


Safety Manual		
	Policy Name	Safety and Infection Control Management Plan for Construction, Renovation, and Modernization Projects
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	Responsible for Content	EH&S, Hospital Epidemiology, and Plant Engineering

I. Description

Identifies, measures, and mitigates potentially hazardous materials and situations to patients and staff prior to work beginning during the design, development, and implementation phases of construction, renovation and/or modernization projects, including cabling projects performed by outside contractors or in-house force labor in UNC Health Care facilities. For the purposes of this policy, UNC Health Care refers to UNC Hospitals, Ambulatory Care, WakeBrook, Hillsborough Hospital Campus, UNC Hospitals satellite clinics, UNC Faculty Physician community-based practices, and non-clinical satellite facilities. These policies exclude all other affiliated hospitals and UNC PN practices.

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II. Rationale

This plan provides a comprehensive strategy to significantly reduce the risk of injury and infection associated with construction, renovation and modernization projects. All new projects to existing facilities shall be planned/ designed in accordance with applicable health and safety codes, consensus standards, good work practice standards, and will be reviewed to ensure that all applicable infection control and life safety codes, regulations, and guidelines are incorporated into the project prior to implementation.

These requirements shall apply to all worksites where outside contractors are to perform work, services, or maintenance for UNC Health Care. Each contractor performing services for UNC Health Care is required to meet all the applicable requirements of UNC Health Care’s Infection Control and Environmental Health and Safety Management Program, policies, and OSHA and EPA regulations.

III. Safety and Infection Control Requirements

A. General Information

Construction/renovation activity by both outside contractors and in-house personnel will be performed in accordance with this policy. When planning demolition, construction, or renovation work, a proactive risk assessment must be conducted using risk criteria to identify hazards that could potentially compromise patient care in occupied areas of the organization’s buildings. The scope and nature of the activities will determine the extent of the risk assessment required. Specifically, contractors and project managers must ensure there are specified methods in use to minimize dust generation and dispersal, reduce vibration and noise, and observe interim life safety measures as necessary. Construction projects in, near, or potentially impacting patient care areas will be evaluated by Hospital Epidemiology (HE) and Environmental Health and Safety (EH&S) prior to work beginning and during regularly scheduled construction site rounds until the work is completed and final cleaning has taken place. It will be the responsibility of Project Manager to ensure compliance. For the purpose of this policy, Project Manager will refer to either the Plant Engineering or Planning project manager assigned to the project. Routine maintenance activities that do not generate dust or odors are excluded from this policy.

Modernization projects including cabling projects can also have an impact on patient care. It is imperative that modernization projects be coordinated through Plant Engineering, EH&S and Hospital Epidemiology to ensure a safe environment. Contractors who will be working on modernization projects must also comply with the policy.

B. Pre-Construction Activities

1. Plan Review
 - a. Representatives from HE and EH&S, in conjunction with Plant Engineering or Planning, will review plans for all construction and renovation projects.
 - b. EH&S will review plans for safety, indoor air quality, and ergonomics issues and to ensure that all state and federal safety regulations have been considered in the design of the project.
 - c. HE will review plans for issues relating to infection control, see Appendix 1, and to ensure that all infection control standards and applicable guidelines have been considered in the design of the project.

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- d. In the absence of state design codes for physician practices and specialty clinics, HE and EH&S will rely on the most current edition of the Facility Guidelines Institute's recommendations.
 - e. In order to make informed recommendations on plans, knowledge of the function of the planned space is necessary. This may require HE and EH&S to request a walk-through of the proposed project with the Project Manager, clinical staff and/or other appropriate personnel.
 - f. Any recommendations for plan changes will be submitted in writing at plan review meetings to the Plant Engineering project manager for submittal to the designer. The Plant Engineering project manager will implement recommendations as deemed appropriate.
 - g. The safety and health review of major capital improvements is supplemental to the Division of Health Service Regulation and the Department of Administration review. The contractor shall provide workplace safety and meet all OSHA and UNC Health Care's safety and infection control requirements for capital improvement and facilities improvement projects.
2. Pre-Construction Notification to Building Occupants through the Project Manager
- a. Building occupants must be notified as soon as possible but not less than 48 hours in advance of scheduled activities that are likely to impact the Indoor Environmental Quality (IEQ) in their work area(s). Examples of such activities include roofing projects, flooring projects, and any construction or renovation activities that generate excessive noise, vibration, or air contaminants that could affect occupied spaces beyond the immediate project area. Notification must be made in writing to the manager(s) of all potentially affected departments and must include the following information:
 - A brief description of the project and how it could impact Indoor Environmental Quality (IEQ) within the building
 - Steps taken to reduce the impact of the project on building IEQ
 - The expected project start date and the expected project completion date
 - The expected daily work hours
 - The name, phone number, and email address of the project manager and/or other person(s) who may be contacted to request assistance or to report a problem
 - What to do in the event of an occupational injury or illness

3. Pre-Construction Meetings

Representatives from HE and EH&S will attend pre-construction meetings so infection control and safety issues can be discussed prior to the start of construction. This is a multidisciplinary team including Plant Engineering, Contractor Project Managers, Nursing, HE, EH&S, and other UNC Health Care departments affected by the construction/renovation project.

Examples of the kinds of issues discussed at these meetings include: (1) risk assessment, including identification of areas where high-risk patients are treated or housed; (2) determination of whether construction poses sufficient increased risk to recommend that patients be moved to an area in which no construction is occurring; (3) coordination of the relocation of affected patients and pedestrian traffic routes to avoid construction areas ; (4)

determination of optimal routes for construction traffic, including transport of construction supplies and waste; (5) types of infection control measures and barriers recommended (e.g., plastic or solid); (6) contractor compliance with UNC Health Care's construction, industrial hygiene and safety programs (e.g., PPE, dust control, fire prevention, ILSM, compressed gas storage, etc.); and (7) proposed start and end dates. Departments are responsible for obtaining code compliant temporary storage for departmental materials and equipment, which will be displaced during the renovation period. The storage of any items in corridors or stairwells is strictly prohibited.

4. Risk Assessment

For all projects that are in, near, or may impact patient care areas, the Plant Engineering project manager will initiate a Preconstruction and Infection Control Risk Assessment (PCRA) form and forward it to HE and EH&S for approval. This pre-construction risk assessment will include risk criteria that have been developed to address the impact of demolition, renovation, or new construction activities have on air quality requirements, infection control, utility requirements, noise, vibration, and emergency procedures. The four-step Risk Assessment assists in identifying the patient populations at risk and the preventive measures to be implemented. After approval by the aforementioned departments, the Risk Assessment form is returned to the Plant Engineering project manager **prior to the start date of the project**. The project manager is responsible for ensuring that all infection control and safety requirements on the Risk Assessment form are implemented.

a. Required Steps for Completing the Infection Control portion of the PCRA (Appendix 2)

- i. **Step One: Definition of Construction Activity Types (Type A, B, C, and D) (Appendix 3)** – The construction activity types are defined by the amount of dust that is generated and the duration of the work.
 - ii. **Step Two: Definition of Infection Control Risk Groups (Group 1- Low Risk; Group 2-Medium Risk; Group 3-High Risk; Group 4-Highest Risk) (Appendix 3)** – Identify areas in which patients are at risk of developing adverse outcomes if exposed to construction-related dust.
 - iii. **Step Three: Definition of the Class of Precautions (Appendix 3):** Use the Infection Control Matrix to determine of the Class of Infection Control Precautions (**I, II, III, or IV**) that will be required. This is based upon Construction Project Type (**A, B, C, or D**) and the Patient Risk Group (**Low, Medium, High, Highest**).
 - iv. **Step Four: Implement the appropriate Infection Control Construction Precautions.** The Precautions are based upon the project classification (**I, II, III, or IV**) selected from the Infection Control Matrix.
5. Controlling Dust and Extrinsic Contamination of the Hospital Environment – Quick Reference for Construction Barrier Specifications (Appendix 3)

a. Products and Materials

i. Approved Barrier Products

- Sheet Plastic: Fire retardant polyethylene, minimum 6-mil thickness. Fire retardant rating shall be printed on plastic.
- Dry wall with metal studs or other approved Class-C rated materials per the NC Fire Code.
- Solid core, wooden doors in metal frames, preferably varnished or painted.

