

Washington University - St. Louis

Contractor Safety Guidebook

Revised June 16, 2008

The Washington University – St. Louis contractor safety policies are designed to provide for the protection of its personnel, students, visitors, facilities and surrounding environment through the development and implementation of a comprehensive safety program.

Contractors are expected to also provide safe workplaces and implement their own safety programs. This guidebook is intended to assist in coordinating Washington University facilities and contractor operations during construction and renovation projects. Contractors are expected to comply with all applicable Federal, State and Local laws and also follow safe work practices for construction trades. Some of these regulations and safe work practices are outlined in this guidebook. Due to the wide variety of construction operations, it is infeasible to outline every conceivable applicable regulation and work practice in this guidebook. Nothing in this guidebook should be construed to be part of the contract specification. Contractor management and supervision must thoroughly review their own work practices and workplace hazards and then provide employees all the necessary training and equipment for their safety.

Disclaimer: While there are regulations specified in the guidelines, it is the responsibility of the Contractor to adhere to the most updated regulations listed in the Code of Federal Regulations.

Emergency Phone Numbers

For coordination of construction and renovation projects at the Medical School Campus the following points of contact should be used.

Facilities Management Department (FMD) Phone Numbers:

Building Services.....	314-362-3100
Design and Construction.	314-362-8145
Environmental Health and Safety	314-362-6816
Radiation Safety.	314-362-7436

Emergency Phone Numbers

WUSM Protective Services	314-362-HELP (4357)
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For coordination of construction and renovation projects at the Hilltop Campus the following points of contact should be used.

Facilities Planning & Management Phone Numbers:

Capital Projects and Records	314-935-5628
Maintenance Operations	314-935-5544
Utility Operations	314-935-4319
Custodial Services	314-935-4472
Card Access	314-935-8322
Grounds Maintenance	314-935-4533

Emergency Phone Numbers:

Washington University Police Dispatcher	314-935-5555
Washington University Hazardous Materials Manager	314-935-4650
Washington University Environmental Compliance	314-935-7864
Washington University Safety	314-935-5659

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I. DEFINITIONS

Business Manager: A Washington University - St. Louis individual(s) responsible for the business operations within a Washington University Department.

Competent Person: As related to construction, excavation, trenching or shoring work, the contractor's "competent person" means one who is capable of identifying existing and predictable hazards in the surroundings, or working conditions which are unsanitary, hazardous or dangerous, and who has authorization to take prompt corrective measures.

Confined Space: A confined space is defined as a space that is large enough for a person to enter, but has limited means for entry or exit and is not designed for continuous occupancy. Examples include tanks, silos, storage bins, utility vaults, and pits. A permit-required confined space is a confined space that contains potential or known safety hazards. Entry into a permit-required confined space is only allowed by trained personnel under an approved permit program.

Consultant: A person(s) or group who is contracted by Washington University to provide professional advice or services.

Contractor: An entity or agency **under contract to** Washington University (OR) the person, firm, or corporation with whom the contract is made to perform the installation or maintenance of equipment, renovation or construction of a building including rooms and interior on Washington University property. This includes all subcontractors employed by the contractor during the performance of the work on University property.

Lockout/Tagout: A program used to ensure that employees are protected from sources of potentially hazardous energy. The program requires that hazardous energy sources be identified and locked and or / tagged out before work is done on systems. When a Washington University Lockout/Tagout program is in use, the contractor will work within that program. The contractor will contact the Project Coordinator/Manager to reach the University representative who is responsible for the Lockout/Tagout program.

Project Coordinator/Manager: The Washington University individual(s), including but not limited to Design and Construction Project Managers, Construction Managers, Building Services Supervisors, Maintenance Staff, Project Managers or other Washington University representatives that are responsible for oversight and coordination of work performed by contractors.

II. SAFETY PROGRAM OBJECTIVES

The objective of this guidebook is to assist in providing a safe environment for employees, students, patients, visitors and construction workers in all areas of renovation or new construction. Major objectives of a contractor's safety and health program are:

1. Protect employees, students, visitors, workers, property, and the environment from potential hazards.
2. Provide a safe and healthful workplace free from recognized hazards.
3. Comply with all governmental safety, health, and environmental standards.
4. Maintain an effective health and safety program, which includes managers, supervisors, faculty, staff and contractors.
5. Cooperate with building occupants, visitors, and others involved in the work area to maintain a safe and healthful workplace.

III. BASIC SAFETY RULES

1. Vehicles must observe designated pedestrian crosswalks, fire lanes, disability parking and the posted speed limit. Unless otherwise posted, there is a campus wide speed limit of 20 mph on roadways. The speed limit is 5 mph with flashers when vehicles are driving through the intercampus. Pedestrians have the right-of-way on all interior walking paths and sidewalks. No vehicle or equipment will be parked in such a manner that it will create an unsafe driving or pedestrian walking condition.
2. Passing a Washington University Transit bus is prohibited, unless the bus is parked in a designated stop and out of the lane of travel.
3. Obey all posted warnings.
4. Washington University buildings are considered "smoke free environments," smoking is permitted in designated areas only.
5. Contractors must remain in designated areas at all times and use approved travel routes into and out of site.
6. Work areas must be maintained in an orderly manner that does not block exits or traffic through the work area.
7. Trash must be removed daily (OR) Trash or rubbish shall not be allowed to accumulate on the site.

