveys and Audits**

7.1 Radiation users conduct personal surveys and monitor workspaces before leaving the laboratory and take any necessary remedial or control measures. EH&S also conducts periodic radiation surveys of the areas where radioactive materials are used or stored. The inspections are conducted in accordance with the requirements of the regulations or license condition.

## 7.2 Radiation Safety Inspections

- 7.2.1 EH&S will perform unannounced inspections quarterly. Typically, one individual in the lab will have responsibility for maintaining radiation safety records and assuring compliance. However, all individuals working in the lab should be aware of the location of records and should be able to answer questions asked by inspectors.
- 7.2.2 Laboratories will be inspected for compliance with the requirements specified in this guide and the conditions specified in the individual license. The Radiation Safety Self Audit form can be used by lab staff to audit for compliance in advance of EH&S inspections.
- 7.2.3 Each deficiency must be responded to immediately. Repeat infractions are not tolerated. Licensees are required to respond in writing detailing the following:
- Mitigating circumstances
  - Corrective actions taken
  - The date of compliance
- 7.2.4 Survey results will be reported to the Radiation Safety Committee quarterly.

## 8.0 General Radiation Safety Practices

- 8.1 A current copy of the NJIT RADIATION SAFETY USERS' GUIDE will be available to all personnel within the laboratory. This can be accomplished by printing a copy from our web site, or by posting the web site address in your lab records
- 8.2 Follow the practices to prevent personnel and facility contamination and spills.
- 8.3 Wear laboratory coats and appropriate laboratory clothing (no shorts or sandals) when handling RAM or working at a labeled RAM work area.
- 8.4 Use safety glasses or other appropriate splash shields when handling RAM.
- 8.5 Wear disposable gloves when handling RAM or working at a labeled work area.

- 8.6 Do not eat,  drink,  smoke,  store food, or mouth-pipette in areas where RAM is used or stored.

- 8.7 Wash hands thoroughly and survey yourself and your work area after working with RAM.
- 8.8 Use careful experimental planning, dry runs, shielding, distance and monitoring.
- 8.9 Use, store, and transport RAM in appropriate containers to contain a spill and/or prevent exposure.
- 8.10 Use smooth work surfaces, protective bench coverings, contamination monitoring, proper equipment, and segregated work areas.
- 8.11 Work with volatile radioactive material in a fume hood to reduce the possibility of inhalation of radioactive material. Iodination of proteins using I-125 is the most common procedure requiring use of a fume hood. When required by license conditions, use approved fume hoods or glove boxes to control possible airborne contamination.

## 8.12 Follow practices to prevent personnel exposure

### 8.12.1 Minimize Time

- The total radiation exposure is proportional to the length of time of the exposure. Minimizing the time of exposure to radiation will keep the total radiation exposure low. Some of the methods of minimizing exposure time include planning experiments in advance, and performing dry runs with non-radioactive or tracer amounts of radioactive material.

### 8.12.2 Maximize Distance

- Radiation exposure levels decrease rapidly with increasing distance. This relationship is known as the inverse square law and states that the intensity of the radiation exposure decreases in proportion to the inverse of the distance squared.

$$E \propto 1/d^2$$

For example, an exposure rate of 1000 mR/hr at 1 cm from a radiation source would be 10 mR/hr at 10 cm. Therefore, any increase in distance from a source (using tongs or forceps to handle specific types of radioactive material) will reduce the total radiation exposure to an individual.

### 8.12.3 Use Shielding

- Because most work with radioactive material involves relatively small activities, shielding is not necessary in most cases. If shielding is necessary, it will be stated in your lab license. If you have questions about shielding, call or e-mail EH&S.
- The type and thickness of material needed for shielding depends on the radioisotope and the activity of the radioisotope being used.
- For beta emitting radioisotopes, shielding made from materials with low atomic numbers, such as plexiglas, are used. For example, a minimum of 3/8" plexiglas is recommended when working with P-32.

## 8.13 Laboratory Monitoring

### 8.13.1 When to Monitor

- A. Labs should be checked by the Principal Investigator for contamination after each use of RAM. At least one such survey must be recorded WEEKLY. Use the standard forms for documenting monitoring. (see Exhibit 18-5)
- B. If no RAM is used in a given week, an entry of "No RAM Use" must be recorded. During weeks when radioactivity is used in limited areas within a laboratory, the survey may be limited to the applicable areas and "No RAM Use" recorded for other areas. If no RAM is to be used for extended periods of time, license inactivation is recommended.

### 8.13.2 What to Monitor

- A. Include areas of potential radioactive contamination such as bench tops, the floor, telephones, doorknobs, faucet handles, freezer/refrigerator handles, etc. during routine monitoring.
- B. Monitor all facilities and equipment (liquid scintillation counters, centrifuges, pipettes, refrigerators, fume hoods, RAM sinks, etc.) used with RAM prior to being returned to non-controlled use and before performing any maintenance or repair work.

### 8.13.3 How to Monitor

- A. Survey meters may be used in areas where only gamma emitters (eg. I-125) or energetic beta emitters (eg. P-32) are used. Wipe tests must be used to check for contamination in labs using RAM that cannot be easily detected with a survey meter (eg. H-3, C-14), and
- B. Use of survey meters:
  1. Prior to use, assure that the instrument is functioning by performing a battery test, checking the background reading, and assuring that it responds to radiation.
  2. Verify that the meter and probe are appropriately sensitive for the isotope being monitored. Use a low-energy gamma scintillation probe for I-125; a pancake probe for energetic beta emitters like P-32.

3. To perform a survey, move the meter/probe slowly over the surface you are monitoring. Keep the face of the probe parallel to the surface, and as close as possible without contaminating the meter.
4. Do not use a meter in high background areas.

#### 8.14 Performing a Wipe Test

- A. Put on gloves and lab coat;
- B. Drag the “wipe” over the surface to be tested applying moderate pressure and covering approximately 100 cm<sup>2</sup>;
- C. Count the wipes in a liquid scintillation counter. Include one “blank” sample to verify that the background reading on the counter is consistent, and
- D. Perform a constancy test before using the counter. Most counters come with a “standard source” that can be used for this test. The constancy reading should be consistent (typically within 10% of the average value for the source).

