



BROWN

**Construction Safety &
Environmental
Management Program**

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CONSTRUCTION SAFETY & ENVIRONMENTAL MANAGEMENT PROGRAM

I. Purpose

The purpose of the Brown University Construction Safety & Environmental Management Program is to ensure that all Contractors and University employees performing construction type work are responsible for performing the work in conformance with all environmental, health and safety laws and regulations and these University standards.

II. Scope

Contractors and University employees performing construction type work are responsible for conforming to the provisions of the Brown University Construction Safety & Environmental Management Program, which has been prepared for the protection and safety of Brown University students, faculty, staff, neighbors and property.

III. Application

This program applies to any University employee performing construction type work and Contractors working for Brown University. Contractors include, but are not limited to the following:

- Construction Managers
- General Contractors
- Hazardous Waste / Disposal Haulers
- Laboratory Testing Contractors
- Remediation Contractors
- Service Contractors
- Sub-Contractors

In this program the term Contractor is synonymous with both University hired contractors and University employees who are performing construction type work.

IV. Definitions

Confined Space – means a space that (1) Is large enough and so configured that an employee can bodily enter and perform assigned work; (2) Has limited or restricted means for entry or exit (for example, tanks, vessels, silos, storage bins, hoppers, vaults, and pits are spaces that may have limited means of entry.); and (3) Is not designed for continuous employee occupancy.

EHS – An abbreviation for Brown University’s Office of Environmental Health & Safety.

EPA – An abbreviation for the United States Environmental Protection Agency.

Hot Work – is defined as the temporary operation involving open flames or which produces heat and/or sparks. This includes, but is not limited to: Brazing, Cutting, Grinding, Soldering, Thawing Pipe, Torch Applied Roofing, Welding and the use of Heat Guns.

LASER – the term is an acronym which stands for “Light Amplification by Stimulated Emission of Radiation”

NBC – An abbreviation for the Narragansett Bay Commission; Rhode Island’s agency governing wastewater within the city of Providence.

Powder Actuated Fastening Tool – a tool or machine that drives a stud, pin, or fastener by means of an explosive charge.

Project Manager – Refers to the Brown University Project Manager.

RIDEM – An abbreviation for Rhode Island Department of Environmental Management; Rhode Island’s agency governing environmental issues in the state.

RIPDES – An abbreviation for Rhode Island Pollutant Discharge Elimination System; The Department of Environmental Management’s program for stormwater discharges.

Universal Waste – A universal waste is defined by the RIDEM as a waste of any of the six types listed below that has at least one hazardous waste characteristic, per 40 CFR 261 Subpart C, must be managed as a universal waste if it is not managed as a hazardous waste.

- Batteries
- Pesticides
- Thermostats
- Cathode Ray Tubes (i.e. computer monitors)
- Mercury Containing Devices
- Mercury Containing Lamps

V. Responsibilities

All Contractors who perform any service to Brown University are required to follow all federal, state and local regulations and laws as well as the policies of Brown University contained within this program. This Construction Safety & Environmental Management Program has been developed for the protection and safety of Brown University students, faculty, staff, neighbors and property. This program shall be provided to Contractors to aid in the communication of hazard information for University properties and to outline Brown’s safety and environmental procedures.

Brown University Project Managers shall help ensure Contractor compliance with all of the policies set forth by this program by including this program into project specifications and communicating problems to the Contractor when they are identified. Brown University Supervisors shall ensure University employee compliance with all of the policies set forth by this program by being familiar with this program, making training mandatory for all employees and correcting identified problems.

Brown University suggests that contractors implement the contents of this program through weekly safety talks with sub-contractors and their employees.

VI. Procedures

1. General Safety Issues

a. Standard Safety and Security Procedures

The following are several reasons for temporary or permanent removal of a Contractor employee from the Brown University premises.

- Possession or use of alcoholic beverages or regulated drugs not prescribed by a physician.
- Possession of explosives, firearms, ammunition and/or other weapons.
- Deliberate violation of safety or security rules.
- Illegal dumping, handling, or disposal of hazardous materials.
- Destruction or removal, without written permission, of any property belonging to Brown University, the property owner, employee or other contractors or employees.

- Intimidating, threatening, harassing, impeding or interfering with an inspector, security officer, or Brown University employee, student or designated representative.
- Using emergency exits other than for emergencies or blocking emergency exits.
- Misuse of fire prevention and protection equipment.
- Unauthorized removal or destruction of a safety barricade, handrail, guardrail, warning sign, fall protection, or other warning devices intended to protect Brown University students, faculty, staff, neighbors or property.
- Brown University employees will not lend University owned equipment or property to Contractors. Contractors must provide all necessary tools and equipment to safely complete their work.

b. Safety Permits and Procedures

The approval for such work typically is granted by Facilities Management, but may require specific approval from other University departments. Approvals should be requested during normal business hours and with the appropriate lead-time.

Contractors must notify the Brown University Project Manager prior to performing the following activities unless the project documents specifically request the activity:

- Working on electrical, steam, chilled water systems or other energized systems.
- Working on heating, ventilation, or air conditioning equipment.
- Working in confined spaces on campus including but not limited to manholes, tanks, tunnels, vaults. (see the confined space section of this document)
- Working on security systems.
- Moving emergency equipment (fire extinguishers, first aid kits, etc.) provided by Brown University.
- Working with hazardous materials (including solvents and paints).
- Using powder actuated tools.
- Operating a power vehicle or self-propelled work platform.
- Excavation or trenching.
- Working with compressed air or gases.
- Working on a roof.

Contractors must obtain Brown University Project Manager approval to perform the following activities:

- Working on fire protection or detection systems.
- Installing a temporary electrical service.
- Using a gas, diesel, or LP (propane) powered engine indoors.
- Lifting or hoisting with cranes, derricks, hoists or helicopter.
- Performing blasting operations.
- Any additional work not listed in the project documents which have a high risk of injury to the contractor and its employees or the Brown community.

Contractors must obtain Brown University EHS Office (863-3353) approval to perform the following activities:

- Performing Hot Work which includes open flames or which produces heat and/or sparks. This includes, but is not limited to brazing, cutting, grinding, soldering, thawing pipe, torch applied roofing, welding and the use of heat guns.

- Disposing of hazardous wastes (including waste oil & lead-containing materials).
- Using radioactive sources or conducting field radiography (x-ray).
- Working with or impacting suspect asbestos-containing materials. (see the asbestos section of this document).
- Using a Class 3 or 4 laser.
- Working on a fume hood, biological cabinet or autoclave.
- Working in a solvent storage area.
- Excavations requiring dewatering operations

Special Rules for Operations Involving Utilities:

- Only Brown University Facilities Management may shut down or start up operating utilities.
- The Contractor must contact the Brown University Project Manager, who will coordinate with Facilities Management, in advance of the need for such shutdowns or startups.

Special Rules for Lockout / Tagout of Machinery, Pipes, etc.:

- If the Contractor intends to service or maintain equipment that could potentially hurt someone if unexpectedly started, the Contractor is responsible for informing the Brown University Project Manager of the lockout / tagout procedures intended to occur.
- The Contractor is also required to comply with the OSHA Standard 29 CFR 1910.147 – *Control of Hazardous Energy Sources* in order to perform such procedures.

c. Housekeeping

The Contractor is responsible for ensuring and maintaining good housekeeping while at Brown University. The Contractor must keep work areas neat, clean, orderly and free of excess trash debris and never block walkways, stairs, exits or create a tripping hazard. All open holes, trenches or excavations to which Brown University students, faculty or staff may fall must be covered and/or guarded by a railing system. A Contractor's failure to maintain good housekeeping in a work area may result in increased potential for safety hazards and incidence of accidents and chemical spills.

d. Accident, Incident, Injury or Illness

After notifying the appropriate emergency agency, Brown University Public Safety (401-863-4111 if on the Providence Campus) or 911, work related accidents, incidents, injuries, and illness must be immediately reported to the Brown University Project Manager. The Contractor is also responsible for notifying OSHA of any incident that is reportable to that agency.

2. Environmental Issues

Brown University is fully committed to protecting the environment and maintaining a safe and healthy campus and workplace. The following principles have been established to clarify the University's commitment towards these goals:

1. Comply with all applicable environmental and safety laws and regulations and with specific University policies as contained herein.
2. Minimize hazards to students, faculty, staff, visitors, and the general community.
3. Require those who do business with Brown and/or visitors who avail themselves of Brown University facilities to perform their work in a manner that adheres to all applicable laws and regulations, and protects the University.
4. Minimize waste through efficient use of resources and substitution.

Brown EHS provides a broad range of services to the University to promote the protection of our students, staff and the public. The following summarizes the environmental issues that may be faced by contractors on-site. EHS staff is available to provide guidance in implementing these procedures.

a. Hazardous Waste Management

The Contractor must also ensure, at a minimum, proper labeling, adequate secondary containment, segregation of incompatible materials and routine inspection of storage areas as required by law. In addition, all hazardous waste containers shall be constructed of a material that is compatible with the waste, shall be in sound condition, and shall be kept securely closed at all times in accordance with Rhode Island Department of Environmental Management (RIDEM) Hazardous Waste regulations. Containers and/or tanks used to store hazardous wastes must be managed in accordance with U.S. Environmental Protection Agency (EPA) and RIDEM regulations.

The Contractor, in coordination with the Office of Environmental Health & Safety (EHS) staff and the hazardous waste transporter, is responsible for completing all disposal documents, which may include, but are not limited to, waste profiles, waste analytical samples and hazardous waste manifests. Brown University (Office of Environmental Health & Safety, Box 1914, 164 Angell Street, Providence, RI 02912) shall be designated as the Generator on all documents and shall be provided with copies of all waste analyses, land disposal restriction forms and related documentation. **The Brown University Environmental Compliance Officer (Henry Huppert 401-863-3850) or the Environmental Specialist (Patrick Humphrey 401-863-1610) are the only staff allowed to sign the hazardous waste manifests for Brown University.** At the time of shipment, the Contractor shall provide the bottom three copies of the manifest to the EHS representative for distribution to the appropriate agencies.