IV. SPECIAL PROCEDURES AND WORK PERMITS

The following special procedures are specific to Washington University. Although some topics listed below are covered by regulations, they receive special interest in hospital, research and academic areas. The work permits noted below are to assist in coordinating contractor work activities and Washington University activities affecting the same systems. Failure by the contractor to request these work permits from the Project Coordinator/Manager in advance may negatively impact scheduling, therefore placing future contracts in jeopardy.

1. Federal, State and Local Agencies

Immediately contact the Project Coordinator/Manager whenever a Federal, State or Local Governmental agency representative contacts you or arrives on-site in relation to safety, environmental, or radiation concerns. It is then the responsibility of the Project Manager/Coordinator to contact Environmental Health & Safety immediately.

2. Hazardous Materials Disposal / Remediation

If there are hazardous materials that need to be properly disposed of contact the Project Manager/Coordinator. The Project Coordinator/Manager will then contact EH&S for approval on selecting a certified hazardous waste disposal/remediation company.

3. Hazard Communication and Chemical Safety

- a. Contractors shall have copies of Material Safety Data Sheets (MSDS) available at the job site for review by the Project Coordinator/Manager and Washington University Environmental Safety Health and Safety (EH&S) at all times (OR) other Washington University safety and health employees (and) Washington University Hazardous Materials Manager and Environmental Compliance Officer.

Hazardous Chemicals with strong odors often cause complaints and concerns among students, employees, patients and visitors. MSDS of materials that will produce strong odors or which are extremely hazardous will be forwarded, before use, to the Project Coordinator/Manager for review with EH&S. These chemicals should not be applied or used until approval is given by the Project Coordinator/Manager, University Hazardous Materials Manager and Environmental Compliance Officer.

- b. The contractors HAZCOM program must be provided to Washington University - EH&S, Hazardous Materials Manager and Environmental Compliance Officer, and must contain the following information:

- A written hazard communication program;
- An inventory of chemicals;
- Material safety data sheets (MSDS) for all chemicals at the site;
- Labeling of all containers and other warnings; and
- Documentation of employee safety training should be provided.

c. **Asbestos containing materials:**

Upon discovery of materials that may contain asbestos (Presumed Asbestos containing Material, PACM) the Contractor should not disturb areas and should immediately contact the Project Coordinator/Manager. The Project Coordinator/Manager will then arrange for testing.

d. **Lead awareness:**

Contractors and Subcontractors should be aware that painted surfaces may contain lead. Therefore, it is the responsibility of the Contractor and Subcontractor to abide by applicable regulations pertaining to the removal of lead based paint.

e. **Fluorescent light bulbs & PCB containing ballasts disposal:**

- Personnel removing and discarding fluorescent light bulbs are responsible for determining if the bulb should be recycled due to mercury vapor & lead content and making sure the bulbs are moved to the designated collection point. (Green end caps or green writing indicates the bulb is environmentally friendly and can be disposed of with other construction wastes). To dispose of fluorescent light bulbs, contact the Project Coordinator/Manager.
- Personnel removing ballasts from fluorescent light fixtures are responsible for determining if it contains PCBs (Polychlorinated Biphenyl's), removing any PCB containing ballast's from the fixture, placing each ballast into proper containers, labeling the container to indicate that it contains PCBs and making sure the containers are moved to a central collection point.

f. **Plumbing work:**

If liquid mercury or sharps are discovered in plumbing, collect in a bucket or pail with a lid, label and notify EH&S at 362-6816, University Hazardous Materials Manager and Environmental Compliance Officer.

- If it is anticipated that a contract employee could come into contact with bloodborne pathogens while working at Washington University, then it is mandatory that contract employees have training in bloodborne pathogen awareness.
- If applicable, contract employees must have documentation of bloodborne pathogens awareness training and should be offered the hepatitis B vaccination or sign a letter of declination.

4. Hot Work and Fire Alarm Systems

- a. Hot work involving the use of open flames, welding apparatus, and spark producing equipment can result in fires and explosions. It is very important that all contractors at a minimum utilize the Washington University FM Global Hot Work Permit program.
- b. 48 hours before performing hot work, contractors shall submit a Hot Work Permit to Design & Construction (phone: 314-747-5092 / fax: 314-362-8342) for work on a Medical School project and to Capital Projects 935-5628 on a Hilltop Campus project or Maintenance 935-5544. The Project Coordinator/Manager may be able to provide assistance filling out the Hot Work Permit.
- c. Fire Suppression and Fire Alarm systems: The Contractor shall contact the Project Coordinator/Manager 48 hours before work on these systems. Note: operations that create dust or particles, such as sanding and spray painting, may affect fire alarm systems.
- d. Hospital projects only: Contractor employees and sub-contractor supervisors shall attend a mandatory 1/2 hour safety meeting within the first week on the job site with Fire Safety Division.