8.15 Scintillation counters often contain internal sealed sources. Contact EH&S before disposing of, or moving, a counter to make arrangements for proper removal and disposal of the internal radiation source. Do not attempt to remove the source yourself.

#### 8.16 Records must include

- A. A map of the lab;
- B. The date of the survey;
- C. The initials/name of the person performing the survey;
- D. The survey instrument used;
- E. The background reading in cpm, and
- F. The survey results for each area in cpm.

#### 8.17 Positive Monitoring Results

- A. Contamination exceeding three times background must be corrected;
- B. Following decontamination, perform a resurvey. Record resurvey results in lab records, and
- C. For widespread contamination or personnel contamination, contact EH&S immediately.

## 9.0 Ordering and Receiving RAM

### 9.1 Obtaining Approval

- 9.1.1 All radioactive material received in the lab must be approved by EH&S before the order is placed, including purchases from a radioactive material vendor, purchases from EH&S, gifts, transfers from another Licensee, and transfers from another institution.
- 9.1.2 Approval may be obtained through the RAM Order Approval section of our web site or by calling EH&S between 9:00 am and 3:30 p.m.
- 9.1.3 A radiation safety approval number will be issued if the order is approved.
- 9.1.4 Each stock vial, sealed source, standard, marker, etc. must have its own unique approval number. For example, if you are ordering 2 x 0.250 mCi of P-32, you should make two entries and receive two approval numbers.

### 9.2 Placing the order

- 9.2.1 All university orders must be purchased using the University’s Purchasing System.
- 9.2.2 The Purchasing Department will receive approval from the Director of Environmental Health and Safety for RAM purchases and then place the order to the vendor.
- 9.2.4 Radioactive materials vendors have been instructed not to accept orders placed any other way.
- 9.2.5 To transfer RAM between licensees at NJIT
  - 9.2.6.1 The lab receiving the material must obtain RSO approval.
  - 9.2.6.2 Enter the name of the licensee supplying the material in the “vendor” field.
  - 9.2.6.3 The lab sending the material should record the transfer date on their inventory log.

### 9.3 Receiving RAM

#### 9.3.1 Common radioactive material package signage include:



#### 9.3.2 Packages containing quantities considered exempt by the Department of Transportation may not be labeled.

### 9.4 Procedures for Receiving Packages

- All deliveries must be made through the receiving area.
- Inspect package for obvious damage or leakage.
- The receiver will the Principal investigator when the pick-up is ready.
- Monitoring and opening should be performed right away!
- Notify the appropriate person that the package has arrived and place it in a secure location until it can be monitored and opened.
- Put on lab coat and gloves while handling and opening the package.
- Place package on bench cover in a secure location.
- Survey with meter at contact and at three feet
- Read paperwork to ensure package contents match order.
- Conduct smear survey according to procedure.



- Review smear results prior to moving package. If contamination above 1,000 dpm/100 cm<sup>2</sup> is present, place the package in a plastic bag, store in the radioactive waste cage, and notify health physics.
  - Notify EH&S immediately if wipe test results exceed background.
  - Complete radioactive material package survey record, keep a copy, and forward the original to health physics.
  - Monitor the external surface of the shipping container (box) for removable contamination (wipe test) and document the results in your receipt log.
  - Remove the radioactive material immediately and store it in your lock box.
  - Document the receipt in your lab inventory records.
- No packages should be delivered directly to your lab.

### 9.5 Procedures for Opening RAM Packages

- Put on lab coats and gloves before opening the outer package.
- Open the inner package to verify the contents and check the integrity of the final source container (inspect for evidence of breakage, loss of liquid, discoloration of packaging, etc.). Report any problems to EH&S.

- Monitor the package and the packing material for contamination. If there is no contamination, obliterate all radiation labels and discard the packaging in regular trash.

## **10.0 RAM Inventory**

10.1 Each laboratory must maintain an accurate inventory and accountability system.

10.2 The principal Investigator should continually track incoming shipments of material and account for its use, transfer, and disposal. In addition, it should ensure that material is secured and accessible only to approved persons.

10.3 The Principal Investigator should document arrival, usage, transfer and disposal of all RAM.

### 10.4 Receipt Log

10.4.1 Receipt records must include at least the following:

- radionuclide
- date of receipt
- initial activity
- amount of each withdrawal from the stock vial
- date of final stock vial disposal
- package monitoring results

### 10.5 Quarterly Inventory

10.5.1 Each calendar quarter, an inventory of RAM on hand in the lab is required. The activity on hand for each radionuclide should not exceed the licensee's possession limit for that radionuclide

10.5.2 Sealed sources should be inventoried and included on the summary.

10.5.3 To complete your quarterly inventory:

- Dispose of any material no longer useful to your research and record the disposal date on the receipt log.
- Perform a physical check of all remaining stock vials/sources in the lab. There should be a one to one correlation between the sources on the receipt log without a disposal date, and the sources in the lab.
- Sum the activity on hand for each isotope.

## **11.0 Laboratory Security**

11.1 Access to radioactive material must be controlled so that unauthorized persons do not have access to the licensed material.

11.2 Stored radioactive material must be secured (locked).

11.3 Stock vials and sealed sources must be stored in locked containers.

11.4 The containers must be kept locked at all times.

11.5 Locked boxes must be secured to the refrigerator/freezer/cabinet.

11.6 Lock boxes can be obtained from EH&S.

11.7 Material that is not in storage must be controlled and maintained under constant surveillance.

## **12.0 Radioactive Waste**

12.1 EH&S handles and processes radioactive waste in a cost effective and environmentally safe manner in accordance with all applicable regulations.

## 12.2 Waste Collection

12.2.1 EH&S collects radioactive waste from all laboratories on campus.

12.2.2 In order to be collected, radioactive waste must be packaged and tagged as described in this Guide. This is necessary in order for the university and your laboratory to be in compliance with various federal, state, and local regulations.

## 12.3 Requirements for All Waste Types

12.3.1 All radioactive material symbols and markings must be obliterated before putting the waste into the container.

12.3.2 The radioactive material symbol is the familiar “propeller” design.



12.3.3 Radioactive material markings are the words “**Caution Radioactive Material**” “**Danger Radioactive Material**,” “**Radioactive I**,” “**Radioactive II**,” and similar phrases (as specified in regulations). At times, people affix radioactive material labels to the outside of waste containers. These also must be obliterated before the waste is collected.