Brown University has four EPA identification numbers defined by specific contiguous areas of the campus. The following table provides the EPA Identification Numbers that should be used on all hazardous waste manifests. Contact an EHS representative for guidance on the use of particular EPA ID's. For projects that are not part of these category areas of the campus, EHS staff will contact the RIDEM to get temporary EPA ID numbers for the project.

Facility Name	Facility Address	EPA ID#
Central Heat Plant/FM Building	295 Lloyd Avenue	RID982715898
Facilities Mgmt. Garage	87 Prospect Street	RIR000016667
50 John Street	50 John Street	RIR000016634
Main Campus	167 Thayer Street	RIR000016675
10 Park Lane	10 Park Lane	RI5000008912
70 Ship Street	70 Ship Street	RID018564179

Contractor employees must be appropriately trained in hazardous waste procedures. In the event a Contractor encounters previously unidentified material that is reasonably believed to be radioactive, volatile, corrosive, flammable, explosive, biomedical, infectious, toxic, hazardous, asbestos containing or oil-based, the Contractor shall immediately stop work in the affected area and report the condition to the Project Manager. At no time shall such material be disposed of in chutes, dumpsters, drains, pipes or any other waste container. The Contractor agrees to cooperate with the Project Manager and any consultants engaged by the Project Manager to perform services with respect to the analysis, detection, removal, containment, treatment and disposal of such regulated materials.

Waste Hauling

Waste hauling or disposal subcontractors shall be selected from an approved list provided by EHS. Contractor must establish a contract with the proposed waste hauler for the management of the waste prior to the commencement of the work. Any questions regarding waste hauling should be directed to the EHS office by calling (401) 863-3850 or (401) 863-3353.

Wastes that will be required to be hauled off-site as hazardous waste include, but is not limited to, waste oil, contaminated fuels, lead contaminated paint or debris, spill clean-up materials, used solvents, batteries, fluorescent tubes, lighting ballasts and mercury containing switches.

The following is the listing of approved companies that perform waste hauling services for Brown University.

Triumvirate Environmental
61 Inner Belt Road,
Somerville, MA 02143
Phone: 800- 966-9282
Fax: 617-628-8099
Contact: Robert Abril

Waste Management New England Environmental Transport, Inc.
P.O. Box 144
209 Pickering Street
Portland, CT 06480
Phone: (860) 342-0667
Fax: (860) 342-4819
Contact: Jennifer Mancini

Clean Harbors Environmental Services

8 Dexter Road

East Providence, RI 02914

Phone: 401-431-1847

Fax: 401-431-2154

Contact: William Howard

Excess or Abandoned Products

Unusable product is material that cannot be used for its original purpose. Products are not considered waste unless they become contaminated, dried or otherwise unusable for their original purpose. Contractors must segregate useable products from waste products. The contractor must remove all useable products before the job is completed. Unusable products, (i.e., those that can not be used for their original purpose) must be disposed of as waste. Some of these wastes cannot be discarded with normal trash. Contractors must coordinate the disposal of waste products considered hazardous by EPA or RIDEM with EHS staff and follow all hazardous waste procedures. Products must not be abandoned or otherwise left on campus unless specifically requested by the Brown University Project Manager. Abandoned products include but are not limited to paints, chemicals, solvents, compressed gases, adhesives, caulking, oils, mastics, refrigerants, building materials, etc.

Ballasts

Older (pre 1980) light ballasts can contain Polychlorinated Biphenyls (PCBs). As a result, these lighting ballasts are considered hazardous waste in the state of RI. Ballasts manufactured after 1980 do not contain PCBs, however, it is the policy of Brown University to collect these ballasts and send them off-site for recycling. Ballasts cannot be disposed of with the general trash. Ballasts that do not contain PCBs will state “No PCBs” on the ballast label. If there is no information on the label regarding PCBs it must be considered a PCB ballast. It is more expensive to dispose of PCB ballasts. As a result, PCB and non-PCB ballasts must be segregated as they are removed from the fixtures. Separate containers should be established for each type of ballast and labeled appropriately.

Fluorescent Bulbs

In the State of RI, fluorescent tubes are considered hazardous waste if they are disposed. RIDEM considers fluorescent tubes “Universal Wastes” if the tubes are to be recycled in lieu of being disposed as hazardous waste. Fluorescent tubes cannot be disposed of with the general trash. It is the policy of Brown University to recycle all spent fluorescent tubes generated on-site. Contractor must follow all procedures outline by RIDEM for the management of Universal Wastes.

Fluorescent tubes shall be handled so that they remain unbroken. Broken fluorescent tubes must be collected, stored and disposed of as hazardous waste. Contact EHS if you generate broken bulbs. As tubes are generated, they must be stored in cardboard boxes obtained from the proposed transporter or in those approved for use by the transporter. Boxes of tubes must be stored indoors. The contractor must repackage boxes damaged by the weather before the transporter will accept them.

Fluorescent Tubes must be kept in secure containers to ensure that waste item(s) remain intact. Specifically, it is important to ensure that fluorescent lamps are protected from breaking. Boxes must be closed at all times except when waste is being added to the container. Bulbs cannot stick out of the boxes.

Soils

Contractor shall not sample or remove any soils off-site without prior approval from EHS. Urban soils are often contaminated with lead, arsenic, and polynuclear aromatic

hydrocarbons. The presence of these contaminants can be naturally occurring or can result from the deposition of hazardous materials (e.g., from coal ash, leaded gasoline, lead paint) over the last century. The soils on the Brown University campus may have these contaminants at concentrations above the regulatory levels set by the RI Department of Environmental Management. If contaminants are present above specific concentrations, the soil may be subject to RIDEM Rules and Regulations for the Investigation and Remediation of Hazardous Material Releases. Movement of contaminated soils off-site is a time consuming and costly effort. Priority should be given to reusing the soils on-site, if possible. Impacted soils kept on site during construction must remain covered at all times to prevent run-off from precipitation. Contractors are also responsible for following all of the requirements in the “Excavation” section of this document. Contractor shall not sample or remove any soils off-site without prior approval from EHS.

Underground and Aboveground Tanks

Waste oil and oil-contaminated debris are considered a hazardous waste in Rhode Island. Contractors at Brown University must comply with all state and federal requirements including RI DEM Hazardous Waste regulations for waste oil and oil-contaminated debris.

Underground Storage Tank (UST) Removal:

Closure of UST's must be pre-approved by the RI Department of Environmental Management. Contractors must coordinate the application for closure with EHS staff. Removal typically cannot occur until at least 10 days following submittal of the application for closure. Contractor shall work with EHS and Facilities Management to identify the contents. If the contents are uncontaminated, the contractor shall use a licensed transporter to move the fuel to an on-site tank with same type of fuel. Ensure that the destination tank has adequate capacity to hold the oil. If oil is contaminated (not reusable), work with EHS staff to manifest the oil off-site as a hazardous waste. All releases must be reported immediately to Brown University EHS. Tanks must be cut/cleaned per Providence Fire Marshal's regulations. Closure Assessment reports are required if fuel has leaked. Tank closures-in-place are only approved under special conditions. The closure report must be submitted to State within 30 days and shall be submitted to EHS at least 7 days prior to the due date.

The following is the listing of approved companies that perform UST removal and waste fuel hauling services for Brown University.

Lincoln Environmental
333 Washington Highway
Smithfield, RI 02917
Phone: 401-232-3353
Fax: 401-232-1130
Contact: Steve Cadoret

Clean Harbors Environmental Services
8 Dexter Road
East Providence, RI 02914
Phone: 401-431-1847
Fax: 401-431-2154
Contact: William Howard

Triumvirate Environmental
61 Inner Belt Road,
Somerville, MA 02143
Phone: 800- 966-9282

Fax: 617-628-8099
Contact: Robert Abril

Cyn Environmental Services
PO Box 119
100 Tosca Drive
Stoughton, MA 02072
Phone: 781-341-1777
Fax: 781-341-6298
Contact: Mike Courtemanche

Aboveground Storage Tank (AST) Removal:

The contractor shall work with EHS and Facilities Management to identify the contents of the AST. If the contents are uncontaminated, the contractor shall use a licensed transporter to move the fuel to on-site tank with same type of fuel. Ensure that the destination tank has adequate capacity to hold the oil. If oil is contaminated (not reusable) work with EHS staff to manifest the oil off-site as a hazardous waste.

b. Transport of Hazardous Materials

All transportation of hazardous materials while on Brown University property shall be conducted in accordance with USDOT Hazardous Materials Regulations for proper packaging, marking/labeling, handling, documentation, etc. At no time should hazardous materials be transported via public or private roads at Brown University in a manner that could result in an unsafe condition for personnel or the environment.

c. Spill Prevention and Control

Brown University's Spill Prevention Control and Countermeasures (SPCC) Program establishes University-wide procedures for the prevention and detection of spills and/or releases of oil or hazardous materials, including the following:

- Based on the inventory of oil and hazardous chemicals that will be brought on-site, the Contractor shall have available equipment (e.g., secondary containment pallets, absorbent pads, absorbent booms, speedi-dry) that is suitable and sufficient to control a potential spill/release.
- The Contractor is responsible for identifying conveyances to the environment (e.g., sumps, storm/floor drains, etc.) and adequately minimizing spill potential to these areas.
- The Contractor is responsible for the proper storage of all flammable and combustible chemicals that are brought and/or stored on site to complete the work of this contract. Storage of these materials requires the use of safety containers, safety cabinets, and/or secondary containment. The Contractor shall also ensure that any incompatible chemicals are safely segregated. The Contractor is responsible for maintaining and securing all chemical containers and all chemical storage areas. This requires selecting locations and methods to minimize exposure to rainfall, surface water, and the ground surface or subsurface. Enclosures, shelters, and secondary containment shall be used as needed.
- The Contractor must use appropriate protective procedures such as double containment, employee training, overflow protection, and other measures as part of activities involving the use, storage, or handling of petroleum products or hazardous materials on Brown University Property.