5. Hazardous Work Permit Program

- a. **Fume Hoods:**
The contractor will contact the Project Manager/Coordinator prior to the start of construction or renovations that could possibly involve chemical fume hoods and related duct work. The Project Manager/Coordinator will then contact EH&S to determine if testing of the fume hood or ducts is necessary.
- b. **Biological Safety Cabinets (BSC's):**
The contractor will contact the Project Coordinator/Manager to request a Hazardous Work Permit from EH&S at least one week before moving or repairing cabinets or related ductwork.

c. **Cold/Warm Room and related equipment:**

The contractor will contact the Project Coordinator/Manager to request a Hazardous Work Permit from EH&S, University Hazardous Materials Manager and Environmental Compliance Officer at least one week before moving or repairing Cold/Warm Room or related equipment. The room users will require sufficient time to remove items.

d. **Rooftop work:**

May require a Hazardous Work Permit due to possible respiratory hazards. The contractor will contact the Project Coordinator/Manager to secure the Hazardous Work Permit from EH&S at least two weeks before accessing the roofs. Respirators may be required.

e. **Steam Tunnel work:**

Welding or other operations that may create additional hazards will need a Hazardous Work Permit, Hot Work Permit or Confined Space Entry Permit. The contractor will contact the Project Coordinator/Manager to request a hazardous Work Permit from EH&S at least two weeks before starting such operations in steam tunnels.

6. Underground Utility Location

- a. Anyone proposing to excavate, dig, bore, tunnel, or disturb the earth in any manner which may damage buried utilities is required to contact the Project Coordinator/Manager, and the Utility Operations Manager for Hilltop Campus projects at least 72 hours (3 working days) before starting the proposed work.
- b. Full procedures for underground utility location are available from the Facilities Management Department for Medical School projects and Facilities Planning & Management Capital Projects and Records Department or the Utility Operations Manager for Hilltop Campus projects.

7. Mechanical or Electrical Service Interruptions

- a. Call the Project Coordinator/Manager 48 hours prior to starting proposed work that could interrupt utilities. The Project Coordinator/Manager will contact Building Services for Medical School projects and Maintenance Operation and/or Utility Operations for Hilltop Campus projects, and post an outage notification before work begins. The following is a list of services that could be affected by service interruptions:

Exhaust Systems	Deionized H2O
Air Supply Systems	CO2
Vacuum Systems	Medical Gas
Chilled H2O	Electric
Steam	Potable H2O
Fire Suppression	Telecommunications & Data
Irrigation	Fire Alarm Systems

8. Excavations and Trenches

- a. All excavations and trenching need to be managed by the Washington University Project Coordinator/Manager.
- b. All underground utilities and nearest shutoff stations or valves must be located prior to commencement of work.
- c. A daily inspection of the excavations, shoring systems, adjacent areas, and protective systems shall be performed by a competent person.
- d. Trenches more than 4 feet deep require approved shoring or sloping.
- e. To prevent persons from falling into an open trench substantial fencing or barricades shall be lighted “flashing” and maintained around the perimeter of the trench. This is especially important for trenches that must remain open overnight. A plastic ribbon is not a substitute for this purpose.
- f. The Contractor shall notify the Project Coordinator/Manager prior to beginning trenching or excavation work in roadways.
- g. Ladders will be provided at least every 25 feet for access to trenches over 4 feet deep.

9. Electrical Hazards

- a. It is very important that each contractor establish and maintain an effective electrical safety-related work practices program. References for such a program include OSHA standards 29 CFR 1910.331 to 1910.333

— Electrical Safety-Related Work practices and CFR 1926 Subpart K Electrical.

- b. Training shall be documented for all employees who face a risk of electric shock from working on, or near, electrical circuits, which are not reduced to a safe level by electrical insulation.

10. Lockout/Tagout

- a. The lockout/tagout standard (the control of hazardous energy standard) in 29 CFR 1926.417 and 1910.147 will be followed by all contractors on all job sites. Permits shall be obtained from the Project Coordinator/Manager prior to performing any lockout / tagout. The Project Coordinator/Manager will contact Facilities if necessary. The OSHA lockout / tagout procedure requires at a minimum:

- Use of locks and/or tags on energy isolating devices.
- Special lockout/tagout procedures for jobs requiring multiple lockout/tagout devices.
- Contractors must provide their own lockout/tagout equipment.
- All contractor employees, (authorized, affected, and other employees), must be trained by the contractor (or another acceptable training source) concerning lockout/tagout procedures.
- An annual inspection shall be conducted by an authorized employee of the contractor to evaluate the implementation and efficacy of lockout/tagout procedures.
- Locks and/or tags must not be removed by anyone other than the employee applying them except under a special, approved permit.
- Testing or positioning of machines or equipment will be performed only under special procedures per OSHA 29 CFR 1910.147(f).

- b. Procedures:

All contractors will have a general lockout/tagout program prior to performing work at Washington University. A written form will be required for lockout/tagout procedures for machinery or equipment which require more than one energy isolating device to be locked and/or tagged. Contractors are required to coordinate with Project Coordinators/Managers to ensure that lockout/tagout procedures are communicated to affected Facilities Managers.

c. Training:

All contractor employees will be trained by the contractor (or another acceptable training source) concerning the lockout/tagout procedures prior to beginning work at the site. A record will be kept of all employees trained and verification (by exam or other written means) that they understood the training they received. The training will include the disciplinary actions that will be taken if lockout/ tagout procedures are not followed. Documentation of training should be provided to the Project Coordinator/Manager.

d. Inspections:

Audits and inspections of the lockout/tagout procedures will be conducted routinely by contractor's foreman, supervisor, or on-site safety personnel. A record will be kept of the inspections and the follow-up action taken and provide copies to the Project Coordinator/Manager.