12.3.4 Do not put any red or orange bags, or red or orange sharps containers in the radioactive waste. Since bio-hazardous material is not permitted in the radioactive waste and red is associated with bio-hazardous material, the presence of red bags makes disposal of the waste difficult. Note that white sharps containers can be purchased from many laboratory supply companies (e.g., Fisher Scientific).

12.3.5 Biohazard symbols must be obliterated and markings

“Biohazard: Caution,” “Biohazard: Sharps,”

and the like) on any material in the waste and from the outside of the waste containers.

12.3.6 When practical, minimize the amount of radioactive waste generated by surveying items before putting them into the waste. If a survey in a low-background area shows no reading distinguishable from background, dispose of the material as non-radioactive waste. If readings exceed background, dispose of the material as radioactive waste.

12.3.7 Segregate all waste by isotope. If a procedure involves multiple isotopes, put the waste in containers for the isotope with the longest half life.

12.3.8 Label the outside of all RAM waste containers with stickers indicating “Caution Radioactive Waste do not empty” and with the isotope contained (one isotope per container). EH&S will provide waste buckets, labels, and heavy plastic bags to line the containers. If the containers EH&S supplies do not meet your needs, you may purchase any appropriate container and plastic liners, and EH&S will supply labels to affix to the containers. For information on how to obtaining supplies, refer to the EH&S RAM Waste Packaging.

12.3.9 Shield all RAM waste containers properly, if required.

12.3.10 Do not allow waste to accumulate in the lab or to overflow its container. Do not allow empty waste containers to accumulate in the lab.

12.3.11 Survey waste containers that are no longer needed and, if found to not be contaminated, obliterate all markings and dispose in the ordinary trash.

## 12.4 Dry Waste

12.4.1 Dry waste is any material that has been contaminated with radioactive material, usually gloves, paper towels, plasticware, glassware, etc. In addition to the requirements for all waste types above, requirements for dry waste are as follows.

12.4.2 Place dry waste other than sharps containers in a clear plastic bag of polyethylene at least 4 mils (0.1 mm) thick or of other material of similar strength. Securely close the bags and attach a properly



completed waste transfer memo to each bag (a single memo cannot be used for multiple bags). For sharps containers simply attach the Tag directly to the securely closed container.

- 12.4.3 Do not put used scintillation vials in the dry waste.
- 12.4.4 Do not put lead or organic solvents, or other material regulated under RCRA in the dry waste. Lead should be transferred to EH&S separately.
- 12.4.5 If you want to know if a specific material can be put in the dry waste contact EH&S.
- 12.4.6 Sharps or glass plates in the waste must be placed in an appropriate rigid container of sufficient strength that the material will not puncture it. Needles and syringes (with or without needles attached) will be accepted only in a white commercial sharps container with biohazard symbols and markings obliterated.
- 12.4.7 Do not put vials of stock material in the dry waste unless EH&S personnel are in your laboratory to take the waste.
- 12.4.8 Although liquids should not be put in the dry waste, small containers with residual liquids are permitted if the waste also contains sufficient material to absorb twice the volume of the liquid.
- 12.4.9 Do not put any infectious material or biohazard labels or bags in the dry waste. Disposal of these items is discussed below.

#### 12.5 Unused Material in Stock Vials

- 12.5.1 Stock vials containing unused material should be kept in a lock box or otherwise secured until EH&S personnel are in your laboratory to take the waste. If a request for waste pick-up includes stock vials, include a note in the “Additional Instructions” section.
- 12.5.2 When EH&S personnel arrive to collect the waste, they will contact someone in the lab. At that time, place the vial with unused material in clear plastic bag of polyethylene at least 4 mils (0.1 mm) thick or other material of similar strength. The bag may already contain other dry waste so long as the Radioactive Waste Tag for the bag reflects the correct total activity. Securely close the bags and attach a properly completed waste transfer memo to each bag (a single memo cannot be used for multiple bags).

#### 12.6 Animal Carcasses and Biological Material

- 12.6.1 In addition to the requirements for all waste types above, animal carcasses, infectious waste, and bio-hazardous waste containing radioactive material must meet the following requirements.
- 12.6.2 Waste containing bio-hazardous, pathogenic, or infectious material must be treated to reduce any potential non-radiological hazard from the material. After treatment, all “biohazard” and “regulated medical waste” symbols and markings must be obliterated.
- 12.6.3 Place frozen carcass, infectious waste, and biological waste in clear plastic bag of polyethylene at least 4 mils (0.1 mm) thick or other material of similar strength. Securely close the bags and attach a properly completed waste transfer memo to each bag (a single memo cannot be used for multiple bags). Keep the material frozen until pickup.
- 12.6.4 Segregate the material by isotope. Animal carcasses containing no more than 0.05  $\mu\text{Ci/gm}$  of H-3 or C-14 must be placed in separate bags from other carcasses. These carcasses are not regulated as radioactive.
- 12.6.5 Do not generate animal carcasses that contain activity greater than 0.05  $\mu\text{Ci/gm}$  of H-3 or C-14 or that contain any RAM with a half life greater than 120 days without prior approval.

#### 12.7 Liquids Scintillation Fluid in Vials

- 12.7.1 All liquid scintillation vials and fluid must be transferred to EH&S for commercial disposal. The “biodegradable” scintillation fluids are not listed as “soluble” in water and therefore are not suitable for drain disposal. In addition to the requirements for all waste types above, scintillation vials containing radioactive material must meet the following requirements.
- 12.7.2 Tightly cap each vial.
- 12.7.3 Segregate vials by isotope and vial type (mini vial/regular). Vials containing only tritium and carbon 14 can be intermingled.
- 12.7.4 Determine, from its label, whether the scintillation fluid contained in the vials is hazardous or non-hazardous. Frequently the term “biodegradable” “eco-friendly” or “non-flammable” are used on the label instead of “non-hazardous.” When completing the radioactive waste pick-up request, check the appropriate box.

12.7.5 Place vials into clear plastic bags of polyethylene at least 4 mils (0.1 mm) thick or other material of similar strength, closed at the neck. Attach a completed waste transfer memo to each plastic bag of vials (a single memo cannot be used for multiple bags). The waste transfer memo must provide the type of scintillation fluid in the vials so that EH&S can determine the applicable regulations for disposal of the vials.