- The Contractor must ensure that his/her employees are adequately trained in spill procedures outlined below.

The University's SPCC Program also establishes reporting requirements in the event of a spill or release of oil or hazardous materials. In the event of a release or spill, the Contractor must follow all of the reporting requirements of the SPCC Program as specified below:

- The Contractor shall extinguish all sources of ignition and isolate incompatibles or reactive chemical substances.
- The Contractor shall determine if the spill/release is incidental or non-incidental.¹

For incidental spills/releases:

- The Contractor shall attempt to stop or contain the spill/release at the source provided that doing so does not endanger anyone.
- The Contractor shall prevent discharge of materials to environmental receptors including drains, sumps, soil, etc.
- The Contractor shall immediately notify the Project Manager of all incidental spills/releases.
- The Contractor is responsible for the proper collection, storage and disposal of waste materials in compliance with EPA and RIDEM regulations and in cooperation with the Project Manager.

For non-incidental spills/release:

- The Contractor shall immediately report the spill/release to the University Public Safety 401-863-4111. Public Safety will notify the University's SPCC Coordinator who will advise you on the need and initiate contact with spill response vendors.
- The Contractor shall follow the steps for incidental spill/releases identified in item above, provided that it is safe to do so.
- The Brown University SPCC Coordinator will coordinate ALL reporting to outside agencies and will conduct follow-up written notifications if necessary.
- The Contractor will conduct an incident analysis and coordinate with the Project Manager and the SPCC Coordinator on any actions that are required to prevent recurrence.
- If it is deemed necessary to engage a professional spill cleanup company, Brown University SPCC Coordinator will coordinate the cleanup through the Project Manager. The costs of the clean-up efforts will be the responsibility of the Contractor.

d. Pest Control

If a Contractor or his/her employees see evidence of cockroaches, mice, ants or other pests during the course of their work, they must notify the Project Manager immediately. The

¹ **"Incidental"** spills meet **ALL** of the following criteria: 1) personnel are familiar with the hazards associated with the spilled material; 2) containment/response does not pose potential health and safety hazards (e.g. fire, explosion or chemical exposure); 3) a small quantity of material is spilled/release which **DOES NOT** reach the environment or pose potential health and hazardous; and 4) spilled/release material can be readily absorbed, neutralized, or otherwise controlled at the time of release by employees in the immediate area or by maintenance personnel.

"Non-incidental" spills include 1) major spills/release that do not reach the environment or 2) any amount of spilled material that escapes to the environment (including drains, sumps, soil, etc.).

Contractor shall not use any insecticide products on University property unless such activities are part of your contracted work and you are specifically trained and licensed to do so.

e. Air Emissions

Combustion Units

[Combustion units include, but are not limited to boilers, hot water heaters, emergency generators and kilns.]

Brown University has an air operating permit issued by the RI Department of Environmental Management. Brown is subject to several Air pollution control regulations including but no limited to:

- Air Pollution Control Regulation No. 9: Air Pollution Control Permits
- Air Pollution Control Regulation No. 27: Control of Nitrogen Oxides Emissions.

For the main campus this means that the installation or modification of any boiler with heat input greater than one million btu/hr will require the addition of the unit in Brown University's existing air operating permit.

For University property located off the main campus, a minor source permit is required if the unit meets any of the following criteria

- Any fuel burning device designed to burn:
 - Residual oil or solid fossil fuels having a heat input capacity of one million Btu or more per hour
 - All other liquid fuels having a heat input capacity of five million Btu or more per hour
 - Gaseous fuel having a heat input capacity of ten million Btu or more per hour
 - Alternative fuels, including but not limited to, wood chips, hazardous wastes or waste oil having a heat input capacity of one million Btu or more per hour

As a result of the air operating permit all Contractors must immediately report the following to the EHS:

- Any installation or modification of a combustion unit with a maximum heat input value of one million btu/hr or greater.
- Any maintenance or repairs to a combustion unit that could result in a change in maximum heat input value or overall emissions (e.g. modification or installation to burners, exhaust stacks, generators or fuel conversions).
- Any conditions discovered which could have resulted in an increase on air pollutant emissions.

CFC Containing Units

[CFC containing units include those containing any ozone depleting refrigerants including, but not limited to, Chlorofluorocarbons (CFC) and Hydrochlorofluorocarbons (HCFC).]

Contractors shall immediately notify the EHS whenever they become aware of any unintentional or intentional release of CFCs above de-minimis levels as established by EPA regulators.

Contractors shall provide the following documentation to the Project Manager and EHS:

- EPA certifications for any reclaimers to which CFC products evacuated from Brown systems are to be sent.
- Certifications for any CFC recycle/recovery equipment to be used at Brown.
- Technician Certifications who will work on Brown University systems.
- Service records for all units containing greater than 50 pounds of refrigerant. Records must include the date and type of service and the type and quantity of refrigerant added.

Contractors shall immediately notify and provide documentation to the Project Manager and EHS whenever:

- A leak rate equals or exceeds 35% per year for commercial/industrial processes.
- A leak rate equals or exceeds 15% per year for comfort cooling processes.
- A release occurs of >100 pounds in a 24 hour period for CFC-12, CFC-113 and R-500.

Halon

Service providers shall immediately notify the Project Manager whenever it becomes aware of any unintentional or intentional release of halon.

f. Stormwater and Wastewater

Stormwater

Projects that disrupt over one (1) acre of land must adhere to the RIDEM's Phase II stormwater requirements. These projects are required to obtain a Rhode Island Pollutant Discharge Elimination System (RIPDES) permit, implement best management practices, and comply with all conditions of the General Permit including the development of a Stormwater Pollution Prevention Plan. The contractor is responsible for coordinating with Brown EHS the completion of applications for stormwater discharge permit and developing and implementing best management practices and adherence to all conditions of the permits obtained. Stormwater Pollution Prevention Plans must be submitted for approval to Brown EHS.

Impacted soils kept on site during construction must remain covered at all times to prevent run-off from precipitation.

For projects that disrupt less than one (1) acre of land Brown University requires contractors to provide erosion control plans for construction sites where runoff may disrupt municipal stormwater systems. The contractor will be held responsible for cleaning of catch basins or stormwater systems which were clogged as a result of erosion on a site.

Wastewater

Brown University's wastewater discharge is regulated by the Narragansett Bay Commission (NBC) and in some cases the RIDEM. The discharge of any wastewater must adhere to all wastewater discharge prohibitions. These include but are not limited to:

- No discharge of mercury, silver or other metal-bearing wastewater.
- No discharge of highly corrosive substances (pH < 5 or pH > 10).
- No discharge of flammable materials that could create a hazard for Brown University personnel or NBC treatment works personnel.

The Contractor must identify all wastewater streams for the Project Manager and obtain approval for drain discharge from NBC and/or RIDEM as appropriate. In addition, for

excavation projects, the Contractor is responsible for obtaining and adhering to the NBC/RIDEM dewatering permit.

g. Biological, Chemical and Radiological Hazards

Some Brown University operations involve the use of biological, chemical, or radioactive materials that can be hazardous to Brown’s students, faculty or employees if not handled safely. Areas where work with biological, chemical, or radioactive materials is being performed will be marked with appropriate signs. Do not enter these areas and do not handle hazardous biological, chemical, or radioactive material unless it is part of your contracted work and you are specifically trained to do so.

h. Asbestos Containing Materials

The Contractor shall not disturb, damage or otherwise handle any *suspect* asbestos containing material. It is recommended that the following suspect materials be assumed to contain asbestos until tested and proved otherwise:

Suspect Asbestos Containing Materials		
Cement Pipes	High Temperature Gaskets	Electrical Wiring Insulation
Cement Wallboard	Lab Hoods/Benches/Gloves	Chalkboards
Cement Wallboard	Fire Blankets/Curtains/Doors	Roofing Shingles and Felt
Flooring Backing	Elevator Equipment Panels	Base Flashing
Construction Mastics	Elevator Brake Shoes	Thermal Paper Products
Acoustical Plaster	HVAC Duct Insulation	Caulking/Putties
Decorative Plaster	Boiler Insulation	Adhesives
Textured Paints/Coatings	Breeching Insulation	Wallboard
Ceiling Tiles and Lay-in Panels	Pipe Insulation	Joint Compound
Spray-applied Insulation	Cooling Towers	Vinyl Wall Coverings
Blown-in Insulation	Electrical Cloth	Asphalt Floor Tile
Fireproofing Materials	Heating and Electrical Ducts	Vinyl Sheet Flooring
Taping Compounds	Electrical Panel Partitions	Vinyl Floor Tile
Packing Materials (wall/floor penetrations)	Ductwork Flexible Fabric Connectors	Spackling Compounds

The Contractor shall not sweep, dust, vacuum, or mop dust or debris that is the product of a suspect asbestos containing material. The Contractor shall also not pick up or throw away any suspect asbestos-containing waste or trash. If it material that is suspected to be asbestos containing is disturbed and becomes airborne, the Contractor shall immediately notify the Project Manager and Service Response at 401-863-7800.