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- Portable dust containment system, such as “ZipWall” as manufactured by Zip Wall, LLC, Cambridge, Mass., or equivalent.
 - Control cubes (heavy-duty, flexible, vinyl, portable, ceiling access modules) can be used for limited ceiling access.
 - ii. HEPA-Filtered Ventilation Units: Unit will be maintained and filters will be changed in accordance with manufacturer’s recommendations and as necessary. A pre-project inspection of HEPA filtered equipment should be conducted by the Project Manager or for in-house projects, the PED Project Manager, to verify that the filters are clean and that there are no potential by-pass issues, such as damaged filters or seals.
 - iii. Exhaust Hoses: Heavy duty flexible steel reinforced ventilator/blower hose.
 - iv. Adhesive Walk-Off Mats: Provide mats with a minimum size of 24 inches x 36 inches. Ideally, adhesive mats will be used. Bleach (10%) spray on wet carpet will be allowed *inside* the site when needed for heavy demolition/high dust producing activities. In addition, the wet carpet should be replaced or professionally cleaned weekly because of the decreased effectiveness of the bleach in the presence of heavy dirt and debris.
 - v. Disinfectants: Environmental Services uses the following UNC Health Care approved surface disinfectants - Metriguard for horizontal surfaces; A-458-2N for floor cleaning. See [Environmental Services Infection Control Policy](#) for details.
- b. Dust Reduction and Containment Measures
- i. Barriers
 - Construction activities causing disturbances of existing dust or creating additional dust will be conducted in tight enclosures designed to prevent the flow of dust into adjacent areas.
 - Barriers should be in compliance with applicable codes and standards.
 - Dust barriers will be completed prior to work beginning including demolition or equipment removal.
 - Plant Engineering project managers will be responsible for routinely monitoring the integrity of barriers (e.g., daily).
 - Construction supervisors should ensure that gaps or breaks in barrier joints are repaired upon identification.
 - Where containment is possible utilizing existing walls and doors, the doors should be kept closed and sealed with duct tape to prevent the escape of dust. The construction entrance door should be kept closed except during entrance/egress.
 - In areas where containment is not possible utilizing existing walls and doors, the following methods of containment may be used. If the project includes any high risk construction techniques (i.e., torch cutting, welding, burning) non-combustible barriers (i.e., sheet rock, gypsum board) should be used instead of plastic barriers.
 - Drywall barriers. Seams or joints will be covered or sealed to prevent dust and debris from escaping. Self-closing (e.g., metal spring) construction site entrance doors will be used for areas with drywall barriers. Prior to building

drywall barriers, a temporary plastic barrier should be placed to prevent dust contamination of areas outside the construction site, see Appendix 3.

- An anteroom or double entrance opening should be considered in very high risk areas (e.g., Surgical Services) and approved by HE prior to start of project.
- Airtight plastic barriers extending from floor to ceiling decking, or to the ceiling tiles if ceiling tiles will not be removed. Plastic barrier seams will be sealed with duct tape. Where barrier has potential to sag (e.g. ceilings), barrier will be continuously supported with tape used only for sealing. Plastic barriers requiring an entrance will have an overlapping, weighted flap, minimally 2 feet wide or zippered closure for personnel access. Portable dust containment units such as Zip Wall (or equivalent), with polyethylene pulled tight against floor, ceiling and walls with duct tape or equivalent. **Plastic barriers are acceptable only for short term projects (e.g., < 2 weeks).**
- Tightly sealed barriers will be placed at penetration of ceiling envelopes, chases and ceiling spaces. Dust barriers should be erected at elevator shafts or stairways within the construction area, allowing for emergency egress. Holes, pipes, conduits, punctures and penetrations of existing perimeter walls should be sealed (See Plant Engineering for proper controls).
- Replace any ceiling tile displaced for inspection immediately when unattended if outside the construction barrier.
- All penetrations should be sealed with plastic and duct taped within the construction/renovation area to prevent the incursion of dust outside the containment barrier.
- Staff should report any problems or concerns regarding barriers or the construction site to the Project Manager and/or HE.

c. Ventilation

- i. If possible, remove or isolate the HVAC system in areas where work is being performed to prevent contamination of the duct system. Block off and seal unused air vents.
- ii. If possible, exhaust fans discharging directly outside will be utilized to maintain negative pressure within the construction area. Exhaust discharge should be at least 30 feet from any air intake. Where direct outside exhaust or minimum air intake separation is not possible, HEPA-filtered units will be used to filter recirculated air. Exhaust fans and HEPA filters will run continuously within the construction project area throughout the project. Equipment will be maintained and filters monitored and changed as needed in accordance with manufacturer's recommendations. When exhaust discharging directly outside will involve dust/debris, the exhaust air stream shall be filtered.
- iii. Negative air pressure will be continuously maintained within the construction area at 0.01 inch water gauge when all doors are closed as measured by an installed manometer. If negative air pressure cannot be achieved as determined by the on-site supervisor and/or the PED Project Manager, alternative methods of environmental control should be utilized (e.g., HEPA filtration air scrubbing) and HE will be notified.

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- iv. In areas where an anteroom is used, airflow will be maintained from the clean area through the anteroom and into the work area (i.e., negative pressure differential will be maintained in the work area).
 - v. Windows should remain closed on the project site.
 - vi. If a chute is used for debris removal, ensure negative pressure differential is maintained between the project area and the hospital.
 - vii. HE or the Project Manager may request an initial barrier inspection be conducted prior to start of work. If questions arise regarding the negative pressure following a visual inspection of the containment barriers, EH&S can be contacted to conduct testing with smoke tubes or other visual indicators to verify negative pressure has been achieved at all sides of the containment.
 - viii. Depending on the project, other measures besides ventilation and containment may be needed to assure adequate health and safety is maintained. These may include pre-selection of products (i.e. low VOC), local exhaust controls for power tools, etc., and modification or substitution of application methods.
- d. Cleanliness and Surface Disinfection
- i. Adhesive walk-off mats will be used inside and/or outside of exits and entrances to the work area. Adhesive walk-off mats will be changed as frequently as needed (i.e. when no longer preventing dusty footprints outside the work area). Bleach (10%) spray on wet carpet will be allowed *inside* the site when needed for heavy demolition/high dust producing activities. In addition, the wet carpet should be replaced or professionally cleaned weekly because of the decreased effectiveness of the bleach in the presence of heavy dirt and debris.
 - ii. When construction is in an occupied area, the construction area will be vacuumed or damp-mopped at the end of each work day and more frequently as needed.
 - iii. Vacuum cleaners will have HEPA filters.
 - iv. Ensure that patient care equipment and supplies are protected from dust exposure.
 - v. Execute work by methods to minimize raising dust from construction operations. Water mist work surfaces to control dust, when appropriate.
 - vi. Keep dust and accumulated dirt in the work site to a minimum. Keep area around site clean. Any dust tracked outside the barrier must be removed immediately. Wet mop with disinfectant to minimize dust and debris in and outside of the work site.
 - vii. The wheels of carts used for waste transport will be kept clean to avoid dust tracking outside the site.
 - viii. Cover construction supplies and materials during transport within the facility to and from the work site.
- e. Traffic Control
- i. Construction traffic will be routed to avoid patient transport routes when possible. These routes should be discussed at the pre-construction meeting and communicated from the construction supervisors to all workers.
 - ii. Pedestrian traffic in construction areas is prohibited.
 - iii. Ideally, designate an elevator for the sole use of construction workers. Elevators used primarily by the public should be avoided.

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- iv. Clean and sterile patient care items should not be transported through construction/renovation areas.
- v. UNC Health Care staff are prohibited from entering the construction site unless supervised by the Project Manager or Safety Officer and must not damage or alter temporary barriers. This does not refer to designated Plant Engineering, Epidemiology and EH&S staff.
- f. Storage of Building Supplies and Departmental Supplies
 - i. Departments are responsible for obtaining temporary storage for departmental materials and equipment that will be displaced during the renovation project. The storage of any items in corridors or stairways is strictly prohibited. Patient care items may not be stored within the construction areas as it cannot be appropriately protected from contamination.
 - ii. Construction materials such as drywall will be stored in clean, dry areas to prevent growth of bacteria and fungi.
 - iii. Ductwork materials will be stored in a clean, dry area to prevent the accumulation of dust in the ductwork prior to installation. Ideally, all of the ductwork should have plastic covering over each open end to ensure that no dust or debris collects prior to installation.
 - iv. Storage of construction related equipment and supplies should be within the construction area (i.e. within the barriers or in a location approved by the Plant Engineering Project Manager).
- g. Protective Clothing
 - i. In some highly sensitive areas, such as the Surgical Suites, protective clothing (e.g., coveralls, hair covering, shoe covers) may be required. Protective clothing will be removed any time the worker leaves the immediate work area.
 - ii. Used protective clothing will be disposed of in a non-regulated waste container located in or near the work zone exit.
- h. Precautions for Patients in Clinical Areas Where Ceiling Work is Planned
 - Contractors and other departments (e.g. ISD) occasionally must enter ceilings to perform repairs or maintenance. An open ceiling permit (see Appendix 9) must be requested prior to work beginning. If the ceiling access is occurring in the highest risk areas, HE must be informed in order to determine the need for plastic barriers prior to beginning the work. This assessment may be done in collaboration with Plant Engineering and the nurse managers.
 - ***Highest Risk Areas**
 - **Any inpatient area housing immuno-compromised patients:**
 - BMTU, all ICUs, burn floor [5 East], solid organ transplant floors [CTSU, 5WST, ISCU], Oncology [4ONC], Pediatric Oncology [5CH, CICC]
 - Step-down Units
 - Cardiac Cath Lab
 - VIR
 - Dialysis
 - Central Processing
 - Negative pressure isolation rooms
 - Operating rooms, including C-section rooms and Outpatient Surgery
 - PACU