10. Confined Space Entry Program

- a. Confined spaces potentially present serious hazards to employees entering them such as: oxygen deficiency, toxic materials, flammable materials, and hazardous energy. Each contractor must establish and maintain an effective confined space entry procedure that complies with OSHA standard 29 CFR 1926.21(b)(6) and 1910.146 when applicable.
- b. For those contractors performing work in areas with confined spaces, a copy of your confined space entry procedures must be submitted to the Project Coordinator/Manager prior to beginning work at the site.
- c. Contractors must provide all equipment required for safe entry, including rescue equipment.

11. Fall Protection

- a. Reasonable protection shall be provided to protect personnel from accidental falls associated with floors, floor openings, platforms, scaffolds, guardrails, physical barriers, and elevated work locations. Standard guardrails must be provided for work locations 6 feet or more above the adjacent level per OSHA standard 29 CFR 1926.500 and fall protection generally provided for heights over 10 feet.
- b. All employees working at unguarded locations above 6 feet in construction (10 feet on scaffolds) must be protected by properly wearing approved fall protection equipment including safety harnesses and life - lines as specified by supervision. All employees required to wear approved fall protection devices must be properly trained as to the need for and purpose of the protection. Also, they must be instructed in the proper use of the

equipment and shall demonstrate that they know, understand, and can use the fall protection devices properly.

- c. Contractors shall ensure employees use fall protection devices as required.

12. Scaffolds

- a. Contractors shall comply with OSHA Standards 29 CFR 1926, Subpart L on Scaffolding and 29 CFR 1910.28
- b. Access to scaffolds shall be limited to authorized personnel only, especially after working hours.

13. Blasting and Explosives

- a. Before blasting operations contact Design and Construction at 314-362-8145, for Medical School projects and Capital Projects and Records (314) 935-5628 and also inform the Project Coordinator/Manager.
- b. Store no more than, a maximum of, one day's supply of explosives on a Washington University construction site.

V. SAFETY POLICIES

1. FACILITIES, EQUIPMENT, TOOLS AND VEHICLES:

All workplace facilities equipment, tools and vehicles must be properly designed and maintained from a safety standpoint. All workplace facilities, equipment, and activities must comply with the applicable governmental regulations including OSHA and EPA. Proper stairways, ladders, platforms, and guardrails must be provided in compliance with OSHA regulations to ensure employee safety and compliance with OSHA regulations. All equipment tools and vehicles used must be used in accordance with manufacturers operating instructions.

2. EDUCATION AND TRAINING:

All Contractors, managers, supervisors, and employees must be properly trained to evaluate, and control workplace safety and health hazards. No contract employee is allowed to perform a job until he or she has been properly trained to perform the job safely. Specific training must be provided concerning the safety rules and procedures pertaining to the jobs being performed. Safety and health training is to be conducted initially upon employment and, at least annually thereafter. Frequent refresher training such as "tool box" safety talks should also be part of the training program.

3. INSPECTIONS:

Contractors should perform frequent and regular safety inspections, typically, at weekly intervals, and daily in hospital areas.

4. EMERGENCY PROCEDURES:

All employees must know, understand, and be able to follow all workplace emergency procedures pertaining to their assignment. Call 911 from a cellular phone. On School of Medicine projects contact Protective Services at 362-HELP (362-4357). On Hilltop Campus projects contact the Washington University Police Department at 935-5555. Periodic tests, drills, audits, etc. must be conducted to verify employee knowledge and understanding of all emergency procedures.

5. ACCIDENTS:

All accidents, incidents, injuries and illnesses must be reported to a Washington University Project Coordinator/Manager immediately. "Employers' First Report of Accident" will be copied to the Project Coordinator/Manager.

6. ACCIDENT RECORD KEEPING AND REPORTING REQUIREMENTS:

- a. Within 8 hours after its occurrence, an accident which is fatal to one or more employees or which results in the hospitalization of three or more employees shall be reported by the employer to the nearest OSHA Area Director.
- b. All injuries requiring a first report of injury on School of Medicine projects will be reported to Protective Services within 24 hours of the incident. First report of injury for Hilltop Campus projects will be reported to the Washington University Police at 935-5555.

VI. GENERAL SAFETY PROCEDURES

The following General Safety Procedures apply to the entire workplace and should be followed by all contractors.

1. OSHA General Duty Clause

Hazardous conditions or practices not covered in an OSHA standard may be covered under Section 5(a)(1) of the Occupational Safety and Health Act of 1970 which states: "Each employer shall furnish to each of his employees employment and a place of employment which are free from recognized

hazards that are causing or are likely to cause death or serious physical harm to his employees.”

2. General Inspections and Training

- a. Contractors should have a designated Site Safety Coordinator available for each job site. The contractor’s Site Safety Coordinator should be identified to the Project Coordinator/Manager at the start of the project.
- b. Contractors should initiate and maintain an inspection program to provide frequent and regular self - inspections of the job site, materials, and equipment.
- c. Contractors should instruct each employee to recognize and avoid unsafe conditions, the regulations applicable to his or her environment, and how to control or eliminate any hazards or other exposure to illnesses or injury.
- d. The use of any machinery tools, materials, or equipment which is not in compliance with the applicable requirements of OSHA standards is prohibited.