If it is part of the Contractor’s work, stripping of floor finishes shall be done using low abrasion pads at speeds lower than 300 rpm and wet methods shall be used. The Contractor shall take care not to over strip floors and shall stop stripping immediately upon removal of the old surface coat. Sanding of flooring material is strictly prohibited unless it is part of your contracted work and you are specifically trained to do so.

Any suspect asbestos containing material that is observed by the Contractor to be crushed, ripped, broken or in any way damaged should be reported to the Project Manager immediately.

Contractors must immediately convey to the Brown University Project Manager any information they newly discovered about the presence, location and quantity of asbestos containing or potentially asbestos containing materials.

Asbestos containing building materials should not be entombed or abandoned as a solution to project cost. The material may be forgotten and overlooked in future renovations causing a potential for future exposures. Examples of entombing includes but is not limited to installing carpet over vinyl asbestos tiles, installing fiberglass pipe insulation over asbestos pipe insulation. All exceptions to this policy must be approved by the Director of EHS. It is the policy of Brown University that no asbestos containing building materials may be used in new construction or renovations on University property.

Asbestos Abatement Activity Requirements

For planned asbestos abatement projects Brown University will have determined, before work is begun, the presence, location, and quantity of asbestos-containing materials that would be impacted by the work of the contract. The Brown University Project Manager will provide a current asbestos inspection report to the contractor which is consistent with the scope of work. Contractors should coordinate with the Project Manager for specific requirements for asbestos abatement work. The Office of Environmental Health & Safety should be consulted as needed by the Project Manager.

The following is the list of approved asbestos abatement companies that perform asbestos abatement services for Brown University. Any other contractor must receive specific approval by EHS, Purchasing & Facilities Management.

Yankee Fiber Inc.
2 Dexter Road
East Providence, RI 02914
Phone: (401) 435-4390
Fax: (401) 435-5584
Contact: Ron Gagnon, Jim Hutzler

Pasquazzi Brothers Inc.
464 Dyer Avenue
Cranston, RI 02920
Phone: (401) 942-2250
Fax: (401) 943-8233
Contact: Henry Pasquazzi

Sitecon Corporation
1430 Cranston Street, Suite A
Cranston, RI 02920
Phone: (401) 944-2335
Fax: (401) 944-6669
Contact: Michael Lema

Brown University has specific requirements during all asbestos abatements.

- Contractors & asbestos abatement contractors must review and be familiar with the asbestos inspection report and asbestos abatement plans.
- The asbestos abatement contractor must:
 - Perform all OSHA required personnel air monitoring.
 - Provide original waste shipment records to EHS for recordkeeping and copies to the Brown University Project Manager.

- Provide copies of waste shipment records to the state.
- Under the direction of the Brown University Project Manager, the Industrial Hygiene consultant shall:
 - Perform an asbestos inspection, take samples as appropriate and prepare a report for any affected area within the defined scope of work.
 - Prepare and submit the asbestos abatement plan to RIDOH.
 - Perform baseline air monitoring as required.
 - Provide air monitoring during every work shift where abatement is performed.
 - Perform visual inspections and clearance air samples at the completion of abatement activities.
 - Authorize re-entry once acceptable air clearance samples have been received.
 - Provide all analytical results, inspection reports, abatement plans and air clearance results to EHS and the Project Manager.
 - Provide air clearance results to RIDOH.

The following is the list of approved industrial hygiene consultants that perform industrial hygiene services for Brown University. Any other industrial hygiene consultant must receive specific approval by EHS.

Rhode Island Analytical
41 Illinois Avenue
Warwick, RI 02888
Phone: (401) 737-8500
Fax: (401) 738-1970
Contact: Daniel Simas

Emery Environmental Associates
P.O. Box E
Pawtucket, RI 02861
Phone: (401) 727-4941
Fax: (401) 724-0926
Contact: Patrick Emery

Brown University faculty, staff and students can view the University's complete Asbestos Operations & Maintenance Program at the following URL:

http://www.brown.edu/Administration/EHS/restricted/asbestos_operations.pdf

i. Lead Paint

Unless the Brown University Project Manager provides a specific lead-paint inspection, Contractor's should assume that any painted surface they come in contact with is coated with lead-based paint. Therefore, Contractor's should not perform any intrusive, dust-generating work on painted surfaces (e.g., drilling, cutting, brazing, scraping, demolition), unless the surface has confirmed to be non-lead or unless such work is part of your contracted work and you are specifically trained to do so.

Any painted surfaces that have loose, flaking, chipping or otherwise non-intact paint should not be impacted by the Contractor and should be reported to the Project Manager immediately.

Lead paint abatement contractors should coordinate with the Project Manager and the University's EHS Department for specific requirements for lead abatement work. Refer to

the section of this program on Hazardous Waste for guidelines on the proper disposal of lead containing paint.

Waste Generation Notification Requirements

The contractor shall notify the Brown University Office of Environmental Health & Safety prior to beginning work and provide the following information:

- Location of project
- Results of any analytical work performed including sampling locations
- Estimate of the quantity of lead-containing material to be generated
- Identification of the proposed hazardous waste transporter and its 12 character EPA ID number (e.g., CTD000012345)
- Identification of the proposed ultimate disposal location for the waste and 12 character EPA ID number for the disposal location

EPA Identification Numbers

EHS will provide the contractor with the appropriate EPA identification number or request a new temporary EPA ID number from RIDEM if an EPA ID does not exist for the work location. Contractors or subcontractors shall not obtain EPA ID numbers on behalf of Brown University under any circumstances.

Waste Hauling or Disposal Subcontractor Selection

Waste hauling or disposal subcontractors shall be selected from the approved list provided by EHS. Refer to the “Waste Hauling” section of this document.

Waste Storage, Container and Container Labeling Requirements

As hazardous waste is generated, the contractor must ensure that it is packaged as follows:

Container Specifications – All containers will meet all applicable DOT requirements. Any existing labels on the containers must be removed or completely painted over prior to using it for waste.

Waste Storage – Drums may be used to store either liquid or solid materials, but if a liquid is stored in a drum it must be stored on a secondary containment pallet. All drums must be closed except when adding material to the drum. Boxes may only be used for solid material and shall have a 6-mil poly liner and be secured to a pallet. All boxes must be closed except when adding material to the container. Roll-offs may only be used for solid material and shall have a 6-mil poly liner. Roll-offs shall be covered so as to protect waste from contact with rainwater. All roll-offs must be closed and secured except when adding material to the container.

Container Labeling – All containers must be labeled as soon as material is added to it. Hazardous waste labels can be obtained from the selected waste hauler. For drums, labels will be attached to the side of the drum near the top, and the drums are to be stored so that the labels are easily visible at all times. For boxes, two sets of labels must be attached and be on opposite sides of the box. All labels will be attached to box near the top, and the containers are to be stored so that the labels are easily visible at all times. Duct tape or similar shall be used to close the box flaps. Two sets of labels must be attached and be on opposite sides of the roll off. All labels must have the words “Hazardous Waste” and must identify the contents of the container. All materials placed in the roll-off shall be no more than three feet long in any direction and the roll-off may not be filled higher than the sidewalls.

The contractor must ensure:

- The containers are in good condition (e.g., no damage, dents, excessive rust)
- There is no water damage to the container and that the waste is protected from the weather

If a container is damaged, the waste must be transferred to a new container with the appropriate labels.

Waste Identification, Characterization and Profiling

The contractor must perform all waste characterizations of the waste generated at the site as required by the waste disposal location. Contractors must provide all results of waste characterization to EHS. Contractors will coordinate with EHS and the waste disposal location to develop the waste profile. The Office of Environmental Health & Safety must review and sign waste profiles prior to the contractors arranging for waste shipment.

Waste Movement On-site

Waste containers must not be moved from the work site without permission of EHS. When multiple projects are being completed on campus, waste is not to be moved from project area to project area without consultation and approval of EHS.

Waste Shipment Off-site

Waste must be transported from the work site within 90 days of the date of generation or when the project is completed, whichever is sooner. Waste must not be moved off-site without the approval of EHS. The contractor must coordinate the waste shipment with the waste hauler and with staff from EHS.

Only staff from EHS may sign Waste manifests and Land Disposal Restrictions forms.

Industrial Hygiene Monitoring

Brown University uses a select group of approved industrial hygiene consultants that perform industrial hygiene services for Brown University. Please refer to the list of IH consultants used in the asbestos section of this document. Any other industrial hygiene consultant must receive specific approval by EHS.

Brown University faculty, staff and students can view the University's complete Lead Exposure Control Program at the following URL:

http://www.brown.edu/Administration/EHS/restricted/lead_exposure_control.pdf

j. Construction in Occupied Buildings

When building occupants are present during construction projects additional safeguards must be implemented to eliminate exposures and complaints. Dusts/particulates from demolition, sanding and other construction activities must be controlled by containment and negative air ventilation systems. Similar controls must be utilized for similar odorous activities including, but not limited to, carpet adhesive, painting, welding, and coatings.

Control of dusts/particulates in both occupied and unoccupied buildings will also prevent the contamination of HVAC systems. The contractor must ensure that the HVAC system in each building is turned off and that the system is sealed off to prevent contamination. If an HVAC system is unprotected and contaminated by construction/demolition materials, the contractor will be held responsible for the cost of the system and other related cleaning.

Negative air ventilation systems shall have appropriate filtration and exhausted outside of the building.

Occupant complaints related to dust/particulates and odors during construction may interrupt the project schedule. Projects may only continue once problems have been resolved.

k. Mold Prevention & Remediation

This section provides guidance for Contractors and employees who may encounter moldy or potentially moldy building materials. This section is first designed to prevent mold growth and second to ensure compliance during mold remediation activities.

The following are EPA guidelines on how to prevent excessive mold growth from becoming a problem at Brown University properties.