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- Transplant Clinic
 - BMTU Clinic
 - Oncology clinics and infusion areas
 - Pharmacies
- i. Special Precautions for Water Handling (Plumbing Alterations)
 - i. Caution will be used when handling fluids (i.e., removing plumbing pipes and fixtures) to prevent wetting and/or contamination of building materials or work areas.
 - ii. Before an area is released for patient occupancy/use, Plant Engineering will ensure appropriate water temperature and potability.
5. Construction-Related Infection Control and Safety Education
- Plant Engineering will provide training to all prime and sub-contractors and their employees. It is the contractor's responsibility to ensure coordination with Plant Engineering for training.
6. Safety Compliance
- a. All companies performing construction or renovation on UNC Health Care's property shall comply with all federal, state, and UNC Health Care's safety and environmental regulations. For example, all outside contractors must comply with the federal and state requirements as outlined in Occupational Safety and Health Standards for the Construction Industry, 29 CFR Part 1926 as adopted by 13 NCAC 7C.0101, including 29 CFR Part 1910 General Industry Safety and Health Standards applicable to construction. It is the responsibility of the contracting department to ensure that the contractor is complying with all applicable safety regulations. EH&S is available for consultation as needed to address issues relating to safety program requirements.
 - b. All contractors performing construction or renovation projects for UNC Health Care are required to have documented safety programs and comply with such programs. These programs should not only meet the requirements of any Federal (OSHA), State, and local agencies, but should also meet the requirements of UNC Health Care policies. For multi-prime, single prime, tiered construction projects, etc., it shall be the responsibility of the lead contractor to ensure that the work site, the subcontractors and their employees, the machinery/equipment being utilized, and all other aspects of the construction project remain in compliance with the project's safety program, as set forth in the project documentation. If the contractor performs work in occupied patient care areas, the provisions of this policy set forth in Appendix 5 and 6 shall also be applicable, as appropriate.

C. Activities during Construction

1. Maintenance and Construction Meetings

These multidisciplinary meetings including representatives from HE and EH&S are held on a biweekly basis to discuss issues with pending and ongoing construction and maintenance projects within the hospital.
2. Safety
 - a. Construction and renovations in occupied buildings should not interfere with required exits. If it is necessary for an exit to be closed, temporary approval must first be obtained from the Director of Plant Engineering or ACC Administration, or designee. Projects which may cause disruptions of the life safety systems are required to complete an Interim Life Safety Measures document (see Section IV). The purpose of this plan is to establish and document the necessary safety provisions. Said document, if required, is to be finalized at the design phase of the project. EH&S will be notified in the event any

exit has to be closed. Temporary emergency evacuation routes shall be posted by the Project Manager for any areas, which require temporary modifications in their evacuation routes due to construction activities.

- b. The contractor is required to keep the jobsite free of debris and loose combustible materials. All debris is to be removed from the construction area periodically or as directed by the Project Manager and/or project requirements.
- c. Signage shall be placed at all entrances to the project site identifying the area as unsafe and closed to all but authorized construction personnel. Should it be necessary for employees to enter the construction site, permission must be obtained from the Plant Engineering Project Manager and appropriate personal protective equipment worn.
- d. To ensure compliance with the public protection provisions, the Project Manager will inspect, with the architect and engineer, each project periodically and will report findings to EH&S and/or HE as appropriate. The Project Manager assigned to the project shall monitor safety activities on the site and shall ensure compliance with all safety requirements. The Project Manager will also complete the Weekly Monitoring Checklist: ILSM-PCRA Precautions (Appendix 7) and maintain copies of these inspections with other documentation pertinent to the project.

3. Construction Site Rounds

As a means of assessing compliance with this policy, regularly scheduled visits to construction sites will be performed by EH&S and HE and a representative of Plant Engineering. HE and EH&S will prepare a written report of the findings with recommendations for correction of deficiencies. The Plant Engineering Project Manager is responsible for ensuring that deficiencies presenting a significant infection, safety, or environmental risk are corrected within 24 hours. Construction/renovation activity may be halted when a significant breach in infection control and/or safety measures is identified by HE and/or EH&S.

4. General Contractor Inspections

The general contractor shall maintain on-site a list of all contractors trained to maintain compliance with all PCRA and ILSM findings.

D. Post Construction Activities

1. The contractor will vacuum and clean all surfaces in the completed construction area, rendering them free of visible soil and dust prior to the removal of barriers.
2. Barrier materials should be removed carefully to minimize spreading of dirt and debris. They should be damp wiped, HEPA vacuumed or water misted prior to removal and should be discarded as construction debris.
3. A final inspection may be conducted by the Project Manager, Hospital Epidemiology, EH&S and others as may be necessary.
4. Environmental Services will perform the final cleaning of construction/renovation areas before allowing patients to occupy the area.
5. All blockages from the air systems will be removed.
6. The ventilation system will be balanced, as necessary, to conform to design specifications. Ensure the ventilation system is functioning properly and is free from contamination with construction debris/dust after construction/renovation is complete.
7. HVAC equipment and filters will be examined by Plant Engineering for blockage and/or leakage.

8. Any barriers or covers placed during construction to prevent activation of smoke or heat detectors must be removed.
9. Documentation on all sign-offs, including that of containment barriers/negative pressure and inspections shall be provided to PE project manager.

IV. Interim Life Safety Measures (ILSM)

UNC Health Care will implement, document, and enforce reasonable interim life safety measures (ILSMs) necessary to protect occupants during periods when the Life Safety Code® is not met or during periods of construction.

Shutdown of existing fire protection systems for renovations and maintenance shall be kept to a minimum. Plant Engineering or UNC-CH Facilities Services will notify the following agencies and departments: 1) Hospital Police or UNC Public Safety; 2) the departments being effected by the shutdown; 3) the Chapel Hill Fire Department; 4) the North Carolina Department of Insurance – the Property Insurance section; and 5) the North Carolina Department of Insurance – the State Fire Marshal with jurisdiction over the Hospitals. If the shutdown will be greater than 4 hours. A fire watch will be initiated when a fire alarm or sprinkler system is out of service more than 4 hours in a 24-hour period in an occupied building. Notification and fire watch times are documented.

Plant Engineering or UNC-CH Facilities Services will post signage identifying the location of alternative exits to everyone affected.

ILSM will be evaluated and applied as necessary when Life Safety Code® deficiencies cannot be immediately corrected or during periods of construction. The Joint Commission requires that Interim Life Safety Measures (ILSMs) be evaluated for routine maintenance activities as well as for issues identified in the Plans for Improvement (PFIs). For routine maintenance, the employees in Maintenance and contractors will be educated on life safety compliance and ways to prevent the requirement to implement ILSMs. In regard to barrier penetration based PFIs, Plant Engineering and EH&S have determined that the aggregate sizing of the wall or ceiling penetrations historically discovered within the existing facility do not pose an immediate threat to life safety and that no additional ILSMs need to be implemented unless the nature of the deficiency is related to another type of issue or if the penetration is greater than 5% of the rated barrier. For all other deficiencies listed as a PFI, a risk assessment will be performed to determine the need for the implementation of interim life safety measures.

The following criteria for evaluating when and to what extent the hospital follows special measures to compensate for increased life safety risk during maintenance activities:

- Determine if the impact is significant
- In general, projects less than a week in length which do not reduce the level of life safety below Life Safety Code® minimum requirements are not significant
- Activity which takes place in a room with an intact door which does not penetrate walls generally does not require an ILSM
- Activities that block or compromise exit stairs, required exit corridors, or exit discharge areas for more than one shift generally require an ILSM

The following criteria for evaluating when and to what extent the hospital follows special measures to compensate for increased life safety risk during construction and renovation activities will be utilized.

- Inspects exits in affected areas on a daily basis. Means of egress for exiting renovation/construction areas will be inspected daily by the PE/FS Project Manager or the on-site contractor supervisor.