#### 12.9 Bulk Liquid

12.8.1 Put bulk liquids into a new quart, gallon, or 5-gallon plastic container that is compatible with the liquid. Laboratories are responsible for ensuring the compatibility of the liquid and the container.

12.8.2 Place a completed chemical waste tag on each container when waste is first added to the container. For information on completing chemical waste tags, contact the EH&S Chemical Waste Disposal Program. Call EH&S to have chemical waste tags sent via campus mail.

12.8.3 The plastic containers should be filled no more than 90% full (to allow for expansion of the liquid) and capped with a tight fitting cap.

12.8.4 Segregate all liquids by chemical and radionuclide.

12.8.5 Prior to requesting collection of liquid waste, obliterate all radioactive materials labels and place the container of waste into clear plastic bags of polyethylene at least 4 mils (0.1 mm) thick or other material of similar strength, closed at the neck. Attach the completed waste transfer memo to the container of liquid waste (a single memo cannot be used for multiple containers).

#### 12.10 Sealed Sources

12.9.1 Sealed sources are devices containing radioactive material which are engineered to prevent the material from ever escaping the device. The most common example found in research laboratories are calibration standards for scintillation counters and gamma counters. To dispose of these sources, simply advise EH&S of Radioactive Waste Pick-up Request with the relevant information.

12.9.2 Note the manufacturer and model, and the serial number of the source.

12.9.3 Place the source or sources in a plastic bag or other container, and securely attach the Waste Tag to the outside of the container. EH&S personnel will collect the sources during routine waste collection.

### 13.0 Spills and Emergencies

13.1 The Licensee is responsible for all remedial actions in responding to emergencies. The Radiation Safety Officer, the Director of Environmental Affairs and the Director Health and Safety Compliance Assurance must be notified under the following conditions:

- Radioactive contamination outside a licensed area
- Deliberate misuse of radioactive materials. All inquiries will be kept in confidence. (Deliberate misuse of radioactive material will result in loss of use privileges and could result in criminal action.)
- Known or suspected personnel contamination, inhalation, injection, or ingestion of RAM.
- Any accident resulting in direct exposure to personnel.
- Known or suspected loss of radioactive material, including loss to the air or sewer.
- Contaminated or damaged radioactive material shipments.

#### 13.2 Emergency Notification

13.2.1 In case of emergencies involving only radioactive materials (RAM) call Public Safety at 3111:



13.3 Public Safety must be notified under the following conditions:

- A. Radioactive contamination outside a licensed area
- B. Deliberate misuse of radioactive materials. All inquiries will be kept in confidence. (Deliberate misuse of RAM will result in loss of use privileges and could result in criminal action.)
- C. Known or suspected personnel contamination, inhalation, injection, or ingestion of RAM.
- D. Any accident resulting in direct exposure to personnel.
- E. Known or suspected loss of radioactive material, including loss to the air or sewer.
- F. Contaminated or damaged radioactive material packaging.

#### 13.4 Spill Procedures

13.4.1 Spills or contamination involving microCurie amounts and small volumes of liquid may be cleaned up by lab personnel. However, any time you are not sure how to proceed please contact us for assistance.

- A. Call Public safety at Ext. 3111.
- B. Notify other persons in the area.
- C. Prohibit access to the area.
- D. Prevent the spread of contamination by covering the spill with absorbent material and limiting access.
- E. Clean up the spill using disposable gloves, lab coats, shoe covers and tongs (if appropriate). Proceed from the outermost edges of the contaminated area inwards, reducing systematically the area that is contaminated. Take care not to spread the contamination. Put all contaminated objects into RAM waste.

Normal cleaning agents should be adequate. Keep cleaning supplies to the minimum needed to do the job. Place them into a plastic bag and into a clearly labeled waste RAM waste container.

- F. Survey: Following decontamination, monitor all personnel and the area for removable contamination with a wipe test. If the floor was contaminated, be sure to monitor the bottom of shoes. Continue decontamination until wipe test results are less than three times background. Document results in lab records.
- G. Report the spill to Public Safety at Ext. 3111 if you need assistance, if there is personnel contamination, if the contamination is outside the licensed area, or if any other conditions listed in the section above occur.

**Exhibit S-4-22A**



**Application for Authorization to Possess and Use Radioactive Materials**

INSTRUCTIONS: Complete (please type) and forward five copies of all information to the Radiation Safety Officer. A copy of the application with a designated authorization number will be returned to the authorized user when approved by the Radiation Safety Committee.

**Applicant for Authorized Use of RAM:**

Name: \_\_\_\_\_ Title: \_\_\_\_\_ Building & Room: \_\_\_\_\_

Department: \_\_\_\_\_ Tel. #: \_\_\_\_\_ E-mail Address: \_\_\_\_\_

1. Project title: \_\_\_\_\_
2. Building/Room # where material will be located: \_\_\_\_\_

Use: \_\_\_\_\_ Material Storage: \_\_\_\_\_

Waste Storage: \_\_\_\_\_

3. List isotopes and limits (Item 4 requires handling procedures for **each** radioisotope):

Radioisotope	Half-life	Total Quantity (mCi)	Max. Amount per Experiment (mCi)	Chemical Form
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

4. Is the material to be obtained or used in especially hazardous form? (e.g. highly toxic) No: \_\_\_\_  
Yes: \_\_\_\_

If yes, please explain: Radiation Protection: Check special equipment to be used to control radiation exposure:

Glove box ____	Shoe covers ____	Fume hood ____	Lab coat ____
Body dosimetry ____	Respirator ____	Handling tongs ____	Ion chamber ____
Finger dosimetry ____	Mechanical pipettes ____	Scintillation well counter ____	Absorbent liner & tray ____
Protective Gloves ____	Wrist dosimetry ____	Liquid scintillation counter ____	Transport Container ____
Shielded storage ____	GM survey meter ____	Radiation signs & labels ____	Shielding Lead: ____ Lucite: ____

5. Waste Disposal: Check the appropriate item(s). Describe all waste streams. Include information on any hazardous materials- biohazards, carcinogens, toxic chemicals, etc.\*

\_\_\_\_ Solid \_\_\_\_\_

\_\_\_\_ Aqueous \_\_\_\_\_

\_\_\_\_ Organic \_\_\_\_\_

\_\_\_\_ Animal \_\_\_\_\_

6. \* Note: Please refer to the Radiation Safety Manual for the proper guidelines for the segregation and consolidation of waste.