- Store all raw building materials to prevent exposure to precipitation and moisture prior and during installation.
 - Any newly installed materials found to contain excessive moisture must be removed and replaced at the expense of the contractor.
- Fix leaky plumbing and leaks in the building envelope as soon as possible.
- Watch for condensation and wet spots. Fix source(s) of moisture problem(s) as soon as possible.
- Prevent moisture due to condensation by increasing surface temperature or reducing the moisture level in air (humidity). To increase surface temperature, insulate or increase air circulation. To reduce the moisture level in air, repair leaks, increase ventilation (if outside air is cold and dry), or dehumidify (if outdoor air is warm and humid).
- Keep heating, ventilation, and air conditioning (HVAC) drip pans clean, flowing properly, and unobstructed.
- Vent moisture-generating appliances, such as dryers, to the outside where possible.
- Maintain low indoor humidity, below 60% relative humidity (RH), ideally 30-50%, if possible.
- Perform regular building/HVAC inspections and maintenance as scheduled.
- Clean and dry wet or damp spots within 48 hours.
- Don't let foundations stay wet. Provide drainage and slope the ground away from the foundation.
- Minimize the use of wet extraction machines on carpets during humid seasons (i.e. summer).

The following are EPA guidelines on how to safely investigate and evaluate mold and moisture problems.

- Contact the Office of Environmental Health & Safety if a mold problem is expected or found.
- Do not touch mold or moldy items with bare hands.
- Do not get mold or mold spores in your eyes.
- Do not inhale mold or mold spores.
- Consider using PPE when disturbing mold. The minimum PPE is an N-95 respirator, gloves, and eye protection.
- Consult Table 2 of the EPA's guideline for "Mold Remediation in Schools and Commercial Buildings" for Personal Protective Equipment (PPE) and containment guidelines.

Once mold growth has occurred Brown University recommends following the U.S. EPA guidelines for mold remediation found in the publication entitled “Mold Remediation in Schools and Commercial Buildings,” a guideline for mold remediation. This guideline can be viewed at the following URL:

<http://www.epa.gov/iaq/molds/index.html>

In summary, the guideline provides contractors with easy to follow tables which dictate times and methods of remediation of a wide variety of materials. For example, the guideline makes the following recommendations.

- It is acceptable for clean water damage to be cleaned up and completely dried within a period of 24 to 48 hours to prevent mold growth.
- Cleanup within 24 to 48 hours must take place following the EPA guidelines.
- For existing mold growth on building materials or cleanup after the 24 to 48 hour period caused by clean water, clean up must take place following the EPA guidelines.
- EPA requires that mold growth be categorized in to three action levels.
 - Small which requires that the total surface area affected is less than 10 square feet.
 - Medium which requires that the total surface area affected is between 10 and 100 square feet.
 - Large which requires that the total surface area affected to be greater than 100 square feet or potential for increased occupant or remediator exposure during remediation?

Small areas can be cleaned up by meeting the following minimum requirements:

- See Table 2 for the cleanup method that is appropriate for the materials in question and this size area.
- Minimum PPE: N-95 respirator, disposable gloves, and goggles.
- No containment is required.

Medium areas can be cleaned up by meeting the following minimum requirements:

- See Table 2 for the cleanup method that is appropriate for the materials in question and this size area.
- Limited PPE: N-95 respirator or half-face APR with a HEPA cartridge, disposable gloves, disposable coveralls and goggles.
- Limited containment is required.
 - Use polyethylene sheeting ceiling to floor around affected area with a slit entry and covering flap; maintain area under negative pressure with HEPA filtered fan unit. Block supply and return air vents within containment area.

Large areas can be cleaned up by meeting the following minimum requirements:

- See Table 2 for the cleanup method that is appropriate for the materials in question and this size area.
- Full PPE: full-face respirator with HEPA filter, disposable gloves, disposable full body clothing, head gear and disposable foot coverings
- Full containment is required.
 - Use two layers of fire-retardant polyethylene sheeting with one airlock chamber. Maintain area under negative pressure with HEPA filtered fan exhausted outside of building. Block supply and return air vents within containment area.

If the mold is a preexisting condition, Brown University may have determined, before work is begun, the presence, location, and quantity of mold-contaminated materials that would be specifically impacted by the work of the contract. The Brown University Project Manager

will provide any available mold inspection reports for those work areas in question. The contractor shall not disturb moldy materials unless such activities are part of the contracted work and the contractor has been approved by EHS and specifically trained to do so. Mold remediation contractors should coordinate with the Project Manager and the Office of Environmental Health & Safety for specific requirements for mold remediation work.

The Contractor shall prevent and remediate mold growth by following all of the applicable Environmental Protection Agency's guidelines. The Contractor shall not sweep, dust, vacuum, or mop dust or debris that is contaminated with mold. The Contractor shall also not pick up or throw away any suspect mold-contaminated waste or trash. If the material is mold-contaminated and is disturbed and becomes airborne, the Contractor shall immediately notify the Project Manager and EHS.

Contractors must, immediately, convey to the Brown University Project Manager any information they newly discover concerning the presence, location and quantity of mold-contaminated materials.

The following is the list of approved mold remediation companies that perform mold remediation services for Brown University. Any other mold remediation contractor must receive specific approval by EHS.

Enviro-Clean, Inc.
41 Cedar Swamp Road
Smithfield, RI 02917
Phone: (401) 232-5850
Fax: (401) 231-6126
Contact: Eric Anderson

Air sampling for mold remediation projects must only be performed with approval from the Office of Environmental Health & Safety. Brown University uses a select group of approved industrial hygiene consultants that perform industrial hygiene services for Brown University. Please refer to the list of IH consultants used in the asbestos section of this document. Any other industrial hygiene consultant must receive specific approval by EHS.

3. OSHA Safety Issues

a. Right-To-Know / Hazard Communication

The Contractor shall submit an inventory of all hazardous materials that are brought on-site with accompanying Material Safety Data Sheets to the Project Manager. The Contractor shall also ensure that all containers that are brought on site for the storage of hazardous chemicals (e.g., gas, paint, etc.) are labeled and inspected in accordance with all applicable regulations. The Contractor shall remove all hazardous materials that it brings on-site when work involving a specific hazardous material is complete (see abandoned products section of this program). Be sure to remove hazardous materials in compliance with all of the requirements of the environmental section of this document. The Contractor may request and review Material Safety Data Sheets for any chemicals that are encountered on University property during the performance of its work by contacting EHS at 863-3353.

- Rhode Island State Law requires that employees receive initial and annual right-to-know training about the chemical hazards present in their workplace.
- When hazardous materials are used to complete a project scope of work, MSDS and similar information regarding these products must be provided to Brown prior to their use. Contractors must maintain MSDS's on-site.

- The use of hazardous materials in occupied buildings must be approved by the Brown University Project Manager and following the guidelines in the “Construction in Occupied Buildings” section of this document.
- Use flammable solvents and materials with extreme caution.
- Flammable paints and solvents must be stored in approved flammable liquid storage cabinets if inside buildings consistent with NFPA standards.

The Contractor must also comply with all of the OSHA regulations regarding multi-employer workplaces.

Brown University faculty, staff and students can view the University’s complete Hazard Communication Program at the following URL:

http://www.brown.edu/Administration/EHS/restricted/hazard_communication.pdf

b. Personal Protective Equipment

Personal protective equipment (PPE) is designed to provide additional worker protection despite efforts to eliminate the hazard through engineering controls. Personal protective equipment can only protect a worker from hazards if the equipment is worn consistently and properly. The following is a listing of common types of PPE, which are used in the construction industry. However, this is not a complete list and other forms of PPE should be used as appropriate when working at the University. Contact the Office of Environmental Health & Safety at 863-3353 for additional assistance in selecting the correct PPE for the task.

Brown University faculty, staff and students can view the University’s complete Personal Protective Equipment Assessment Program at the following URL:

http://www.brown.edu/Administration/EHS/restricted/ppe_assesment.pdf

Head Protection

OSHA specifies that any employee working in an area where there is potential danger of head injury must wear a protective hard hat. Potential dangers include injury from impact, falling objects, flying objects, or electrical shocks or burns. Hard hats are always required on multi-trade jobsites due to the risk of injury from other trade operations.

- All hard hats must meet the most current hard hat requirements as set forth by ANSI. The most current ANSI hard hat standard is Z89.1-2003 as of October 2003.
- Daily inspections must be made on all hard hats, including the shell and suspension system.
- A hard hat is not to be modified or painted unless the manufacturer’s instructions allow it.

A protective hair covering (hair net) may also be prudent for individuals who have long hair. A hair net could be used to protect against chemical contamination of hair, entanglement of hair in machinery or equipment, and preventing hair from interfering with the workers vision or respiratory device.

Eye and Face Protection

Eye and face protection can be used to protect the worker from airborne dusts, mists and particles; glare; splashing liquids; ultraviolet radiation or a combination of these hazards.

Safety glasses, safety goggles, and face shields are all types of eye and face protection with specific emphasis on certain hazards.

- Safety glasses are used for impact hazards, which include, but are not limited to grinding, cutting and equipment operation.
- Safety goggles are used for splash and particulate hazards, which include, but are not limited to chemical application, sanding and misting.
- Face shields are only to be used in conjunction with safety glasses or goggles. Use of a face shield alone is unacceptable. Face shields are to be used as additional protection for the workers face and will protect the worker from direct impact and splashes.

It is important to realize that contact lenses do not provide any protection for the eyes. Safety goggles must be worn when working with chemicals. If a something does enter your eye you must remember to remove your contact lenses to ensure a thorough flushing of your eye. If not removed a chemical can concentrate behind the contact lens and create an increased hazard.