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- Provides temporary but equivalent fire alarm and detection systems for use when a fire system is impaired. PE/FS Electronics Shop will ensure the fire alarm, detection, and suppression systems are in good working order. Temporary but equivalent fire alarm and detection systems as determined by project specific site needs shall be provided when any fire system is impaired. The contractor will provide, install, and maintain temporary fire extinguishers throughout the work until the permanent system is in place.
- Provides additional firefighting. PE/FS will provide additional fire-fighting equipment as may be deemed necessary.
- Uses temporary construction partitions that are smoke-tight, or made of noncombustible or limited-combustible material that will not contribute to the development or spread of fire as determined by PE/FS and the contractor in charge of the project.
- Increases surveillance of buildings, grounds, and equipment, giving special attention to construction areas and storage, excavation, and field offices. As determined by ILSM, fire, safety, and infection control inspections will be conducted by PE/FS, Hospital Police, EH&S, or HE in conjunction with the contractor in charge of the project. Rounds will be coordinated between PE, EH&S, and HE.
- Enforces storage, housekeeping, and debris-removal practices that reduce the building's flammable and combustible fire load to the lowest feasible level. The contractor in charge of the project will develop and enforce storage, housekeeping, and debris-removal practices that reduce the building's flammable and combustible fire load to the lowest feasible level. The contractor shall establish procedures to minimize storage of combustible and flammable materials on site. Combustible trash shall be removed from the site daily. The project manager for PE or FS will monitor activities daily to implement appropriate housekeeping measures, when necessary.
- Provides additional training to those who work in the hospital on the use of firefighting equipment as may be deemed necessary.
- Conducts one additional fire drill per shift per quarter if deemed necessary by the Plant Engineering Project Manager and/or EH&S.
- Inspects, tests, and documents the testing date for temporary systems monthly.
- Conducts education to promote awareness of building deficiencies, construction hazards, and temporary measures implemented to maintain fire safety. EH&S, in conjunction with information provided by PE/FS, will train personnel when structural or compartmentation features of fire safety are compromised. This training will be conducted for individuals that work in or adjacent to the affected area(s), to compensate for impaired structural or compartmentalization features of fire safety.
- Trains those who work in the hospital to compensate for impaired structural or compartmental fire safety features. During the construction and renovation of new and existing areas of the hospitals and ambulatory occupancies, Plant Engineering (PE) or UNC-CH Facilities Services (FS) will implement reasonable and appropriate measures to provide free and unobstructed exits in the Hospitals or ambulatory occupancies in those construction/renovation areas. Personnel will receive training when alternative exits are designated from the Department Safety Coordinator or EH&S. In order to ensure that the appropriate DSC is contacted, PE/FS will provide EH&S with a list of all areas with alternative exits at least one month prior to the closure. Buildings or areas under construction must maintain escape routes for construction workers at all times. EH&S will conduct training as may be deemed necessary.

ILSMs will also be evaluated for issues identified in the Statement of Conditions at regularly scheduled meetings between PE and EH&S.

Documentation will be maintained for each measure as may be required for any given project.

V. Ceiling Opening and Fire/Smoke Barrier Penetrations

No ceiling throughout the entire Hospital complex may be opened nor may any penetration into or through a fire/smoke barrier be modified or created without prior written permission from the Plant Engineering (PE) Department. No ceiling located on the 1st floor of the Ambulatory Care Center may be opened nor may any penetration into or through a fire/smoke barrier be modified or created without prior written permission from the Ambulatory Care Center (ACC) Administrative Office. This section of the policy also applies to the Hillsborough Hospital Campus, WakeBrook, Burn Reconstruction and Aesthetic Center, and ambulatory care occupancies at Meadowmont B. Opening a ceiling means to remove or alter any ceiling to gain access to the area above it. Examples are: lifting a tile in a drop ceiling just enough to see above it, drilling a hole in any ceiling, opening any access door, removing a portion of a ceiling or an entire ceiling, or any other activity which may result in the opening of a ceiling.

A. Procedure

1. Departments or contractors who need to create an opening(s) in a ceiling(s), or who need to create a new opening or modify an existing opening in a fire/smoke barrier to perform a permissible function must first obtain either an "Open Ceiling Permit" or a "Fire/Smoke Barrier Penetration Permit" or both. These permits will be obtained from the facilities operations staff on site. The request will be evaluated and permission will be granted or denied based upon the information provided at the time of the request, operations occurring within the respective facility during the request period, and the amount of disruption the request will generate as it may require staffing notices, closures, or additional management/department reviews.

Note: Contractors shall be required to work through their hiring department to make the request(s) as the hiring department shall be responsible for ensuring the quality of the work being performed and the integrity of both the ceiling(s) and any barriers that were modified during the work.

2. When working in a patient care area, the department should check with the charge nurse before beginning work so the charge nurse can ensure that at-risk patients are in their rooms and the respective doors are closed. Plant Engineering and Maintenance IC0045 policy, Appendix 3 also contains guidelines for ["Precautions for Patients in Clinical Areas Where Ceiling Work is Planned."](#)
3. When the work is being performed in the highest risk areas, the department overseeing the work should also contact HE for guidance before opening the ceiling. At the time of notification Hospital Epidemiology will also reiterate the infection prevention measures provided to the contractors by Plant Engineering to include:
 - a. Immediately prior to beginning ceiling work in a patient care area, the individual conducting the work should consult the charge nurse, so she/he can assess the potential impact of the work on immunocompromised patients in the area and ensure that patients are in their rooms and doors are closed.
 - b. No patients should be housed in rooms where work is being conducted or ceiling tiles have been removed in the patient's room.
 - c. During the period in which tiles have been removed and work is being done, all immunocompromised patients should wear a surgical mask or N95 mask that covers the mouth and nose *when in the area of the ceiling opening.*

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- d. Thorough cleaning following all work should be done by Environmental Services before patients are allowed to remove their masks.
 - e. Depending on the details of the project, a plastic barrier or cube may be required.
4. Once the permit(s) are issued, the department overseeing the work will be required to maintain a log of the specific ceiling opening locations and dates that include fire/smoke barrier penetration additions or modifications. This log shall be submitted to Plant Engineering or ACC Administration as part of the permit close-out at the conclusion of the project.
 5. After the permit(s) have been approved, the requester and the PED Safety Officer shall retain a copy of the signed permit(s). The permit(s) must be readily available at the location of the ceiling opening or the fire/smoke barrier penetration during the process of performing the work for any health care personnel who may have reason to determine if permission has been granted. Employees in areas where ceilings are opened should verify that the department manager is aware of the ceiling opening project and, if unaware, should contact PE or ACC to confirm that the work has been approved.
 6. When work begins, if previously undetected hazardous materials or suspected asbestos containing materials are found, activities in the area must immediately stop and notification be given to PE or ACC Administration. Activities cannot resume in the area until materials have been examined by PE/Facilities Services and permission has been given to resume work. If an asbestos abatement is performed, a clearance form must be provided giving approval by the Asbestos Control Officer to re-occupy the area. Additional requirements may be located in the Asbestos Control Policy.
 7. If dust and debris are anticipated or are created during the work, HE must be contacted to coordinate remedial action as necessary.
 8. If at any time any individual becomes aware that a rated-wall assembly, i.e. a fire or smoke barrier or ceiling, has been penetrated or compromised, that individual must note the location of the compromise on the fire/smoke barrier penetration permit for notification to Plant Engineering or ACC Administration during close-out of the permit to document that the penetration/compromise was corrected at the time of and as part of the work. If the compromise is to be left uncorrected during the duration of the work the Department is to immediately notify Plant Engineering or ACC Administration so that appropriate corrective/protective measures can be implemented.
 9. When the individual or firm completes the activity for which permission was issued, the permit(s) and supporting data shall be returned to Plant Engineering or ACC Administration so that the permit can be removed from the active permit's list.
 10. The contractor is responsible for proper sealing and/or resealing of penetrations in accordance with all applicable codes and standards. The contractor is responsible for returning the area in which the work was performed to its original state.
 11. Plant Engineering may provide direction at the request of the Department or Contractor to ensure compliance. Plant Engineering may also conduct periodic reviews of past permit closures to ensure that the work was completed in accordance with all applicable codes and standards as well as to ensure the integrity of the Life Safety systems and barriers. Should discrepancies arise, it shall be incumbent upon the Department that either self-performed the work or was responsible for overseeing the work to provide a suitable resolution at the direction of Plant Engineering. After completion of the above procedure, the close-out section of the sheet must be signed by the requesting Department's representative and returned to Plant Engineering or ACC Administration.

B. Implementation

It will be the responsibility of PE and ACC Administration to implement these procedures as outlined below:

1. Contractors who are responsible for sub-contractors must include written notification on the contract document of the ceiling opening requirements. Notification can be a statement typed on a purchase request form that states, "All activities caused by this contract must comply with UNC Health Care's Ceiling Opening Requirements" or if a formal contract is used, it must be one of the general conditions. Alternatively, having the Contractor go through the PE Contractor orientation class shall also be deemed as acceptable notification.
2. Individuals or firms who want to open a ceiling must request permission by completing the request section (Section I, REQUEST) of the Ceilings Control Sheet (Appendix 8) which is available from the Safety Officer or ACC Administration.
3. The project manager will complete the approval section of the control sheet, granting or denying permission to work in the area requested. If permission is denied, the reason is to be written on the sheet. If permission is granted, the project manager will issue the sheet to the requester and will notify the Department of Hospital Epidemiology where and when the project is going to take place.
4. The requester will retain the sheet in the project area and make it available to any UNC Health Care personnel who may ask to see it.
5. The requester will return the control sheet to the project manager after the project has been completed. The project manager will inspect the work area for damages and complete the inspector's section (Section III, Close-Out Inspection). If there are damages they will be described on line C and suitable arrangements will be made with the individual or firm to resolve them. After all of the damages have been resolved, the project manager shall sign the close-out section. A copy of this sheet shall be given to the requester and the Safety Officer or ACC Administration.
6. The project manager will file the control sheet with the project document. A completed status report will then be filed to permit payment for the project. A completed status report must not be filed until clearance has been given for the project.
7. PE/ Facilities Services (FS) trade supervisors, other designated PE/FS personnel, and the UNC Health Care Director of EH&S, or designee, are exempt from the conditions of these requirements due to the nature of their work.