3. Medical Services and First Aid:

- a. Where possible, a contractor should make available a person trained to render first aid.
- b. Where the eyes or body of any person may be exposed to injurious corrosive materials, suitable facilities for quick drenching or flushing of the eyes and body shall be provided within the work area for immediate emergency use.

4. Hand and Power Tools

- a. Electric power operated tools shall either be UL approved double-insulated, or be properly grounded. Ground fault circuit interrupters must be used in damp or wet areas.
- b. Only authorized and properly trained employees shall use power tools.
- c. Powder actuated tools (“Hilti” type, etc.) require operators to be certified, and warning signs must be posted in all areas affected by the noise of the nail gun.
- d. Wrenches shall not be used when the jaws are sprung to the point that slippage occurs.

- e. Impact tools shall be kept free of mushroomed heads.
- f. The wooden handles of tools shall be kept tight in the tool and shall be kept free of splinters and cracks.

5. Personal Protective Equipment (PPE)

- a. Appropriate personal protective equipment shall be worn in all operations where there is an exposure to hazardous conditions or where the need is indicated for using such equipment to reduce the hazard to the employees.

6. Eye and Face Protection

- a. Eye and face protection shall be provided and must be worn when machines or operations present potential eye or face injury.
- b. Eye and face protective equipment shall meet the requirements of ANSI Z87.1-1991, "Practice for Occupational and Educational Eye and Face Protection."
- c. Filter lenses or plates of at least the proper shade number will be provided and are to be worn by contractors involved in welding operations.
- d. Contract employees exposed to laser beams shall be furnished suitable laser safety goggles that will protect for the specific wavelength of the laser and optical density adequate for laser involved.

7. Head Protection

Head protective equipment (hard hats/ helmets) shall be worn in areas where there is a possible danger of head injuries from impact, flying or falling objects, or electrical shock and burns. Hard hats/ helmets shall meet the performance requirements of ANSI Z89.1, "Standard for Industrial Protective Helmets."

8. Hearing Protection

- a. Feasible engineering or administrative controls shall be utilized to protect employees against sound levels in excess of 85 decibels for an 8-hour time-weighted average.
- b. When engineering or administrative controls fail to reduce sound levels below 85 decibels for an 8 - hour time-weighted average or impact noise levels below 140 decibels, hearing protection is required. In all cases where the sound levels exceed the values shown in safety and health regulations, a hearing conservation program shall be administered by the Contractor.

- c. Cotton earplugs are not acceptable for hearing protection.

9. Respiratory Protection

- a. Contractors should have a written respirator protection program that includes respirator training, fit-testing and medical qualification documentation. A copy of this information will be provided to the project coordinator.
- b. When engineering or administrative controls are not effective in controlling toxic substances, appropriate respiratory protective equipment must be worn and provided by the contractor.
- c. Respiratory protective devices approved by the Mine Safety and Health Administration/ National Institute for Occupational Safety and Health for the specific contaminant to which the employee is exposed shall be used.
- d. Respiratory protective devices provided by the contractor shall be appropriate for the hazardous material involved and the extent and nature of the work requirements and conditions.
- e. Contractors required to use respiratory protective devices are required to be thoroughly trained in their use.

10. Gases, Vapors, Fumes, Dusts, and Mists

- a. Exposure to toxic gases, vapors, fumes, dusts, and mists at a concentration above those specified in the most recent “Threshold Limit Values of Airborne Contaminants” of the ACGIH, or OSHA exposure limits, which ever is lower shall be avoided.
- b. Administrative or engineering controls must be implemented whenever feasible to comply with TLV’s.
- c. When engineering and administrative controls are not feasible to achieve full compliance, protective equipment or other protective measures shall be used to keep the exposure to employees of air contaminants within the limits prescribed. Any equipment and technical measures used for this purpose must first be approved for each particular use by an industrial hygienist or other technically qualified person in Environmental Health and Safety.

11. Electrical

- a. All electrical work shall be installed in compliance with the most recent National Electrical Code (NEC).
- b. Only qualified persons are permitted to work on or near energized conductors or parts and then only under special procedures that will ensure proper employee protection.
- c. Unqualified persons shall not be allowed to work within 10 feet of energized overhead power lines.
- d. Equipment must not be operated closer than 20 feet from overhead energized power lines unless specific procedures are followed, by qualified persons using appropriate protection equipment.
- e. Extension cords used with portable electric tools shall be the 3-wire type and shall be protected from damage. Splices shall have soldered wire connections with insulation equal to the original. Worn or frayed cords shall not be used.
- f. Bulbs on temporary lights shall be equipped with guards or deeply recessed in the reflector. Temporary lights shall not be suspended by electric cord, unless designed for suspension.
- g. Receptacles for attachment plugs shall be of the approved concealed contact type. Where different voltages, frequencies, or types of current are supplied receptacles shall be of such designs that attachment plugs are not interchangeable.
- h. Each disconnecting means of motors and appliances and each service feeder or branch circuit at the point where it originates shall be legibly marked to indicate its purpose, unless located and arranged so the purpose is evident.
- i. Cable passing through work areas shall be covered or elevated to protect it from damage, which would create a hazard to employees.
- j. Boxes for disconnecting means shall be securely and rigidly fastened to the surface upon which they are mounted and fitted with covers.
- k. All extension cords and cord & plug connected equipment shall be protected by an assigned equipment grounding conductor program.
- l. No contractor shall permit their employee to work in proximity to any part of an electric power circuit, unless the employee is protected against

electric shock by de-energizing the circuit and grounding it or by guarding it by effective insulation or other means.