If lasers are used during construction or engineering of a project special eye protection might be necessary. Please refer to the laser safety section of this document, the equipment manufacturer, or contact the Office of Environmental Health & Safety at 863-3353.

Hearing Protection

Employers are required to provide hearing protection training and medical monitoring for employees who are working in areas exceeding the OSHA 85 decibel action level. A hearing protective device with an adequate noise reduction rating is required by OSHA when workers are exposed to sound levels exceeding 90 decibels during their work shift. Activities frequently exceeding the OSHA threshold are jack hammering, grinding operations, table saw operation, hammering operations and fire alarm testing.

Brown University faculty, staff and students can view the University's complete Hearing Conservation Program at the following URL:

http://www.brown.edu/Administration/EHS/restricted/hearing_conservation.pdf

Hand Protection

Hand protection is required by OSHA when workers are exposed to hazards such as those from skin absorption of harmful substances, severe cuts or lacerations, severe abrasions, punctures, chemical burns, thermal burns, and harmful temperature extremes.

Hand protection varies based on the type of hazard. There is a large variety of protective gloves used to protect a worker from chemical hazards. A worker must be responsible for being aware of the chemical that they are working with and whether or not the glove they are using is appropriate. A worker should refer to the product's MSDS to determine the appropriate glove to be used for the task.

Protective Clothing

All employees and contractors involved in construction activities must conform to the following. Construction workers must wear, at minimum, Level D personal protective equipment. Level D PPE includes pants, long sleeve shirt, safety boots or shoes, safety glasses or goggles and a hard hat. Gloves or a face shield would be an example of optional Level D PPE.

A safety vest may also be required if a worker is exposed or potentially exposed to vehicular traffic. The safety vest should be reflective and brightly colored so as to alert traffic to the position of the worker during both day and evening operations.

Foot Protection

Safety boots or shoes shall be designed to protect the workers feet from chemical, compression, crushing, or puncture hazards. Safety footwear may also provide electrical protection to the worker if necessary for the tasks being performed.

Safety boots or shoes used on construction sites must meet all of the requirements in both OSHA 29 CFR 1926.96 Occupational Foot Protection and OSHA 29 CFR 1910.136 Occupational Foot Protection.

Respiratory Protection

Employees who respond to emergency situations, or work with or around hazardous materials, hazardous waste, or any other hazardous environment may need to use respiratory protection in cases where engineering controls cannot provide adequate protection against exposures. The proper use of respiratory protection can reduce, minimize, or eliminate the risk of injury or illness due to hazardous chemical exposure.

If any respirator is going to be purchased and installed in a University building by a Contractor for future University use the Contractor must contact EHS.

Brown University faculty, staff and students can view the University's complete Respiratory Protection Program at the following URL:

http://www.brown.edu/Administration/EHS/restricted/respiratory_protection.pdf

c. Confined Space Entry

Background

Brown University has developed and implemented a Permit-Required Confined Space Program to protect all University employees who are required to enter confined spaces. For information on University specific requirements for entering confined spaces please contact the Project Manager or Environmental Health & Safety.

This University-wide program defines a “Confined Space” and an “Enclosed Space” in accordance with 29 CFR 1910.146 and 1910.269, respectively. Entrance into any of these spaces by a Contractor requires adherence with all applicable regulations as well as with certain University protocols as defined further below.

Requirements

- The Contractor is responsible for developing, implementing and maintaining his/her own Confined Space Entry Program, including provisions for emergency rescue in accordance with OSHA regulations as it applies to the work of this contract.
- If during the course of work, the Contractor encounters a confined space that has not been previously identified by the University, it must immediately bring the space to the attention of the Project Manager and delay entry until Brown has examined the space.
- When both University personnel and Contractor personnel are working in or near confined spaces, the Contractor shall coordinate all operations with the affected University personnel before entry.

- Advance notification is always required. Whether you enter a confined space with a Brown employee or not, the Contractor’s entry attendant must always first inform Brown University Project Manager or Service Response at 401-863-7800 before you enter a confined space.

The Contractor shall provide the Project Manager or Service Response with:

- The exact location of the confined space;
- The time of entry and approximate entry duration; and
- The names of authorized attendants and entrants.
- *After the entry:* If you have entered a “permit-required” confined space, you must, after the entry is concluded, notify Brown of (1) the permit space program you followed and (2) any hazards you confronted or created in the space.
- The time the entry is complete and that all entrants are safely out.

Brown University faculty, staff and students can view the University’s complete Confined Space Program at the following URL:

http://www.brown.edu/Administration/EHS/restricted/confined_space.pdf

d. Fall Protection

The OSHA Standard “29 CFR Subpart M – Fall Protection” identifies areas or activities where fall protection is needed. These include, but are not limited to, ramps, runways, and other walkways; excavations; hoist areas; holes; formwork and reinforcing steel; leading edge work; unprotected sides and edges; overhand bricklaying and related work; roofing work; precast concrete erection; wall openings; residential construction; and other walking/working surfaces. The rule sets a uniform threshold height of 6 feet (1.8 meters), thereby providing consistent protection. This means that construction employers must protect their employees from fall hazards and falling objects whenever an affected employee is 6 feet (1.8 meters) or more above a lower level. Protection must also be provided for construction workers who are exposed to the hazard of falling into dangerous equipment.

Under the new standard, employers will be able to select fall protection measures compatible with the type of work being performed. Fall protection generally can be provided through the use of guardrail systems, safety net systems, personal fall arrest systems, positioning device systems, and warning line systems, among others.

The OSHA rule clarifies what an employer must do to provide fall protection for employees, such as identifying and evaluating fall hazards and providing specific training. Requirements to provide fall protection for workers on scaffolds and ladders and for workers engaged in steel erection of buildings are covered in other subparts of OSHA regulations.

Brown University faculty, staff and students can view the University’s complete Fall Protection Program at the following URL:

http://www.brown.edu/Administration/EHS/restricted/fall_protection.pdf

e. Excavation

Prior to any excavation the contractor is responsible for notification of all applicable utility companies that excavation work is being performed. The contractor should contact Dig Safe at 1-888-DIG-SAFE and any other utility that cannot be contacted by calling Dig Safe. The contractor is also responsible for contacting the Brown University Project Manager for specific Brown University owned utility information prior to beginning any excavation. Contractors are also responsible for following all of the requirements in the “Soils” section of this document.

- Contractors must note that contacting Dig Safe will not cover work on private (University) property. Dig Safe will not locate University owned utilities except when they interface with other utilities.
- Contractors must provide Dig Safe numbers to the Project Manager so that the number can be forwarded to Service Response and other University departments.
- Contractors are responsible for updating the Dig Safe number every 30 days and distributing to the appropriate jurisdictions including the Project Manager and City Inspections Division.
- Contractor must verify the location of any marked utility or as-built information either prior to or during excavation.

During excavation the contractor is responsible for ensuring a safe working environment for its employees and pedestrians. The contractor must ensure compliance with all the requirements of U.S. OSHA’s Excavation Standard 29 CFR 1926 Subpart P. In addition Brown University has additional requirements that must be completed during any excavation. They are as follows:

- The contractor is responsible for submitting excavation plans to the Project Manager prior to any excavation related activities.
- Maintain a physical barrier around all excavations and machinery. Often times caution tape is insufficient, and barriers like properly supported snow fencing or temporary chain link fencing must be installed. All excavation sites are to be secured during off work hours to prevent unauthorized access. Only Brown University owned locks, keyed with contractor cores, can be utilized on construction fencing for a University excavation. Contact the Project Manager for coordination of these locks.
- If work is being performed in a public roadway the contractor is responsible for contacting the city and making all arrangements for police details and/or street closures if appropriate.
- The contractor is responsible for providing the proper signage necessary to direct both vehicular and pedestrian traffic safely around or through the work area.
- The contractor will notify the Project Manager prior to any utility shutdown both public and private. The contractor must also notify the Project Manager immediately of any unplanned shutdown or interference with any site utility.
- The contractor will notify the Project Manager of any overtime hours necessary to complete the work.
- If work is being performed in a high traffic areas all workers must conform to OSHA paragraph 1926.651(d) for exposure to vehicular traffic.
- The contractor is responsible for routine inspections of all excavation equipment. The inspection is to include safety features like back-up warning sounds and appropriate lighting.
- The contractor is responsible to ensure that equipment operators carry the required (valid) licenses and have the necessary training to operate the equipment on site.
- If there is potential for a hazardous atmosphere in an excavation contractors must follow all of the requirements in OSHA paragraph 1926.651(g) to ensure workers are

not exposed to hazardous substances and/or an oxygen deficient environment. Should there be a confined space condition such as tunneling or manhole entry the contractor is to follow all OSHA and Brown University confined space requirements.

- If dewatering is necessary for an excavation the contractor must contact EHS and the Project Manager prior to excavation for environmental compliance assistance.
- The contractor is responsible for providing a safe working environment for any employee entering any excavation. OSHA states that while the excavation is open, underground installations shall be protected, supported or removed as necessary to safeguard employees. The contractor will review and adhere to all OSHA requirements while completing the work.
- When working around City and/or University owned trees the contractor must take special precautions not to harm the tree in any way. The contractor must notify the City of Providence Parks Department Forestry Division at 785-9450, ext. 254 if the tree is a city owned and/or Brown University's Grounds Superintendent at 863-7825 if the tree is University owned.

f. Ladder Safety

A means of access is required anytime an employee or contractor needs to access a surface that is 19 inches higher or lower than the surface they are standing or working on. The access is most commonly gained through the use of a ladder. The following are guidelines for safe use of a ladder.