VI. References

1. CDC. Guidelines for Environmental Infection Control in Health-Care Facilities. MMWR 2003;52 (No. RR-10); 1-42.
2. Guidelines for Design and Construction of Hospitals and Outpatient Facilities. The Facility Guidelines Institute. 2014 Edition.
3. ASHE. American Society for Healthcare Engineering of the American Hospital Association web site. Infection Control Risk Assessment Matrix of Precautions for Construction and Renovation, adapted from work by V Kennedy. Web address: http://www.ashe.org/ashe/codes/cdc/pdfs/assessment_icra.doc. Accessed March 1, 2010.
4. TJC. The Joint Commission web site: Planning and Implementation Activities: Temporary Construction Barriers, revised April 1, 2005. Web address: <http://www.jointcommission.org/AccreditationPrograms/Hospitals/Standards/FAQs/Management+of+Env+of+Care/Planning+and+implementation+Activities/barriers.htm>. Accessed March 1, 2010.

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5. Vanderbilt University web site: Infection Control Interventions During Construction in Patient Care Areas, 2002. Web address: <https://mcapps03.mc.vanderbilt.edu/E-Manual/Hpolicy.nsf/AllDocs/4CCD425E4C1D82E586256B8B006B2654>. Accessed March 29, 2007.
6. Johns Hopkins Hospital web site: Infection Control Guidelines Related to Construction/Renovation, 2006. Web address: http://www.hopkinsmedicine.org/heic/policies:/pdf/ifc005_11-22-06.pdf. Accessed March 29, 2007.
7. Public Health Agency of Canada web site: Construction-related Nosocomial Infections in Patients in Health Care Facilities. Decreasing the Risk of *Aspergillus*, *Legionella* and Other Infections. Web address: <http://www.phac-aspc.gc.ca/publicat/ccdr-rmtc/01vol27/27s2/index.html>. Accessed March 29, 2007.

VII. Reviewed/Approved by: Personnel and Environmental Safety Subcommittee

VIII. Original Policy Date and Revisions: Four separate policies were combined into this policy July 2010: Safety Management for New Construction and Renovation Projects (EHS 0050), Infection Control Guidelines for Construction and Renovation (IC 0009), Interim Life Safety Measures (EHS 0025) and Ceiling Opening/Rated Wall Assembly Penetrations (EHS 0026), April 2013, April 2014, October 2016

IX. Comments

For comments or questions about the contents of this policy, contact:

- Environmental Health and Safety, 984-974-0749
- Hospital Epidemiology, 984-974-7500
- Plant Engineering, 984-974-0320

Appendix 1: Sample Hospital Epidemiology Blueprint Review for Clinical Areas

Project Title: _____ . P# : _____

Design Liaison:

Hospital Epidemiology Reviewer: _____

Date of Review:

1	2	3	4	Comments
<p>Hand washing sinks are appropriately placed.</p> <p>Scrub sinks, if used, have an automatic timer or clock with second hand available.</p> <p>Keep hallway sinks if possible.</p> <p>Consider placement of recessed hallway sinks</p>	<p>Yes___</p> <p>Yes___</p> <p>Yes___</p>	<p>No___</p> <p>No___</p> <p>No___</p>	<p>NA___</p> <p>NA___</p> <p>NA___</p>	
<p>Traffic flow appropriate (e.g., no dirty activities through clean areas.</p>	Yes___	No___	NA___	
<p>Ventilation-see comments last column.</p>	Yes___	No___		<p>Please verify that the air exchanges per hour and pressure differential are as recommended by the American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE)</p>
<p>Isolation Room Needed:</p> <p>Isolation room must meet the CDC requirements for Airborne Isolation. Please contact ventilation engineer in Plant Engineering.</p>	Yes___	No___	NA___	
<p>Flooring appropriate (e.g., no carpet in OR, seamless floors in dialysis)</p>	Yes___	No___	NA___	
<p>Medicine preparation area designed to prevent contamination. Medication preparation should be accomplished at least 3 feet from sink and/or splashguard will be placed between the medicine prep area and sink.</p>	Yes___	No___	NA___	
<p>Ice machines are designed for single use dispensing.</p>	Yes___	No___	NA___	
<p>Solid waste, disposal of body fluids and environmental issues</p> <p>Soiled Utility Room is conveniently located.</p> <p>Solid Waste and linen disposal appropriate.</p>	<p>Yes___</p> <p>Yes___</p> <p>Yes___</p>	<p>No___</p> <p>No___</p> <p>No___</p>	<p>NA___</p> <p>NA___</p> <p>NA___</p>	

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<p>Provisions for soiled holding of trash (e.g., regulated medical waste) and soiled linen must be considered. Door to this room should remain closed (e.g., automatic closure).</p> <p>Janitor’s closet is conveniently located.</p> <p>Adequate storage space for housekeeping carts.</p>	<p>Yes___</p> <p>Yes___</p> <p>Yes___</p>	<p>No___</p> <p>No___</p> <p>No___</p>	<p>NA___</p> <p>NA___</p> <p>NA___</p>	
<p>Sharps Disposal – see comments last column</p>				<p>Please verify the installation height for wall-mounted sharps disposal units is the recommended height (i.e., top is between 52 and 56 inches from floor which accommodates 95% of all adult female workers).</p>
<p>Containment of dust and debris</p>				<p>Please verify the barriers for containment of dust will adequately prevent migration of construction dust outside the construction site (e.g., minor renovation for brief period may only require sealed plastic,; major renovation will require sealed temporary walls). Walk-off mats are required. Debris carts must be covered and wheels free of dust before transport.</p>
<p>Patient care in adjacent areas</p> <p>Review of plans has determined that renovation/construction project will not affect patient flow in relationship to adjacent areas (e.g., near loading docks or soiled activities).</p>	<p>Yes___</p>	<p>No___</p>	<p>NA___</p>	

Plan approved: Yes___ No___

Plan approved with incorporation of recommendations: Yes___ No___

Risk Assessment reviewed and approved: Yes___ No___ If yes, Class_____ If no, contact Project Manager and hold this form until Risk Assessment is completed.

Other recommendations:

Appendix 2: Preconstruction Risk Assessment

**UNC Hospitals
Pre-Construction and Infection Control Risk Assessment**

Location of Construction:	Project Start Date:
Project Coordinator:	Estimated Duration:
Contractor Performing Work:	Permit Expiration Date:
Supervisor:	Telephone:

Description of project:

Construction Activities

The following projects do not require completion of the pre-construction risk assessment form:

1. Paint and wallpaper in business offices and non-patient areas.
2. Paint in patient room if closed for painting and less than 3 sq.ft. of wall needs patched. Filter for room unit changed after painting.
3. Installation of soap dispenser/needle box/paper towel holder/etc. in patient room except in a Protective Isolation room or if the patient is out of the immediate area and clean-up can be accomplished before the patient returns.
4. Repair of window blind.
5. Ceiling tile replacement for areas less than 10 2 X 2 tiles, if in business offices and non-patient areas.
6. Ceiling tile replacement for area less than 5 2 X 2 tiles in a patient area if patient is out of the immediate area and clean up can be accomplished before patient returns.
7. Minimum repair of nurse call system/TV/Bed/Telephone.
8. Check or replace electric outlet.
9. Replace light bulb.
10. Unstop sink/commode with no water on floor.
11. Unstop commode when water on floor requires Plant Engineering to have Environmental Services clean area immediately.
12. Repair medical gas outlet. (Front Body)
13. Air balance readings.
14. Check air-conditioning if doesn't generate dust and debris.

General

Yes No

- Will there be noise generated that will impact a department adjacent to, above, or below the construction area?
 - a. If so, these departments must be notified.
 - b. How will noise be reduced to an acceptable level?
- Will there be vibration generated that will impact a department adjacent to, above, or below the construction area?
 - a. If so, these departments must be notified each time this type of work will be performed.
 - b. How will vibration be reduced to an acceptable level?
- Are Emergency Procedures in place for accidental events that could greatly impact Patient Care or Life Safety to the facility? Included in these procedures are such things as:
 - Emergency telephone numbers of key departments.
 - A plan that describes where main valves, switches, and controls are for the area in case of an emergency.
 - A plan for unexpected outages.

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Environment

Yes No

- Will hazardous chemicals be used on this project? How will fumes and odors be controlled? Safety Data Sheets are required for all hazardous chemicals used on the project.
- Is hazardous material abatement required on this job? If so, notify Plant Engineering Safety Officer.
- Will there be hot work done on this project? If there is, then a hot work permit must be posted on the job site. All hot work requires an assessment and may require a fire watch pursuant to NFPA 51B.
- Will there be a Confined Space Entry required on this project? If so, the confined space entry program must be followed. Must notify Plant Engineering Safety Officer as well as Environmental Health and Safety prior to entry.