7. Describe the method/procedure to be taken for ensuring radioactive material is secure against unauthorized access:

\_\_\_\_\_

\_\_\_\_\_

8. Please check the type of application below and submit a separate paper describing the use of the radioactive material by supplying the requested information.

Use in a sealed source:

1. Rationale for experiment
2. Description of experimental technique
3. Description of sealed source; chemical form and type of seal (single or double seal)
4. Describe handling procedures for each radioactive source listed in section 4.
5. Describe storage area and when applicable describe any containers to be used in

transporting the source.

6. Describe radiation monitoring equipment; including methods and frequency of surveys.
7. Provide facility sketch, indicating where sources(s) will be stored and used.

Use in unsealed applications:

8. Give a brief rationale of experiment
9. Provide a description of experimental techniques, especially those phases of the experimental procedures where handling of radioactive material is involved. This should be provided for each radioisotope listed in section 4.
10. Indicate those steps in the experimental procedure where loss of radioactive material is possible and describe the measures to be taken to control contamination.
11. List precautions to be taken to eliminate contamination of the personnel such as the use of protective clothing and gloves. Also describe the use of any special shielding devices to be used to limit personnel exposure.
12. Describe material and waste storage area.
13. Describe radiation monitoring equipment; including methods and frequency of contamination surveys.
14. Provide facility sketch, indicating where source(s) will be stored and used.

Use as on ionization source for an electron capture detector in gas chromatography:

15. Describe the type of analysis to be performed.
16. Describe any operating limits to be imposed on the system to prevent loss of radioactive material.
17. Describe the system to be used in discharging the effluent of the apparatus to controlled ventilation such as a fume hood.
18. If you plan to perform source cleaning operations and/or install new sources, describe the procedure and list the precautions to be taken to control contamination and to limit exposure to personnel.

Use in animal studies:

19. How (and where) will animals be housed?
20. Provide the concentration (in units of uCi/gram) of the radionuclide averaged over the entire weight of the live animal.
21. Describe the kind and number of animals to be used in the study.
22. Describe the radionuclide (including activity) to be administered per animal and how administered.
23. The ultimate fate of the animal and suspected excretion rate of the radionuclide
24. Describe handling and monitoring of the animals and proposed method of disposal of the animal(s) and excreta.

Human Use:

25. Purpose for conducting study.
26. State whether human use is considered routine or non-routine. Include the research protocol for non-routine use.
27. Give the plan of investigation in sufficient detail to permit a critical evaluation of the radioisotope methodology to be employed and the radiation safety controls to be established.
28. Describe the human subjects. Include their statement of consent.
29. Give the quantity of radioactive material to be administered (in millicuries).
30. Calculation of radiation dose.

31. Give a statement on the adequacy of the physical facilities and equipment for supporting the proposed study.
32. Provide the qualification of the individuals responsible for the study.
33. Estimated time needed for completion of the study.
34. Schedule for reporting the results of the study.

I affirm that the foregoing facts are correct to the best of my knowledge and that I shall conduct and/or supervise the described work with full regard for the safety of those engaged in the work and of the general public. I have received a copy of the Radiation Safety Manual for the New Jersey Institute of Technology and understand that I am to abide by the policies and procedures contained therein.

Upon terminating my authorization and prior to departing the University, I agree to contact the Radiation Safety Office to arrange for the close out of my laboratory and the disposal of radioactive material and waste.

Applicant: \_\_\_\_\_(PLEASE PRINT)

Signed: \_\_\_\_\_ Date: \_\_\_\_\_

Applicant

Signed: \_\_\_\_\_ Date: \_\_\_\_\_

Radiation Safety Officer

Signed: \_\_\_\_\_ Date: \_\_\_\_\_

Director of Environmental Health and Safety



**Exhibit S-4-22B**



**RADIATION LICENSE APPLICATION  
 PROTOCOL SUMMARY FORM**

Please submit one form for each proposed use.

* Date of Application	
* Licensee:	
* Email Address:	
* Work Telephone No.	
* NJIT Mailing Address	
* Radionuclide:	
* Chemical & Physical Form:	
*Substance is Volatile:	Yes _____ No _____
*Procedure will be performed at standard temperature and pressure:	Yes _____ No _____
*Building:	Room:

\*Protocol:  
 Provide a brief description of the procedure. Also include information on chemical and physical form generated, any special equipment used to handle, shield or contain the radioactivity, and unusual hazards associated with the procedure.

\*Total Activity Per Experiment:

\*Frequency of Experiment:

\*Mixed hazardous waste or unusual waste stream will be generated:  
 (i.e., any chemical, biological, or genetically hazardous material mixed with radioactive waste)

\* Indicates required field

**Exhibit S-4-22C**



**RAM LICENSE AMENDMENT REQUEST FORM**

* <b>Date of Request:</b>	
* <b>Licensee:</b>	
* <b>Email Address:</b>	
* <b>Work Telephone No.</b>	
* <b>NJIT Mailing Address:</b>	
* <b>Chemical &amp; Physical Form:</b>	
* <b>Are you adding a radionuclide or changing activity limits?</b>	[Yes <input type="checkbox"/> ] [No <input type="checkbox"/> ]
* <b>Are you adding or deleting a room?</b>	[Yes <input type="checkbox"/> ] [No <input type="checkbox"/> ]
* <b>Room Additions :</b> 1. Building _____ Room _____ 2. Building _____ Room _____ 3. Building _____ Room _____	* <b>Room Deletions :</b> 1. Building _____ Room _____ 2. Building _____ Room _____ 3. Building _____ Room _____

Radionuclide	Current Possession Limit (mCi)	Current Annual Limit (mCi)	Requested Possession Limit (mCi)	Requested Annual limit (mCi)

<b>INACTIVATING LICENSE.</b> Check to inactivate <input type="radio"/>	<b>TERMINATING LICENSE.</b> Check to terminate <input type="radio"/>
--	--