- Portable ladders must be able to sustain four times their maximum intended load.
- For fewer than 25 people, generally only one ladder is required unless there is simultaneous traffic in both directions.
- The rungs on portable ladders should be 10 to 14 inches apart and 8 to 12 inches on step stools.
- The rungs on extension ladders should be 8 to 18 inches apart on the base sections and 6 to 12 inches on the extension sections.
- The rungs should be shaped or coated so that they are slip resistant.
- The side rails on all ladders are at least 11 ½ inches apart.
- Ladders shall be maintained so that they remain free of all slipping hazards, such as grease and oils.
- Ladders are to be inspected on a regular basis.
- Ladders that are deemed unsafe must be removed from service immediately.
- Ladders must be setup on level and stable ground.
- Barricades should be setup to direct pedestrian traffic away from a ladder.
- Ladders must be tied off at all times.
- A ladders slope shall always be 4:1 (4' of height to 1' away from building)
- The top of a ladder must always extend 3 feet higher than the roof or work platform it is resting upon. Unless it is equipped with a secure grab rail.
- The areas around the top and bottom of the ladder must remain clear of debris and other objects.
- The side rails of the ladder are to be balanced equally against the upper level.
- When using a stepladder, the metal spreaders must be in the locking position.
- No work shall be performed until all ladders are properly secured.
- Ensure that no electrical wires are in areas where metal ladders are being used.
- While on a ladder employees or contractors must face the ladder and maintain at least three-points of contact with the ladder at all times. No awkward or excessively heavy loads are to be carried on a ladder by employees or contractors.

- Employees or contractors shall not use the rungs on an extension ladder above the landing or work area without the bottom of the ladder being secured.
- All ladders must be removed at the end of the work shift to prevent unauthorized access to elevated surfaces.

Brown University faculty, staff and students can view the University's complete Ladder Safety Program at the following URL:

http://www.brown.edu/Administration/EHS/restricted/ladder_safety.pdf

g. Lock out / Tag out

Brown University protects its students, faculty, employees, neighbors and property in part by complying with OSHA 29 CFR 1910.147 – Control of Hazardous Energy Sources (a.k.a. Lockout/Tagout). As part of Brown's Lockout/Tagout Program, locks and tags are used to control the start-up of equipment that is being serviced or maintained by its employees. At no time shall the Contractor or its employees override any locks or tags that they encounter during the performance of their work.

The Contractor is responsible for developing, implementing and maintaining his/her own Lockout/Tagout Program in accordance with OSHA regulations as it applies to the work of this contract. The Contractor shall ensure that its Lockout/Tagout Program meets all of the requirements of OSHA's multi-employer workplace requirements.

- Brown University Facilities Management is responsible for all shut down and start up of utility systems for all University properties.
- The Contractor will maintain a log of all machines and equipment that are locked out and/or tagged out during the performance of the work of this contract. This log shall identify the equipment that was worked on, the date that work was performed, and the name of the individual performing the work. The Contractor should submit this log to the Project Manager on a monthly basis when lockout/tagout work is being performed.

Brown University faculty, staff and students can view the University's complete Lockout / Tagout Program at the following URL:

<http://www.brown.edu/Administration/EHS/restricted/loto.pdf>

h. General Electrical Safety

- Ground Fault Circuit Interrupters (GFCI's) are to be used with any electric equipment used in wet or potentially wet environments. GFCI's can be either in the form of a "pigtail" or hard wired to the buildings electrical system.
- Only qualified electricians are permitted to work on electrical systems and equipment that uses or controls electrical power.
- Defective or modified extension cords should not be used.
- Do not operate electrical tools or equipment in wet areas or areas where potentially flammable dusts, vapors, or liquids are present, unless specifically approved for the location.
- Should a circuit breaker or other protective device "trip," ensure that a qualified electrician checks the circuit and equipment and corrects problems before resetting the breaker.
- Erect barriers and post warning signs to ensure non-authorized personnel stay clear of the work area.

- Report hazards (lack of protective guards or covers, damaged equipment, etc.) to the Brown University Project Manager immediately.
- Do not leave electrical boxes, switchgear, cabinets, or electrical rooms open when not directly attended. Insulate energized parts when covers have been removed or doors are open. Use of cardboard, plywood, or other flammable materials to cover energized circuits is prohibited.

i. Compressed Gas Cylinders

Compressed gases can pose a severe hazard to Brown's students, faculty, staff, neighbors and property. Therefore, the following measures must be taken for their protection:

- Valve protection caps must be in place when compressed gas cylinders are transported, moved, or stored.
- Close cylinder valves and replace valve covers/caps when a cylinder is not actively in use, when cylinders are empty and/or when being moved.
- Secure compressed gas cylinders in an upright position in a welding cart or to a solid object (using chains, straps, or a rigid retaining bar). Secure compressed gas cylinders on an approved carrier while being transported.
- Keep cylinders at a safe distance or shielded from welding or cutting operations. Do not place cylinders where they can contact an electrical circuit.
- Contractors must follow all OSHA, Compressed Gas Association (CGA) and applicable NFPA guidelines for compressed gas storage and use. EHS recommends that contractors keep oxygen and flammable gas regulators in proper working order and a wrench in position on the acetylene valves when in use. If not manifolded together, separate oxygen and flammable gas cylinders by 20 feet or a 5-foot high fireproof barrier.
- If a leak develops in a cylinder and it cannot be immediately corrected, move the cylinder to a safe location outside the building if there is a safe means to transport the cylinder. Use of an elevator would be prohibited under such conditions. Notify the Project Manger immediately and call EHS as needed.
- Use only approved spark igniters to light torches.
- Cylinders must not be taken into or stored in confined spaces, including gang boxes and office/storage trailers.
- Do not route hoses and regulators through unventilated or closed containers or areas.
- Do not leave behind partially filled or empty cylinders. Always remove them from the site promptly.

Acetylene is an unstable gas and has compatibility issues with other materials including copper. No copper tubing should be used and special low copper regulators are required. It is recommended that all acetylene tanks have back flow protectors to prevent contamination. Acetylene tanks should never be tipped since there is acetone stored in the bottom of every cylinder.

Contractors must receive specific EHS approval prior to installing any air monitoring equipment on University property. Many compressed gas manifold systems incorporate air monitoring equipment which can have annual operation and maintenance costs exceeding the installation costs. Consult EHS for recommended monitoring equipment being selected. (Notification to EHS) The contractor must provide a cost estimate for annual operation and maintenance procedures. (Notification to Project Manger)

j. Powder-Actuated Tools

Powder-actuated tools can pose hazards to Brown's students, faculty, employees, neighbors and property. Such tools are, therefore, not permitted in occupied Brown buildings without the approval of the Brown University Project Manager. If a power-actuated tool is allowed on campus, it must be operated in accordance with OSHA Standard 29 CFR 1926.302. In addition:

- Contractor's who operate powder-actuated tools must be properly trained in their use and carry a valid operator's card provided by the equipment manufacturer.
- Each powder-actuated tool must be stored in its own locked container when not being used and remain unloaded until it is to be used immediately.
- A sign at least 7 inches by 10 inches with bold face type reading "POWDER-ACTUATED TOOL IN USE" must be conspicuously posted when the tool is being used.
- All Powder-actuated tool operators must have and use appropriate personal protective equipment such as hard hats, safety goggles, safety shoes and ear protectors.
- Powder-actuated tools should not be used in an explosive or flammable atmosphere.
- Before using the powder-actuated tool, the worker should inspect it to determine that it is clean, that all moving parts operate freely, and that the barrel is free from obstructions.
- A powder-actuated tool should never be pointed at anybody.
- Hands should be kept clear of the barrel end. To prevent the powder-actuated tool from firing accidentally, two separate motions are required for firing: one to bring the tool into position, and another to pull the trigger. The tools must not be able to operate until they are pressed against the work surface with a force of at least 5 pounds greater than the total weight of the tool.
- If a powder-actuated tool misfires, the employee should wait at least 30 seconds, then try firing it again. If it still will not fire, the user should wait another 30 seconds so that the faulty cartridge is less likely to explode, than carefully remove the load. The bad cartridge should be put in water.
- The muzzle end of the powder-actuated tool must have a protective shield or guard centered perpendicularly on the barrel to confine any flying fragments or particles that might otherwise create a hazard when the tool is fired. The tool must be designed so that it will not fire unless it has this kind of safety device.
- All powder-actuated tools must be designed for varying powder charges so that the user can select a powder level necessary to do the work without excessive force.
- If a powder-actuated tool develops a defect during use it should be tagged and taken out of service immediately until it is properly repaired.

k. Pneumatic Tools & Compressed Air Systems

Pneumatic tools are tools powered by compressed air. The compressed air creates a powerful energy which if used properly can be extremely useful in construction activities. However the compressed air can also create a hazardous condition if the proper precautions are not taken. Contractor must comply with the following when working at Brown University with pneumatic tools.

- Eye protection is required for any work using a pneumatic powered tool. Face protection is recommended for certain types of work.
- Hearing protection must also be used when operating pneumatic tools which create noise levels in excess of OSHA's action levels.
- A tool retainer shall be installed on each piece of utilization equipment which, without such retainer, may eject the tool.

- All pneumatically driven nailers, staplers, and other similar equipment provided with automatic fastener feed, which operate at more than 100 p.s.i. pressure at the tool shall have a safety device on the muzzle to prevent the tool from ejecting fasteners, unless the muzzle is in contact with the work surface.
- Pneumatic tools shall be secured to the hose or whip by some positive means to prevent the tool from becoming accidentally disconnected.
- Hoses and hose connections used for conducting compressed air to equipment shall be designed for the pressure to which they are subjected.
- The tool/hose/component manufacturer's safe operating pressure for hoses, pipes, valves, filters, and other fittings shall not be exceeded.
- The use of hoses for hoisting or lowering tools shall not be permitted.
- All hoses exceeding ½-inch inside diameter shall have a safety device at the source of supply or branch line to reduce pressure in case of hose failure.
- Protective screens shall be set up to protect nearby workers from being struck by flying fragments associated with the operation of a pneumatic tool.
- Compressed air guns should never be pointed toward anyone. The user should never “dead-end” it against themselves or anyone else.