Utilities

Yes No

Will any of the following systems be out of service at any time during the project?

- Fire alarm (If out for more than 4 hours, Interim Life Safety Measures must be implemented.)
- Sprinkler (If out for more than 4 hours, Interim Life Safety Measures must be implemented.)
- Electrical
- Domestic water
- Medical Gases
- Sewage
- HVAC

Emergency Procedures and ILSM

Yes No

- Will there be any work that may require activation of the Interim Life Safety Measures during this project? If the answer to this question is yes, contact EH&S immediately to evaluate need for area training. Some things that may require ILSM's to be implemented are but not limited to:
 - Any construction that impacts an exit or stairs
 - Any construction that impacts major breaches in a fire or smoke wall
 - Taking the main fire protection system out of service (sprinkler)
 - Taking the main fire alarm system out of service
 - Taking the "area" fire or fire alarm systems out of service for more than 4 hours within a 24-hour period.

Implementation of the ILSM requires the ILSM form to be completed and may require a fire watch.

Additional Safety Concerns

Yes No

- Will construction affect exit routes from occupied areas adjacent to construction site?
- Will project affect traffic patterns in area? If yes, explain plan.

Air Quality and Infection Control

The construction activity types are defined by the amount of dust that is generated, the duration of the activity, and the amount of shared HVAC systems. Contact the Epidemiology Department if any activity is questionable under these guidelines.

Yes No

- Will dust be generated during this project? If yes, explain location of and plan for interim dust barriers or attach floor plan with barriers clearly marked.
- Will debris removal be necessary? If yes, explain plan for debris removal and control.
- Will work be done in a sterile area? If so, how will a sterile atmosphere be maintained in work area and access to and from work area?

Infection Control Classification

Step 1 – Identify the Construction Activity Type

Type A Inspection and non-invasive activities or small scale, short duration activities do not generate appreciable dust and do not require cutting of walls or access to ceilings other than for visual inspection, including, but not limited to:

Yes No

- Removal of ceiling tiles for visual inspection limited to 1 tile per 50 square feet
- Painting (but not sanding)
- Wall covering
- Electrical trim work
- Minor plumbing
- Installation of telephone and computer cabling in non-patient care areas

Type B Small scale, short duration activities that create minimal dust, including, but not limited to:

Yes No

- Installation of telephone and computer cabling in patient care area
- Access to chase spaces
- Cutting of walls or ceiling where dust migration can be controlled

Type C Any work that generates a moderate to high level of dust or requires demolition or removal of any fixed building components or assemblies (e.g., countertops, cupboards, sinks), including but not limited to:

Yes No

- Sanding of walls--drywall finishing for painting or wall covering
- Removal of floor coverings, ceiling tiles, or casework
- Cutting of walls or ceiling
- New wall construction
- Minor ductwork or electrical work above ceilings
- Major cabling activities
- Any activity that cannot be completed within a single work shift

Type D Major demolition and construction projects, including, but not limited to:

Yes No

- Activities that require consecutive work shifts
- Will require heavy demolition or removal of a complete ceiling system (Appendix 3 said cabling systems but I believe that ceiling system is correct)
- New construction

STEP 1: Type: _____

Step 2 – Identify the Patient Risk Groups Affected by the Work

Using the following table, *identify* the Patient Risk Groups that will be affected by the work. For example, include areas that are adjacent to the site or are in areas where vibration may cause fallout on the rooms beneath the site. **Note: This list is not all inclusive. It provides examples of types of patient care areas.**

Low Risk	Medium Risk	High Risk	Highest Risk
<ul style="list-style-type: none"> • Office areas • Public areas (e.g., lobbies) 	<ul style="list-style-type: none"> • Outpatient Clinics (except transplant and oncology) • Cafeterias (e.g., Terrace Cafe, Corner Café) • Public Corridors 	<ul style="list-style-type: none"> • All inpatient nursing units that are not ICUs or Step-down units. • Emergency Room • Labor & Delivery • Laboratories (specimens) • Pharmacy • PACU • Food preparation/food service areas • Cardiology • Echocardiography • Endoscopy • Nuclear Medicine • Physical Therapy • Radiology/MRI • Respiratory Therapy • Linen/Laundry Room 	<ul style="list-style-type: none"> • Any inpatient area housing immuno-compromised patients: <ul style="list-style-type: none"> ○ BMTU, all ICUs, burn floor [5 East], solid organ transplant floors [CTSU, 5WST, ISCU], Oncology [4ONC], Pediatric Oncology [5CH, CICC]) • Step-down Units • Cardiac Cath Lab • VIR • Dialysis • Central Processing • Negative pressure isolation rooms • Operating rooms, including C-section rooms and Outpatient Surgery • PACU • Transplant Clinic • BMTU Clinic • Oncology clinics and infusion areas • Pharmacies

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Step 3 – Complete the Infection Control Matrix to Determine the Class of Precautions. Class III and IV jobs lasting more than two weeks require solid, not plastic, barriers. Class II jobs may require a solid barrier, as recommended by Hospital Epidemiology and Plant Engineering.

Match the Patient Risk Group (Low, Medium, High, Highest) with the planned Construction Project Type (A, B, C, D) on the following matrix to find the Class of Precautions (I, II, III, or IV) or level of infection control activities required.

	CONSTRUCTION ACTIVITY <i>Check type of activity</i>		INFECTION CONTROL RISK GROUP <i>Check risk group</i>
<input type="checkbox"/>	TYPE A: Inspection, non-invasive activity	<input type="checkbox"/>	GROUP 1: Low Risk
<input type="checkbox"/>	TYPE B: Small scale, short duration, moderate to high levels of dust	<input type="checkbox"/>	GROUP 2: Medium Risk
<input type="checkbox"/>	TYPE C: Activity generates moderate to high levels of dust, requires greater than 1 work shift for completion	<input type="checkbox"/>	GROUP 3: Medium/High Risk
<input type="checkbox"/>	TYPE D: Major duration and construction activities requiring consecutive work shifts.	<input type="checkbox"/>	GROUP 4: Highest Risk

Classification of Required Preventive Measures

Patient Risk Group	Construction Activity			
	TYPE A	TYPE B	TYPE C	TYPE D
LOW Risk Group	I	II	II	III/IV
MEDIUM Risk Group	I	II	III	IV
HIGH Risk Group	I	II	III/IV	IV
HIGHEST Risk Group	II	III/IV	III/IV	IV

Step 3: Required Preventive Measures Classification: _____

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<p>a) CLASS I</p>	<ol style="list-style-type: none"> 1. Execute work by methods to minimize raising dust from construction operations. 2. Replace any ceiling tile displaced for inspection immediately when unattended if outside construction barrier. 3. Construction workers should use elevators designated “for staff use.”
<p>b) CLASS II</p>	<p>Follow all precautions for CLASS I, above. Follow these additional precautions:</p> <ol style="list-style-type: none"> 1. Obtain signed Risk Assessment from Hospital Epidemiology before work begins. 2. Provide active means to prevent airborne dust from dispersing into air. Complete all critical barriers before construction begins. 3. Remove or isolate HVAC system in areas where work is being performed to prevent contamination of the duct system. Negative or neutral pressure in work site is preferred. 4. Block off and seal air vents. Seal unused doors with duct tape. 5. Water mist work surfaces to control dust while cutting. 6. Contain construction waste before transport in covered containers. 7. Keep dust and accumulated dirt in the work site to a minimum. Use disinfectant to wipe soiled or dusty surfaces. Keep area around the site clean. Wet mop with disinfectant to minimize dust and debris in and around work site. Use HEPA filtered vacuum cleaner when vacuuming. 8. Place dust control mat at entrance and exit of work site; cover sufficient area so both feet contact the mat. Replace or clean when no longer effective. 9. Remove barrier materials carefully to minimize spreading dirt or debris from construction area. Wipe casework and horizontal surfaces at completion of project. 10. Environmental Services performs final cleaning prior to job being turned over to owner.
<p>c) CLASS III</p>	<p>Follow all precautions for CLASS I and II above. Follow these additional precautions:</p> <ol style="list-style-type: none"> 1. Class III projects lasting more than two weeks require solid, not plastic, barriers. 2. Seal holes, pipes, conduits and punctures appropriately. 3. Maintain negative air pressure within the work site and utilize HEPA equipped air filtration units. 4. Cover construction supplies and materials during transport into the facility and work site.
<p>d) CLASS IV</p>	<p>Follow all precautions for CLASS I, II, and III above.</p> <ol style="list-style-type: none"> 1. Class IV projects lasting more than two weeks require solid (not plastic) barriers. 2. Class IV may require additional measures as determined by Hospital Epidemiology and Plant Engineering. For example, workers could be vacuumed with HEPA vacuum before leaving the worksite or could wear cloth or paper coveralls (e.g., bunny suits) and/or shoe covers when exiting the project site and traveling through neighboring clinical areas.