- m. In work areas where the exact location of underground electric power lines is unknown, workers using jackhammers, bars, or other hand tools shall be provided with insulated protective gloves.

12. Fire Protection

- a. Contractors must obtain Hot Work permits 48 hours before performing welding, soldering or torch work from Design & Construction (314)-362-8145 or EH&S (314)-362-6816 for work on a Medical School projects and to Capital Projects 935-5628 on a Hilltop Campus project.

13. Flammable and Combustible Liquids

- a. Flammable and combustible liquids shall only be stored in approved containers and in appropriate quantities for the job site use.
- b. Signs prohibiting smoking shall be posted in service and refueling areas.
- c. Flammable liquids shall be dispensed through grounded and bonded containers.

14. Welding, Cutting and Heating

- a. All contractors shall be instructed in the safe use of welding equipment prior to using this equipment.
- b. Proper precautions (isolating welding and cutting, removing fire hazards from the vicinity, providing a fire watch, etc.) for fire prevention shall be taken where welding or other “hot work” is being done.
- c. No welding, cutting or heating shall be done near the application of flammable paints, other flammable compounds, or heavy dust concentration which could create a fire hazard.
- d. Arc welding and cutting operations shall be shielded by noncombustible or flameproof shields to protect persons from direct arc rays. Visual barrier screens are required for arc-welding operations.
- e. When electrode holders are to be left unattended, electrodes shall be removed and the holder shall be placed or protected so that it cannot make electrical contact with employees or conducting objects.

- f. All arc welding and cutting cables shall be completely insulated and able to handle the maximum current requirements for the job. There shall be no repairs or splices within 10 feet of the electrode holder except where splices are insulated equal to the insulation of the cable.
- g. Defective cables shall be repaired or replaced.
- h. Fuel gas and oxygen hoses shall be easily distinguishable and shall not be interchangeable.
- i. Hoses shall be inspected at the beginning of each shift and shall be repaired or replaced if defective.
- j. General mechanical or local exhaust ventilation or air - line respirators shall be provided, as required, when welding, cutting or heating the following:
 - zinc, lead, cadmium, mercury, or beryllium-bearing, materials in enclosed spaces;
 - stainless steel with inert-gas equipment;
 - in confined spaces;
 - where an unusual condition can cause an unsafe accumulation of contaminants.
- k. Proper eye protective equipment shall be provided when appropriate.

15. Liquefied Petroleum Gas (LP Gas)

- a. Storage of LP Gas within buildings is prohibited.
- b. Each system shall have containers, valves, connectors, manifold valve assemblies, and regulators of an approved type.
- c. All cylinders shall meet DOT specifications.
- d. Every container and vaporizer shall be provided with one or more approved safety relief valves or devices.
- e. Containers shall be placed upright on firm foundations or otherwise firmly secured (i.e. chained or placed into a cylinder stand).
- f. Portable heaters shall be equipped with an approved automatic device to shut off the flow of gas in the event of flame failure.
- g. Storage locations shall have at least one approved portable fire extinguisher, rated not less than 20-B:C.

16. Housekeeping

- a. Forming lumber, scrap lumber with protruding nails and all other debris shall be kept clear from all work areas.
- b. Combustible scrap and construction debris shall be removed at regular intervals.
- c. Approved receptacles shall be provided for collection and separation of all refuse. Covers shall be provided on containers used for flammable or harmful substances.
- d. Wastes shall be disposed of at frequent intervals.
- e. Lay down areas shall be orderly and free from tripping hazards.

17. Storage

- a. All materials stored in tiers shall be secured to prevent sliding, falling, or collapse.
- b. Aisles and passageways shall be kept clear of debris and tripping hazards.
- c. Storage of materials shall not obstruct exits.
- d. Materials shall be stored with due regard to their fire characteristics.

18. Ladders

- a. The use of ladders with broken or missing rungs or steps, broken or split side rails or with other faulty or defective construction is prohibited. When ladders with such defects are discovered they shall immediately be withdrawn from service and removed from the site.
- b. Portable ladders shall be placed on a substantial base at a 4 to 1 pitch, have clear access at top and bottom, extend a minimum of 36 inches above the landing, or where not practical, be provided with grab rails and be secured against movement while in use.
- c. Portable metal ladders shall not be used for electrical work or where they may come in contact with electrical conductors.
- d. Hand-made ladders shall be constructed for their intended use.
- e. Cleats shall be inset into side rails 1/2 inch, or filler blocks used.

- f. Cleats shall be uniformly spaced, 12 inches, top-to-top.
- g. Except where either permanent or temporary stairways or suitable ramps or runways are provided, ladders shall be used to give safe access to all elevations.
- h. All employees shall be properly trained in the use of ladders and documented by the Contractor.
- i. Ladders shall be inspected at regular intervals by the Contractor.

19. Flagpersons

- a. When signs, signals and barricades do not provide the necessary protection on or adjacent to a highway or street, flagpersons or other appropriate traffic controls shall be provided.
- b. Flagpersons shall be provided with and shall wear a red or orange warning garment while flagging.
- c. Warning garments worn at night shall be of reflective material.