**Exhibit S-4-22D**



**Checklist for Laboratory Relocation**

	<b>Completed</b>
<b>I. Submit License Amendment to EH&amp;S</b> 1. Indicate building and room numbers added. 2. Indicate building and room numbers deleted.	_____ _____
<b>II. Obtain EH&amp;S Approval For Iodination Hood</b> 1. Indicate hood location on license amendment. 2. Contact EH&S for evaluation of hood performance.	_____ _____
<b>III. Remove Radioactive Material (RAM) From Vacated Labs</b> 1. Conduct an inventory of RAM on hand. 2. Consolidate RAM that is to be moved to the new location. 3. Dispose as waste all RAM that will not be transferred. 4. Maintain records of final inventory and reconciliation.	_____ _____ _____ _____
<b>IV. Monitor For Contamination and Presence of RAM</b> 1. Monitor all equipment (refrigerators, centrifuges, etc.). 2. Monitor all areas you are leaving and document results. 3. Perform minor decontamination, if necessary.	_____ _____ _____
<b>V. Prepare / Package RAM for Transfer</b> 1. Place material into a container that will contain a spill, shielded, if necessary, and labeled with: <b><i>“Caution Radioactive Material”</i></b> 2. Transfer RAM by hand or on a cart, dolly, etc. during normal working hours, <b>do not transport RAM or labeled equipment by vehicle.</b> 3. Only a trained radiation worker may transfer RAM. The movers must not transfer RAM or labeled equipment. 4. Inventory RAM that was transferred immediately upon arrival at the new lab. 5. Liquid scintillation counters contain a radiation source and require special attention prior to moving. Contact the manufacturer or EH&S for specifics.	_____ _____ _____ _____ _____
<b>VI. Final Survey by EH&amp;S</b> 1. Notify EH&S of expected date that the lab will be vacated and available for final survey.	_____

**NOTE: This checklist applies only to transfers made with NJIT. Any transfers of radioactive material outside NJIT requires special packaging and approval by the Radiation Safety Officer and the Director of Safety and Health Compliance Assurance.**

**Exhibit S-4-22E**



**Quarterly Inventory of Radioactive Material (RAM)**

An inventory of all radioactive materials is requested at the end of each calendar quarter. To complete the inventory you will need the radioactive materials receipt / disposal log.

1. Compare vials in stock to the receipt / disposal log. Correct any discrepancies.
2. Properly dispose of vials you will not use anymore.
3. For each isotope, add up the number of vials and activity remaining (“on-hand”) in stock on the date the inventory is performed. Sum up the activity that was disposed of to the sewer system (sink disposal) during the quarter. If the on-hand activity is close to the license’s possession limit, you can increase the limit by submitting a license amendment form (SOP Exhibit 24-3).
4. Please remember that all stock vials are potentially contaminated (especially old vials, where small crack and deterioration of the septum may not be visible). They must be handled with disposable gloves, a lab coat, and dosimeters as required in the NJIT Procedures.

Year\_\_\_\_\_

<b>1<sup>st</sup> Quarter (Jan. 1 – March 31)</b>		<b>Isotope</b>				
On-hand number of vials						
On-hand activity (uCi)						
Quarterly sewer disposal sum (uCi)						
<b>Initials / Date</b>						
<b>2<sup>nd</sup> Quarter (April. 1 – June 30)</b>						
Isotope						
On-hand number of vials						
On-hand activity (uCi)						
Quarterly sewer disposal sum (uCi)						
<b>Initials / Date</b>						
<b>3<sup>rd</sup> Quarter (July 1 – Sept. 30)</b>		<b>Isotope</b>				
On-hand number of vials						
On-hand activity (uCi)						
Quarterly sewer disposal sum (uCi)						
<b>Initials / Date</b>						
<b>4<sup>th</sup> Quarter (Oct. 1 – Dec. 31)</b>		<b>Isotope</b>				
Isotope						
On-hand number of vials						
On-hand activity (uCi)						
Quarterly sewer disposal sum (uCi)						
<b>Initials / Date</b>						

**Exhibit S-4-22F**

**Radioactive Package Receipt Record**

Date Received \_\_\_\_\_ Surveyed By \_\_\_\_\_

Transported By \_\_\_\_\_

Type of Package                  cardboard box                  metal pail

Any visible damage?      **NO**                  **YES**      crushedwet      opened

Survey Instrument  
   Model \_\_\_\_\_                  serial # \_\_\_\_\_

Reading at Contact \_\_\_\_\_                  Reading at 3 ft. \_\_\_\_\_

Smear Survey - attach LSC printout.

Based on the LSC's minimum efficiency for the isotopes in use at NJIT any wipe showing greater than 200 counts per minute above background should be considered contaminated. Place contaminated package in radioactive waste storage and contact health physics.

Package contaminated? Yes \_\_\_\_\_ No \_\_\_\_\_

Describe Radioactive Material (activity, physical form, and quantity)

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**Entered Into Inventory** By: \_\_\_\_\_ Date: \_\_\_\_\_

**Reviewed By:** \_\_\_\_\_ Date: \_\_\_\_\_

**RADIATION EMERGENCY PROCEDURES**

**Major Spills, Involving Radiation Hazards to Personnel**

1. Notify all persons not involved in the spill to vacate the room at once. Limit the movement of displaced persons to confine the spread of contamination until they are monitored.
2. If the spill is liquid and the hands are protected, right the container, otherwise use long tongs.
3. If the spill is on the skin, immediately flush thoroughly and monitor.
4. If the spill is on clothing, discard outer or protective clothing at once, monitor and decontaminate ate.
5. Turn off fans, try to avoid creation of airborne contamination.
6. Vacate the room but take care not to track or spread contamination.
7. Contact the NJIT Department of Public Safety at ext. **3111 as soon as possible**. The Department of Public Safety will contact the Director of Environmental Health and Safety and the Radiation Safety Officer.
8. Take immediate steps to decontaminate personnel involved as necessary.
9. The Emergency Response Coordinator will direct the decontamination.

**Minor spills, Involving No radiation Hazard to Personnel**


1. Notify all persons in the room and area at once.
2. Survey people which were in the immediate area of the spill.
3. Permit only the minimum number of persons necessary to deal with the spill into the area.
4. Confine the spill immediately.
  - A. Liquid spills
    - a. Don protective gloves
    - b. Drop absorbent on spill.
  - B. Dry spills
    - a. Don protective gloves
    - b. Dampen thoroughly, taking care not to spread contamination. Water may generally be used, except where chemical reaction with the water would generate an air contaminant: oil should be used instead.
5. Decontaminate: make a plan first.
6. A complete history of the accident and subsequent remedial or protective measures should be submitted to the RSO.