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Additional Requirements or Concerns:		
Permit Requested By	Safety Approval	Epidemiology Approval
Date:	Date:	Date:

Appendix 3: Quick Reference for Construction Barrier Specifications

Sheet Plastic

- Fire retardant polyethylene
- 6 mil thickness
- Must be completely sealed from top to bottom and continuously supported where sagging can occur (e.g. ceilings)
- Entry/exit must be double-layered plastic overlapping with weighted flap at least 2 feet in width at bottom **OR**
- Plastic with zipper that runs the full length of plastic door and with zippers at the bottom to completely seal during work activities
- **Plastic barriers may not be used on Class III or Class IV projects lasting more than two weeks. They may not be used on projects that include torch cutting, welding or burning.**

Dry Wall and Solid Core Door

- Metal studs/frame to secure to floor, ceiling, and sides as needed.
- When metal studs/frame not possible, use duct tape to seal.
- Door in frame with no gaps on top, bottom, or sides. Use duct tape to seal as necessary.
- **Class III and Class IV projects lasting more than two weeks require solid barriers.**
- **When project is considered as having a higher level of hazard than the occupied portion of the building, barrier shall have 1-hour fire resistance rating with 45-minute fire protection rating in openings pursuant to NFPA 241.**

Walk-Off Mats

- Minimum of 24 inches X 36 inches

Ventilation

- All construction zones should have negative airflow. The air movement should be from outside the construction zone into the construction zone.
- Portable HEPA units can be used for zones with low to neutral pressure.

NOTE: Class III and Class IV projects lasting more than two weeks require a solid (not plastic) barrier. Occasionally a Class II project may require a solid barrier as recommended by Hospital Epidemiology and Plant Engineering.

Appendix 4: Contractor Employment Requirements

- A. Each contractor must comply, and require each of its employees to comply, with OSHA regulations and CDC recommendations concerning “Occupational Exposure to Bloodborne Pathogens” by:
1. Providing UNC Health Care HEOHS Infection Control and General Safety Training manual with posttest which incorporates OSHA and CDC standards;
 2. Providing a devoted toll free line with qualified personnel for any interactive questions;
 3. Providing Hepatitis B Vaccination Series, if needed, at no cost, as required by OSHA Bloodborne Pathogen Rules for blood exposure;
 4. Maintaining and distributing an Exposure Determination and Control Plan;
 5. Maintaining required records;
 6. Ensuring proper follow-up evaluations resulting from an exposure incident;
 7. Providing authorization and reimbursement for post exposure medical evaluation and follow-up; and,
 8. Providing an explanation of the signs, labels and color-coding used to identify bio-hazardous materials.
- B. Each contractor must conduct a criminal background check on each of its workers which will show any convictions of each such worker, other than traffic offenses, which have occurred over the preceding seven (7) years. A copy of the results of such checks shall be provided to UNC Health Care upon request. UNC Health Care reserves the right to refuse the services of any worker based upon the results of such check.
- C. Each worker will have all immunization (i.e., immunity to mumps, measles, rubella; varicella; pertussis; along with a yearly influenza immunization) and health requirements met according to UNC Health Care’s Infection Control and Screening Program, Occupational Health Service (summarized on Appendix II). In addition, each contractor shall verify that each worker providing services at UNC Health Care undergoes the same pre-employment/placement drug and health screening which is required of permanent staff of UNC Health Care.

All workers shall be required to wear a badge appropriately identifying each such worker as an employee of the contractor, and/or any other badge required by UNC Health Care.

Appendix 5: Health Screening Criteria

COMMUNICABLE DISEASE SCREEN

A. Tuberculosis screening

1. An appropriate test (i.e., TST or IGRA) and screen for symptoms of TB upon employment and should be offered annually as per the NC TB Manual, NC Health Department
2. If the TST or IGRA test is positive, or symptoms suggestive of TB, must have chest x-ray, if chest x-ray negative, interview for symptoms annually
3. Proof of negative screen must be verified by agency
4. If positive test, but negative x-ray, must have proof of follow-up with county health department, in which diagnosis confirmed, or private MD
5. If symptoms suggest active pulmonary TB, must have proof of follow-up and treatment with the county health department or private MD in which diagnosis and treatment are confirmed.

B. Influenza

Proof of immunity required at employment
Seasonal: October 1 – March 31

C. Rubella

Proof of immunity required at employment (unless birth before 1957 except for a female of childbearing potential) - one vaccine, serological evidence of immunity

D. Rubeola (Red Measles)

Proof of immunity required at employment (unless birth before 1957) – two vaccine doses, serological evidence of immunity, or physician diagnoses disease with laboratory confirmation

E. Mumps

Proof of immunity required unless birth before 1957) - two vaccine doses, serological evidence of immunity, or physician diagnoses disease with laboratory

F. Varicella

Proof of immunity by clinical history or serological testing (positive Varicella titer), two vaccine doses, or physician diagnosed disease

G. Pertussis

Proof of one dose of Tdap

H. Hepatitis B, HIV and Other Disorders

Employees coming in contact with human blood, potentially infectious body fluids, or potentially infectious materials must have the appropriate protective measures provided by his or her employer. This Federal Regulation is to prevent possible exposure to Hepatitis B, HIV and hepatitis C. All temporary service providers shall ensure that personnel placed by his or her firm are trained by UNC Health Care regarding bloodborne pathogens. Such training must be conducted within ten (10) days of temporary personnel placement, if this person is to come in contact with patients.

I. Influenza

- a. Proof of a yearly influenza vaccine dose (during Flu season)

Appendix 6: Weekly Monitoring Checklist: ILSM-PCRA Precautions

Date of assessment/survey:	Assessment completed by:		
Area assessed/surveyed:			
Project Number (if applicable):	Project name:		
	Ye s	N o	NA
	List time, documentation or action/follow-up as needed		
A. EXITS			
1. Exits provide free and unobstructed egress through construction.			
2. Alternative exits are clearly identified.			
3. Means of egress in construction area inspected daily.			
B. FIRE EQUIPMENT AND SAFETY			
4. Fire alarms, detection, and suppression systems are in an operational function.			
5. Fire alarms, detection, and suppression systems are impaired.			
6. Temporary fire alarm, detection, and suppression systems are being inspected and tested monthly.			Date:
7. Training and additional fire equipment are being provided for personnel.			
8. Power has been properly secured at the end of each workday.			
9. No smoking policy been implemented in and adjacent to the construction areas.			

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10. Construction areas are free of storage and housekeeping materials, food waste, and debris from daily operations to reduce flammable and combustible fire load of the building; floor area leading to/from construction site cleaned daily.				
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	Ye s	N o	NA	List time, documentation or action/follow-up as needed
11. Are there the appropriate number of functional fire extinguishers present on the job site in compliance with 1926.150: A fire extinguisher, rated not less than 2A, shall be provided for each 3,000 square feet of the protected building area, or major fraction thereof. Travel distance from any point of the protected area to the nearest fire extinguisher shall not exceed 100 feet.				
12. Number of hazard surveillance inspections in construction area has increased.				Last date or time:
13. Safety education programs have been conducted to ensure awareness of any ILSM deficiencies and construction hazards, as needed.				Date:
C. HAZARD SURVEILLANCE and INFECTION PREVENTION SAFETY				
14. Hand and safety rails are in place and in good condition.				
15. Extension cords are grounded and in good condition.				
16. Power tools are in good condition.				
17. Workers wearing required identification and hard hats are used as required.				
18. Hot work permits have been obtained for any work producing heat or sparks (grinding, removing floor tile with a propane torch, soldering pipe, etc.), and are conducted utilizing the appropriate safeguards and PPE.				

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19. Documentation of worker instruction in Right-To-Know, Infection Control and Fall hazards is available if requested.				Date of request:
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	Ye s	N o	NA	List time, documentation or action/follow-up as needed
20. All compressed gases (acetylene, oxygen, etc.) are stored in an up-right manner and are appropriately (secured in cart or chained to stable surface).				
21. All scaffolding complies with OSHA requirements (1926.451) and workers are using appropriate harnessing (1926.104).				
22. Construction site secure and properly isolated from fresh air intakes.				
23. Lock out / tag out procedures are used as appropriate				
24. Materials used (i.e., fire retardants) comply with necessary safety regulations.				
25. Construction barriers are appropriate (fire retardant poly or dry wall) intact and maintain negative pressure relationships.				
26. Workers demonstrate compliance with traffic patterns.				
27. Workers comply with use of PPE (Hard hats, eye protection etc.) as needed.				
28. HEPA filtration units, HEPA vacuum equipment, &/or continuous use of exhaust fans demonstrate they are functioning appropriately. When applicable, verification that negative pressure is being maintained.				

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29. Exhaust ducts sealed/capped as agreed by PCRA.				
30. Construction area doors are closed and gaskets & hardware are intact.				
31. Construction carts transporting debris are covered and consistent with agreement designed to minimize airborne particulate matter from debris.				