20. Motor Vehicles and Motorized Equipment

- a. Observe posted speed limits, give pedestrians the right of way, and yield to emergency vehicles.
- b. Unless otherwise posted, there is a campus-wide speed limit of 20 miles per hour (mph) and 5 mph with flashing lights activated when vehicles drive within the intercampus.
- c. All vehicles in use shall be checked at the beginning of each shift to assure that all parts, equipment, and accessories that affect safe operation are in proper operating condition and free from defects.
- d. All defects will be corrected before the vehicle is placed in service.
- e. No person shall use any motor vehicle, earth moving or compacting equipment having an obstructed view to the rear unless:
 - the vehicle has a reverse signal alarm distinguishable from the surrounding noise level, or
 - the vehicle is backed up only when an observer signals that it is safe to do so.

- f. Heavy machinery, equipment, or parts thereof which are suspended or held aloft shall be substantially blocked to prevent falling or shifting before employees are permitted to work under or between them.
- g. Park only in areas approved for contractor use.
- h. No person shall pass a Washington University Transit bus unless the bus is parked in a designated bus stop and out of the lane of travel.

21. Railings

- a. A standard railing used to protect personnel from falls shall consist of a top rail, intermediate rail, toe-board, and posts, and have a vertical height of approximately 42 inches from the floor, or platform, to the upper surface of top rail.
- b. The top rail of a railing shall be smooth-surfaced, with a strength able to withstand at least 200 pounds. The intermediate rail shall be approximately halfway between the top rail and floor.
- c. A stair railing shall be constructed similar to a standard railing, but the vertical height shall be not more than 34 inches, or less than 30 inches from upper surface of top rail to surface of tread in line with face or riser at forward edge of tread.

22. Scaffolds

- a. Scaffolds shall be erected on a sound, rigid footing, capable of carrying the maximum intended load without settling or displacement.
- b. Scaffolds and their components shall be capable of supporting, without failure, at least 4 times the maximum intended load.
- c. Guardrails and toe-boards shall be installed on all open sides and ends of platforms more than 10 feet above the ground or floor, except needle beam scaffolds and floats. Scaffolds 4 feet to 10 feet in height, having a minimum dimension in either direction of less than 45 inches, shall have standard guardrails installed on all open sides and ends of platform.
- d. Where persons are required to work or pass under a scaffold, there shall be a screen with no more than 1/2-inch openings between the toe-board and the guardrail, where the persons are required to work or pass under the scaffold.
- e. All planking shall be Scaffold Grade or equivalent. The maximum permissible span for 1 1/4 x 9 inch or wider plank of full thickness is 4 feet, with medium loading of 50 p.s.f.

- f. Scaffold planking shall be overlapped a minimum of 12 inches and secured from movement.
- g. Scaffold planks shall extend over their end supports not less than 6 inches and not more than 12 inches.
- h. All scaffolding and accessories shall be free from defective parts. All defective parts must be immediately replaced or repaired.
- i. An access ladder or equivalent safe access shall be provided.
- j. Also see the scaffold requirements in Section IV, special procedures.

23. Air Tools

- a. Pneumatic power tools shall be secured to the hose or whip in a positive manner to prevent accidental disconnection.
- b. Safety clips or retainers shall be securely installed and maintained on pneumatic impact tools to prevent attachments from being accidentally expelled.
- c. The manufacturer's safe operating pressure for all fittings shall not be exceeded.
- d. All hoses exceeding 1/2-inch inside diameter shall have a safety device at the source of supply or branch line to reduce pressure in case of hose failure.

24. Compressed Air

- a. Compressed air used for cleaning purposes shall not exceed 30 psi.
- b. Compressed air for cleaning will only be used with effective chip guarding and personal protective equipment. This requirement does not apply to concrete form, mill scale, and similar cleaning operations.

25. Compressed Gas Cylinders

- a. Valve protection caps shall be in place when compressed gas cylinders are transported, moved, or stored.
- b. Cylinder valves shall be closed when work is finished and when cylinders are empty or moved.
- c. Compressed gas cylinders shall be secured in an upright position at all times, except if necessary for short periods of time when cylinders are

actually being hoisted or carried. (i.e. chained or placed into a cylinder stand).

- d. Cylinders shall be kept at safe distances or shielded from welding or cutting operations. Cylinders shall be placed where they cannot become part of an electrical circuit.
- e. Oxygen and fuel gas regulators shall be in proper working order while in use.
- f. Applicable technical portions of American National Standards Institute, Z49.1, Safety in Welding and Cutting, shall be followed.

26. Hoists and Cranes

Construction crane standards requirements are found in Subpart N, 29 CFR 1926 550. Some key requirements state that:

- (1) The employer shall comply with the manufacturer's specifications and limitations applicable to the operation of any and all cranes and derricks. Where manufacturer's specifications are not available, the limitations assigned to the equipment shall be based on the determinations of a qualified engineer competent in this field and such determinations will be appropriately documented and recorded. Attachments used with cranes shall not exceed the capacity, rating, or scope recommended by the manufacturer.
- (2) Rated load capacities, and recommended operating speeds, special hazard warnings, or instruction, shall be conspicuously posted on all equipment. Instructions or warnings shall be visible to the operator while he is at his control station.
- (3) The employer shall designate a competent person who shall inspect all machinery and equipment prior to each use, and during use, to make sure it is in safe operating condition. Any deficiencies shall be repaired, or defective parts replaced, before continued use.
- (4) A thorough, annual inspection of the hoisting machinery shall be made by a competent person or by a government or private agency recognized by the U.S. Department of Labor. The employer shall maintain a record of the dates and results of inspections for each hoisting machine and piece of equipment.
- (5) Except where electrical distribution and transmission lines have been de-energized and visibly grounded at point of work or where insulating barriers, not a part of or an attachment to the

equipment or machinery, have been erected to prevent physical contact with the lines, equipment or machines shall be operated approximate to power lines only in accordance with the following:

- (i) For lines rated 50 kV or below, minimum clearance between the lines and any part of the crane or load shall be 10 feet;
 - (ii) For lines rated over 50 kV, minimum clearance between the lines and any part of the crane or load shall be 10 feet plus 0.4 inch for each 1 kV over 50 kV, or twice the length of the line insulator, but never less than 10 feet;
 - (iii) A person shall be designated to observe clearance of the equipment and give timely warning for all operations, where it is difficult for the operator to maintain the desired clearance by visual means;
 - (iv) Any overhead wire shall be considered to be an energized line unless and until the person owning such line or the electrical utility authorities indicate that it is not an energized line and it has been visibly grounded.
- (6) No modifications or additions which effect the capacity or safe operation of the equipment shall be made by the employer without the manufacturer's written approval. In no case shall the original safety factor of the equipment be reduced.

NOTE: To supplement the OSHA standards for Cranes and Derricks, references are made to applicable ASME/ANSI and PCSA standards. The ASME/ANSI "B30" series of standards address: "Cranes", "Cableways", "Derricks", "Hoists", "Hooks", "Jacks" and "Slings". For the purpose of this document ASME/ANSI B30.5, "Mobile and Locomotive Cranes" will be the reference document for the crane inspection criteria. References also are made to the Power Crane Shovel Association (PCSA), Standard No. 2, "Mobile Hydraulic Crane Standards." Additional information can be found on the OSHA web site at <http://www.osha-slc.gov/SLTC/constructioncrane/index.html>.

27. Temporary Lighting

- a. Contractor shall provide, install and maintain adequate temporary lighting to ensure safety and security for that site. This lighting will include lighting removed as part of the project, but that is still necessary to light streets, sidewalks and walking paths adjacent to the construction or renovation project for use by employees, patients, students, faculty, staff or visitors to Washington University.

28. Temporary Sidewalks

Contractor shall provide, install and maintain adequate temporary sidewalks to ensure safety on or near construction or renovation projects. These sidewalks will include sidewalks removed as part of the project, but still necessary for use during the construction or renovation project by employees, students, faculty, staff or visitors to Washington University.

29. Paint Protocol

Evaluation and control of chemical solvent exposure in the workplace are major components of an effective safety and health program. Most paints, primers, and thinners contain organic solvents such as Xylene, Toluene, Ethyl Acetate, Ether, and Methyl Ether Ketone.

Responsibilities:

Project Coordinator/Manager:

1. Advise the Environmental Health & Safety Office prior to any painting operations at Washington University – St. Louis.
2. Contact the EH&S prior to painting. Identify the location of the painting projects as well as a current schedule. Advise EH&S of any changes to the schedule or products being used.
3. Provide all the Material Safety Data sheets to EH&S for review.
4. Provide notification to affected areas regarding painting.

Environmental Health and Safety Office:

1. Review and evaluate all Material Safety Data Sheets provided by the contractor. Provide a timely response on approval or disapproval of the product. Provide recommendations on any substitutions which may be less toxic to use in a hospital environment.
2. Conduct air monitoring, as necessary, to validate safe levels of exposure to staff.
3. Coordinate, as necessary, with the originator of the contract to advise them of any special conditions or concerns.
4. Ensure that appropriate sampling media is readily available for any necessary air monitoring.

Painting Contractor/Subcontractor:

1. Use paints and primers that contain less toxic materials. Use water-base paints instead of solvent base paints when possible. If possible, use an odor-reducing additive to minimize odor from vapors.
2. Painting Operations should be scheduled from 7am to 3pm in patient care areas and from 6pm-5am in non-patient care areas.
3. The Material Safety Data Sheet (MSDS) for all materials used must be kept on site.
4. It is necessary to mix paints in a well-ventilated area. DO NOT mix paints in the hospital.
5. Charcoal filter and/ or carbon filter should be used in the work area during painting. To ensure the removal of solvent vapors, painters should run the filter 4 to 5 hours after the painting is completed. The contractor should be able to provide documentation on charcoal and/ or carbon filters expiration dates or the frequency of use. When finished with work the filter unit should be turned so that it does not blow toward the door.
6. All supply, return, and exhaust grills will be covered with plastic. The HVAC department will provide guideline and recommendation regarding the ventilation system.
7. The ceiling should be covered with plastic barrier.
8. The door should be covered with plastic from the inside during the painting operation. In addition post a sign stating “**PAINTING IN PROGRESS. PLEASE DO NOT ENTER**” to the outside of the door. After the painting is completed, the door to the room should be sealed with plastic from the outside and a sign stating “**PLEASE DO NOT ENTER**” should be posted on the outside of the door.
9. Provide and utilize personal protective equipment necessary to ensure contractors are not overexposed to hazardous materials.