## **Injuries to Personnel, Involving Radiation Hazard**

1. Wash minor wounds immediately under running water, spreading the edges of the gash. If at all practical collect and retain cotton sponges, fluids, etc. for analysis.
2. Report all radiation accidents involving personnel wounds, overexposure, ingestion, or inhalation to the RSO as soon as possible.
3. No person involved in a radiation injury should return to work without the approval of the attendant physician and the RSO.
4. Prepare a complete history of the accident and subsequent activity for the RSC.

## **Accidents Involving Radioactive Dusts, Mists, and Gases**

1. Notify all other persons to vacate the room immediately.
2. Hold breath and close air vents.
3. Vacate the room. Seal off area, if possible.
4. Contact the NJIT Department of Public Safety at ext. **3111 as soon as possible**. The Department of Public Safety will contact the Director of Environmental Health and Safety and the Radiation Safety Officer.
5. Ascertain that all doors giving access to the room are closed. Post conspicuous warnings or guards to prevent accidental opening of doors.
6. Monitor all persons suspected of contamination. Proceed with decontamination of personnel.
7. Report at once to the RSO all known or suspected ingestions or inhalations of radioactive materials.
8. Collect bioassay samples as directed by the RSO.
9. Decontaminate the area only upon the advice of the RSO. Air sampling should be conducted prior to resuming work in the area.

	UNIVERSITY SAFETY ENVIRONMENTAL MANAGEMENT SYSTEM University Heights Newark, New Jersey 07102	
		<b>SOP S – 4 - 23</b>
<b>Electricity Safety Plan</b> <b>29CFR 1910.146</b>		

## 1.0 Scope and Purpose

- 1.1 The goal of this program is to assure employees recognize the hazards associated with electricity and understand how they can protect themselves. This program applies to all activities at NJIT where employees may be exposed to live electricity and electrical devices that have been de-energized.
- 1.2 Under this program, our employees receive instructions in the purpose and use of energy control procedures, as well as the other required elements of the Control of Hazardous Energy standard. This instruction includes the de-energizing of equipment, applying locks and tags, verifying equipment has been de-energized, and equipment re-energizing.

## 2.0 Responsibilities

- 2.1 Director of Environmental Health and Safety
  - Has overall responsibility for the Electrical Safety Program at NJIT.
  - Reviews and updates the program, as necessary.
  - Ensures all affected employees receive electrical safety training.
  - Conducts a Hazard Analysis of the campus to identify affected employees.
  - Conducts Electrical Safety Training for all affected employees.
- 2.2 Department Environmental Safety and Health Officers (DESHO)
  - Identifies persons within their area that work with electricity and require training.
  - Observes for safe work practices involving electricity and reports unsafe practices or hazards to the Director of Environmental Health and Safety.
- 2.3 Department Supervisors
  - Identifies those persons within their department that work with electricity and require training.
  - Ensures those persons participate in Electricity Safety training.
  - Observes for safe work practices involving electricity and reports unsafe practices or hazards to the Director of Environmental Health and Safety.
- 2.4 Affected Employees
  - Participate in required Electrical Safety training.
  - Inspect equipment and materials for electrical defects prior to using the equipment.
  - Work with electricity safely
  - Report hazards involving electricity to a department supervisor, DESHO or the Director of Environmental Health and Safety.



### **3.0 Hazard Analysis**

- 3.1 To determine areas of NJIT that need to be included in the Electrical Safety Program, a Hazard Analysis of the campus and activities must be conducted by the Director of Environmental Health and Safety.
- 3.2 This analysis provides information on which departments have equipment using electricity, various types of wiring installations, and the types of employee functions that must be covered by the Electrical Safety Program.

### **4.0 Training**

- 4.1 Every employee at NJIT who faces the risk of electric shock from working on or near energized or de-energized electrical sources receives training in electrical related safety work practices pertaining to the individual's job assignment.
- 4.2 The goal of our electrical safety training program is to ensure that all employees understand the hazards associated with electric energy and that they are capable of performing the necessary steps to protect themselves and their co-workers.
- 4.3 The NJIT electrical training program covers these basic elements:
  - Lockout and tagging of conductors and parts of electrical equipment.
  - Safe procedures for de-energizing circuits and equipment.
  - Application of locks and tags.
  - Verification that the equipment has been de-energized.
  - Procedures for reenergizing the circuits or equipment.
  - Other electrically related information which is necessary for employee safety.
- 4.4 At NJIT, all the persons working on or near energized or de-energized electric sources are considered "qualified" to work safely with electrical energy and have received the appropriate training and certification to do so.
- 4.5 In addition to the basic training elements, "qualified" employees are to be trained in the skills and techniques necessary to identify exposed live parts, determine nominal voltages, and clearance distances and corresponding voltages.
- 4.6 This training must be completed before participants will be allowed to work in areas of NJIT where electrical hazards exist.
- 4.7 When changes occur at the university that involve electrical elements, we provide additional employee training to ensure the safety of all affected workers.
- 4.8 The Department of Health & Safety conducts the electrical safety training for all employees.
- 4.9 Every employee who participates in the Electrical Safety Program receives a certificate which they sign verifying that they have completed the course, that they understand the information presented, and that they will follow all university policies and procedures regarding electrical safety. These signed certificates of training as well as all training materials and documentation are kept by the safety department.
- 4.10 All employees receiving training on electrical Safety must also participate in Lockout/Tagout education (SOP S-5-8).

## **5.0 Lockout Tagout Energy Program**

- 5.1 It is an NJIT policy that circuits and equipment must be disconnected from all electric energy sources before work on them begins.
- 5.2 Lockout and tagging devices are required to prevent the accidental re-energization of this equipment. The lockout and tagging procedures are the main component of our electrical safety program. (See SOP S-5-8, Control of Hazardous Energy)

## **6.0 Recordkeeping**

- 5.1 The Director of Environmental Health and Safety is responsible for retaining copies of all hazard Analysis reports related to Electrical Safety assessments.
- 5.2 The Director of Environmental Health and Safety shall document all employee training records for the purpose of electrical Safety training.