Contractor must comply with the following when working at Brown University with compressed air systems.

- Before any air line connection is made or removed, always turn the air supply off. Use the valve to turn off the air and never kink the hose as a short cut. Kinking a hose may damage or rupture the air hose.
- Protect air hoses from damage. Keep hoses clear of pedestrian and vehicle traffic and do not drag hoses around sharp corners.
- Be sure to use properly rated and sized air hoses and fittings to keep air pressure even throughout the entire system.
- Keep all connections clean. Clear any dirt/debris from the nipple before connecting the hose.
- Maintain a clean, dry, regulated source of air to operate tools at peak performance.

1. Hot Work

Any Hot Work on campus or in any University building must be permitted by Brown University.

Hot Work is defined as a temporary operation involving open flame or which produces heat and/or sparks. This includes, but is not limited to brazing, cutting, grinding, soldering, thawing pipe, torch applied roofing, welding and the use of heat guns. Contractors must comply with the following:

- Obtain a permit from the Brown University Fire Safety Office for each separate work activity and ensure that all conditions of the permit are met at all times. Blanket Hot Work Permits may be issued for longer duration projects if approved by the University Fire Safety Office. The permit must be submitted to the Fire Safety Office and the Project Manager a minimum of forty-eight (48) hours prior to the start of any hot work. In addition, the Contractor must also maintain its own hot work permit system in accordance with OSHA regulations.
- A Brown University Hot Work Permit containing the phrase “WARNING – Hot Work In Progress – Watch For Fire” must be posted in the Hot Work area while the work is in progress.

- Provide a 10-pound ABC dry powder fire extinguisher, which will remain, ready to use, in the area of the Hot Work at all times.
- Remove combustible materials from the area before beginning work.
- Elevate oxygen/acetylene hoses seven feet above the work area or otherwise protect them from damage.
- Install anti-flash back (safety/check) valves in both the oxygen/acetylene hoses at the regulator.
- Shield adjacent areas with welding partitions.
- Have a second person stand by with an approved fire extinguisher for welding and burning operations in accordance with OSHA regulations and permit requirements. This person should remain in the area for a minimum of 60 minutes after the hot work is completed to ensure the site is cold for areas with early warning systems and smoke detection (fire alarms) and 4 hours for areas where early warning smoke detection is not available.

Brown University faculty, staff and students can view the University's complete Hot Work Program at the following URL:

http://www.brown.edu/Administration/EHS/restricted/hot_work.pdf

m. Cranes and Rigging

Each crane, rigging, or hoist brought onto Brown University property must have an annual inspection performed by a certified testing agency. The Brown University Project Manager must be notified of the use of a crane before operations begin on site, documentation, including a logbook, must also be provided.

All operators must possess a valid Rhode Island hoisting license. Documentation of this license shall be provided to the Brown University Project Manager upon request. At no time shall a non-licensed operator hoist loads. The contractor is responsible for daily record keeping, monitoring and equipment inspections.

The operator is responsible for the proper placement of the crane in relationship to the load to be handled and the landing area so as to obtain the best-rated lift capacity, and the installation and maintenance of crane swing radius protection.

Scale pans and other approved hoisting mechanisms shall be used to hoist materials on a site. Only items specifically designed to be hoisted by a crane should be hoisted. Fifty-five (55) gallon drums should not be directly hoisted by a crane or other means.

The contractor is responsible for submitting excavation plans to the Project Manager prior to any excavation related activities. If work is being performed in a public roadway the contractor is responsible for contacting the city and making all arrangements for police details and/or street closures if appropriate. If work is being performed in a high traffic area all workers must conform to OSHA paragraph 1926.651(d) for exposure to vehicular traffic.

Maintain a physical barrier around all machinery, equipment and hoisting/staging areas. Often times caution tape is insufficient, and barriers like properly supported snow fencing or temporary chain link fencing must be installed. All personnel within the site boundaries must be wearing appropriate PPE such as hard hats, eye protection, etc. All crane sites are to be secured during off work hours to prevent unauthorized access. Only Brown

University owned locks, keyed with contractor cores, can be utilized on construction fencing. Contact the Project Manager for coordination of these locks.

n. Laser Safety

This section applies to contractors using lasers. The OSHA construction industry standard for lasers is 29 CFR 1926.54, Nonionizing Radiation. This standard does not differentiate with respect to class of lasers and, thus, all lasers are covered by the standard.

The lasers commonly used in the construction industry are used to ensure a level working environment. Lasers commonly found in construction are as follows:

- General construction laser levels
- Interior leveling lasers
- Slope and machine control lasers
- Utility and pipe lasers

Although the harmfulness of these lasers is extremely small, care should always be taken when using a visible beam laser in open areas. Never set a visible beam laser in an open area at a height that may strike machine operators, workers, or motorists in the eye. Most visible beam construction lasers are Class 2 and limited to 5mW total output by law. Typically infrared lasers used in construction are Class I lasers, and pose no danger from incidental eye exposure.

- Do not stare into the laser beams.
- Do not disassemble the instrument or attempt to perform and internal servicing.
- Repair and servicing on a construction laser must only be performed by authorized manufacturer service centers.
- The use of controls, adjustments, or the performance of procedures other than those specified in the owners manual may result in hazardous radiation exposure.

All lasers used must comply with all applicable portions of title 21 of the Code of Federal Regulations set by the Department of Health, Education, and Welfare; the Food and Drug Administration; the Center for Devices; and the Bureau of Radiological Health.

Contractors are required to train their employees in the use and safe practices of operating laser equipment. Contractors shall provide appropriate personal protective equipment to employees working with or around lasers in construction. PPE would include primarily include eyewear designed for the wavelength of the laser or device in use. Contractors must warn others by posting appropriate signage in areas where lasers are being used. OSHA has required safety training for individuals who operate laser equipment under the education requirements of 29 CFR 1926.21(b). This paragraph requires the following:

- The employer shall provide for the instruction of each laser equipment operator and instructor in accordance with the applicable manufacturer's recommendations. The instruction process shall inform the operator of various hazards associated with the use of the equipment and the necessary or recommended control measures for the elimination of hazards to personnel. In addition to information from the manufacturer, the American National Standard ANSI Z136.1 could be reviewed for training information.
- Instruction should be conducted by a qualified representative of the manufacturer or by a knowledgeable individual by the employer.

OSHA requirements under 29 CFR 1926.54

- Only qualified and trained persons shall be assigned to install, adjust and operate laser equipment.
- Proof of qualification of the laser equipment operator shall be available and in possession of the operator at all times.
- Employees, when working in areas in which a potential exposure to direct or reflected laser light greater than 0.005 watts (5 milliwatts) exists, shall be provided with anti-laser eye protection devices as specified in 1926 Subpart E.
- Areas in which lasers are used shall be posted with standard laser warning placards.
- Beam shutters or caps shall be utilized, or the laser turned off, when the laser transmission is not actually required. When the laser is left unattended for a substantial period of time, such as during lunch hour, overnight, or at change of shifts, the laser shall be turned off.
- Only mechanical or electronic means shall be used as a detector for guiding the internal alignment of the laser.
- The laser beam shall not be directed at employees.
- When it is raining or snowing, or when there is dust or fog in the air, the operation of laser systems shall be prohibited where practicable; in any event, employees shall be kept out of range of the area of source and target during such weather conditions.
- Laser equipment shall bear a label to indicate maximum output.
- Employees shall not be exposed to light intensities above:
 - Direct Staring: 1 micro-watt per square centimeter
 - Incidental Observing: 1 milliwatt per square centimeter
 - Diffused Reflected Light: 2 ½ watts per square centimeter
- Laser unit in operation should be set up above the heads of employees, when possible.
- Employees shall not be exposed to microwave power densities in excess of 10 milliwatts per square centimeter.

Brown University allows the use of Class 2 and 3a lasers on campus without special permission from the Brown University Radiation Safety Officer. If a project requires the use of Class 3b and/or Class 4 lasers, the contractor will be required to contact the Brown University Radiation Safety Officer at 863-3353 and gain written permission to use the equipment on University projects.

o. Field Radiography

The use of radiography is a routine procedure in the construction industry. The energy source used is a high activity gamma ray source similar to X-rays. Radiographers are required to control access and maintain a specified distance while performing the radiography. Due to public perception and safety considerations of this work Brown University recommends scheduling these activities after hours.

The following are minimum safety procedures a radiographer must follow:

- Project Managers should notify Environmental Health & Safety of the exact dates and times of any radiography work on campus
- The Contractor must be licensed or file reciprocity in the State of Rhode Island
- The Contractor must provide a copy of their license with expiration dates
- Work must be performed in a reasonable time frame
- Project Managers must notify building occupants prior to work beginning

- Coordinate with EHS to be present during work and perform surveys to ensure safety
 - Restrict all entrances and accesses to the work area
 - Post sign on door or barrier that states “Keep Out of Area” during the work
 - Radiographer must coordinate with Public Safety to have a security officer on site for the duration of the work.
- p. Miscellaneous Additional Safety Requirements for the Protection of Brown University Students, Faculty, Staff, Neighbors and Property.
- Do not perform work over the heads of people or leave tools or equipment overhead.
 - Isolate your work area with fences, barricades, safety markers, tape barriers, blinker lights, or other means that is appropriate to the work being performed.
 - Report unsafe acts or conditions to your supervisor or to Brown EHS.

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