**New Jersey Institute of Technology  
Electrical Safety Training Documentation**

**Date of Training:** \_\_\_\_\_

**Name and Title of Trainer:** \_\_\_\_\_

**Employee Name:** \_\_\_\_\_

**Employee ID No.:** \_\_\_\_\_

**Department:** \_\_\_\_\_

**Position:** \_\_\_\_\_

**I have participated in and understand my rights and obligations under the New Jersey Institute of Technology Electrical Safety Training Program.**

**Signature**


\_\_\_\_\_ **Date** \_\_\_\_\_

**Trainer's**

**Signature** \_\_\_\_\_ **Date** \_\_\_\_\_

**Department Environmental Safety and Health Officer Certification**

**Signature** \_\_\_\_\_ **Date** \_\_\_\_\_

	<b>UNIVERSITY SAFETY ENVIRONMENTAL MANAGEMENT SYSTEM</b> University Heights Newark, New Jersey 07102	
		<b>Document Control No. USEMS SOP C – 4 - 1</b>
<b>Document Title: Onsite Vendor / Contractor Environmental Compliance</b>		

## 1.0 Purpose and Scope

- 1.1 The purpose of this SOP is to establish the regulatory requirements, accountabilities and operating procedures related to on-site vendor environmental and safety compliance.
- 1.2 This SOP describes requirements for environmental and safety compliance for service providers who perform work for the university. The scope of this SOP includes all external service providers, vendor, contractors and consultants who perform work for the university. Service providers and contractors are required to identify and prevent any discharges to the air, soil or water from their activities and to prevent any violations of the laws and regulations that apply to their operations.

## 2.0 Responsibilities

- 2.1 Any external service provider, vendor or contractor who performs work for the university during the period of operations that its personnel or equipment are on-site will be responsible for the following:
  - Ensure its operations comply with applicable environmental and safety requirements as specified in the NJIT SOPs.
  - Ensure that applicable environmental and safety requirements are included in procurement documents for subcontractor items and services in concert with the NJIT Purchasing Department
  - Monitor environmental and safety compliance activities of subcontractors performing work at NJIT on behalf of a service provider or contractor.
  - Suspend operations when such operations would result in imminent hazard to workers, members of the public, or the environment
- 2.2 The USEMS Director is responsible to maintain current copies of this SOP and to ensure that any new procurement requirements applicable to NJIT are incorporated into future revisions of the SOP.
- 2.3 The Directors of Building Services and Technical Services, in combination with the Purchasing Department are primarily responsible to implement the operational, notification and recordkeeping provisions of this SOP.
- 2.4 The Director of Environmental Affairs, in combination with the University Safety and Environmental Management System Director, are responsible to ensure contractor USEMS compliance as follows:
  - 2.4.1 Provide technical support to the Purchasing Department and the Directors of Building Services and Technical Services to accomplish the environmental health and safety objectives outlined in this

USEMS and to assist in communications and negotiations with regulatory agencies and external vendors.

2.4.2 Suspend contractor operations for environmental health or safety issues that, in his or her opinion, could represent a danger to workers, members of the public, or the environment.

2.4.3 Ensure EHS documents submitted by contractors are reviewed for accuracy and completeness.

2.5 The Purchasing Department is responsible to ensure that applicable safety and environmental requirements are included in bid specifications and procurement documents and to consider the ability of bidders to meet safety and environmental requirements as part of criteria for selection.

2.6 The Directors of Building Services and Technical Services are responsible to review contractor implementation plans and make recommendations to the University Safety and Environmental Management System Director and Purchasing Department. The Directors of Building Services and Technical Services will also suspend contractor operations for environmental, safety, or health issues that could represent a danger to workers, members of the public, or the environment. This authority may be delegated to the University Safety and Environmental Management System Director.

### **3.0 Assessment, Prevention and Control Procedure**

3.1 Following the award of major service, construction or consulting contracts and prior to the commencement of the work, the Contractor will meet with the Directors of Building Services and Technical Services and the Director of Environmental Affairs to discuss the proposed work and to develop mutual understanding relative to details of environmental protection. If the Director of Environmental Affairs, with concurrence of the Purchasing Department, determines that further documentation is required, the Contractor will submit to the Director of Environmental Affairs for approval, not more than 10 working days after the meeting, a written Safety and Environmental Protection Plan that will include one or more of the following elements:

- Name(s) of person(s) within the Contractor's organization who is (are) responsible for ensuring adherence to the Safety and Environmental Protection Plan.
- Copies of Material Safety Data Sheets (MSDS) for all products proposed to be transported to the worksite and used during the course of the work;
- Name(s) and qualifications of person(s) responsible for manifesting hazardous waste to be removed from the site.
- Description of the Contractor's safety and environmental training program and name(s) and qualifications of person(s) responsible for training Contractor's personnel.
- A list of Federal, New Jersey, and local laws, regulations, and permits concerning occupational safety, environmental protection, pollution control, noise control and abatement that are applicable to the Contractor's proposed operations and the requirements imposed by those laws, regulations, and permits.
- Procedures to provide safety and environmental protection that comply with the applicable laws and regulations. Describe the procedures to correct hazards, unsafe work practices and pollution of the environment due to accident, natural causes, or failure to follow the procedures as described in the Environmental Protection Plan.
- Permits, licenses, and the location of the solid waste disposal facility if wastes are to be transported off-site.
- Drawings showing locations of haul roads, material storage areas, structures, sanitary facilities, material stockpiles and equipment staging areas.
- Environmental Monitoring Plans for the job site including land, water, air, and noise, if applicable.
- Work Area Plan showing the proposed activity in each portion of the area and identifying the areas of limited use or nonuse.

3.2 Approval of the Contractor's Safety and Environmental Protection Plan will not relieve the Contractor of responsibility for adequate and continued control of pollutants and other environmental protection measures.

#### **4.0 Record and Document Retention**

4.1 The EMS Manager will retain copies of all reviewed Safety and Environmental Protection Plans for vendors that have been approved to work on NJIT property.

#### **5.0 Regulatory and Statutory Requirements**

5.1 The regulatory and statutory requirements related to this SOP are federal, state, and local laws and regulations as well as industry standards and methods applicable to the work contracted for vendors to perform.

5.2 Federal, state and local procurement requirements that govern purchasing activities at NJIT are applicable to this SOP.