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	Ye s	N o	NA	List time, documentation or action/follow-up as needed
32. All windows and doors remain closed to prevent circulation of dust/debris.				
33. Walk-off mats, adhesive strips are clean and changed sufficiently, or construction exit cleaned sufficiently to maintain clean entry/exits.				
34. No signs of water leakage or pests.				
35. All fluorescent light bulbs and ballast removed during construction are appropriately boxed and recycled.				
36. No waste paint or other potentially hazardous waste is rinsed down the storm drains.				
37. Ceiling tiles replaced when space not being accessed.				

Additional comments _____
 Project Manager _____ Date _____
 Contractor _____ Date _____

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Appendix 7: Interim Life Safety Measures Construction Project Assessment

**UNC Hospitals Plant Engineering
Interim Life Safety Measures Construction Project Assessment**

ILSM Data Collection

Project Name:										
Project Description:										
Estimated Start Date:					Estimated Completion Date:					
Contractor:										
Contractor Representative:										
Project Manager:										
Life Safety Project Data (check applicable box)										
Will the project include general construction, renovation or significant repairs within or immediately adjacent (connected) to an occupied building?						<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
If yes, document assessment of ILSM # 1, 5, & 7										
Does the project involve the major renovation of an occupied floor or department?						<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
If yes, document assessment of ILSM # 1, 2, 5, 6 & 7										
Will the project result in the total or partial obstruction of approved exit or egress path?						<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
If yes, document assessment of ILSM # 1, 2, 5, 6, & 7										
Will the project result in obstructed access to the hospital by emergency services?						<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
If yes, document assessment of ILSM # 2 & 4										
Will the project result in the rerouting of emergency vehicles to the Emergency Department?						<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
If yes, document assessment of ILSM # 2 & 4										
Does the project involve significant modification of a smoke and/or fire barrier wall?						<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
If yes, document assessment of ILSM # 1, 5, & 7										
Does the project involve an addition to an existing structure?						<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
If yes, document assessment of ILSM # 2, 4, & 7										
Does the project involve the replacement or impairment of the fire alarm, detection, or suppression system?						<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Which Systems?		Alarm		Detection		Suppression				
If yes, document assessment of ILSM # 1, 3, 4, 6, & 7										
Will the project require implementation of temporary construction partitions for any reason (security, infection control, etc.)?						<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
If yes, document assessment of ILSM # 1, 3, 4, 6, & 7										
Will the project result in any of the following?						<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Excavation		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Construction Area(s)		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Construction Storage		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Field Offices		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
If yes, document assessment of ILSM # 1, 5, & 7										
Will the project require disruption of the sprinkler system for more than 4 hours in a 24 hours?						<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
If yes, document assessment of ILSM # 1, 3, 4, 5, 6, & 7 (ILSM #4 is mandatory)										
Will the project result in any other Life Safety Code deficiencies? (Describe below)						<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

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Other Life Safety Code Deficiencies:

If yes document assessment of ILSM #

A “yes” response to any of these questions automatically triggers an assessment for the implementation of Interim Life Safety Measures.

Note: Deficient conditions noted while project is under way may trigger an additional review of the project, including a reassessment for ILSM implementation.

Place a check mark in each applicable ILSM activity as determined by an assessment of the risks identified.

# 1	Inspections / Surveillance			
	Increase surveillance of buildings, grounds, and equipment:	Shift	Daily	Other
	Means of exiting construction areas inspected daily			
	Implementation of Fire Watch - Note required frequency of fire watch:			
	Not Applicable			
# 2	Accessibility			
	Maintenance of escape/egress routes from the construction area			
	Maintenance of access to emergency services for emergency equipment, fire alarm pull stations, fire department connections (internal and external)			
	Notify EH&S of any exit closure so that they can train the respective department on the revised exiting			
	Not Applicable			
# 3	Equipment - Life Safety			
	Temporary fire alarm, detection, suppression system in place			
	Monthly testing and inspection of temporary equipment			
	Provide additional firefighting equipment in project area			
	Provide additional firefighting equipment in adjacent area			
	Not Applicable			
# 4	Communications			
	Notification of the appropriate fire department			
	Notification of Department of Insurance			
	Notify Hospital Police			
	Not Applicable			
# 5	Construction Materials and Practices			
	Partitions smoke tight and constructed of noncombustible or limited combustible materials			
	Implement appropriate storage practices			
	Implement appropriate housekeeping practices			
	Implement appropriate debris removal practices			
	Not Applicable			
# 6	Fire Drills			
	2 fire drills per shift per quarter throughout hospital			
	2 fire drills per shift per quarter in areas adjacent to project			
	>2 fire drills per shift per quarter throughout Hospital. If yes, how many:			
	>2 fire drills per shift per quarter in areas adjacent to project. If yes, how many:			
	Not applicable			
# 7	Training			
	Additional training for staff in the immediate area			
	Additional training for staff throughout hospital			
	Additional training for emergency response teams			

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	Training to promote awareness of fire-safety building deficiencies, construction hazards, ILSM
	Training on changes in the physical environment (egress routes)
	Training on firefighting equipment
	Training on compensation for structural or compartmentalization features of fire safety
	Not Applicable

**UNC Hospitals Plant Engineering
Interim Life Safety Measures Construction Project Assessment Summary**

Date:	
Project:	
Building:	Floor: Room(s):
Project Safety Coordinator:	
General Contractor:	
Estimated Construction Start Date:	
Estimated Construction Completion Date:	

Implementation Checklist

	Review the scope of construction or renovation project for actions required by the ILSM assessment.
	Notify the general contractor of his or her responsibilities regarding ILSMs.
	Notify the necessary departments about potential shutdowns of fire alarms, sprinkler systems, smoke detection systems, etc. Prior to modifications that necessitate shutdowns, implement the necessary ILSMs to provide equivalent system protection. Coordinate with EH&S the scheduling of fire drills as appropriate.
	Develop a plan to train appropriate hospital staff and construction personnel on ILSMs.
	Regularly inspect and report on the construction site regarding ILSMs.

NOTE: If the above construction project does not warrant implementation of Interim Life Safety Measures, indicate the reason(s) below:

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Construction Superintendent:	
Project Manager:	

Appendix 8: Open Ceiling Permit

To be completed by Plant Engineering				
Open Ceiling Permit #:	Date Issued:		Date Returned:	
Project Number (if applicable):		Project Name:		
Request Data (To be completed by Requester)				
Name/Department:		Request Date:		
Firm Performing Work (Note here if Self-Performing):				
Contact Information (Cell Phone):				
Reason for Request:				
When Needed (Start Date):		Planned Completion Date:		
Specific Location(s) (Bldg/Floor/Area):				
Approval				
	Yes	No	Un- kno wn	Include documentation or action/follow-up as needed
Asbestos located in area:				
Location is in a Patient Care/Treatment Area (Inpatient/Outpatient)				If yes, note the date that Hospital Epidemiology (epidemiology@unch.unc.edu or 984-974-7500) was notified:_____. Note: This date must precede the date by 24 hours. Email address is to record archive purposes only.
Fire/Smoke Barrier Penetration Permit Required:				
				If yes, then explain requirements to track penetration locations:
Permission Granted:	Permission Denied:		Date:	
Reason, if Denied:			By:	
Close-Out Inspection				
Inspected By (Department Initiating the Request):			Date:	

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	Yes	No	Un- kno wn	Include documentation or action/follow-up as needed
Is Ceiling in an acceptable condition and the area suitable for intended use?				If no, describe discrepancies and notify Infection Control, if applicable.
If applicable, is the Fire/Smoke Barrier Penetration Permit and associated data being returned with this Permit?				If no, explain reason:
Follow-Up Inspection by Plant Engineering (as deemed necessary within one year of permit being closed):				
By:	Title:		Date:	
Notes:				

Appendix 9: Rated Assembly Permit

Permit #:	Date Issued:	Date Returned:
This permit is required for penetrations to any rated assembly throughout the facility. A description of the nature of the penetration must be completed for EVERY penetration.		
Project Number (if applicable):	Project Name:	
Request Data		
Name/Department:	Request Date:	
Firm Performing Work (Note Here is Self-Performing):		
Contact Information (Cell Phone):		
Nature of Work Being Performed:		
When Needed (Start Date):	Planned Completion Date:	
Specific Location(s)/Bldg/Floor/Area:		
Approval		
Permission Granted:	Permission Denied:	Date:
Reason, if Denied:		By:
Close-Out Inspection Performed at Completion of Work		
Inspected By:	Title:	Date:
Follow-Up Inspection by Plant Engineering (as deemed necessary within one year of permit being closed):		
By:	Title:	Date:
Notes:		

Appendix 10: Fire/Smoke Barrier Penetration Log

All fire/smoke penetrations must be documented individually. Attach this log to the Fire/Smoke Barrier Penetration Permit after completion of work.				
Permit #:		Date:		
Building:	Floor:		Area:	
Time Started:		Time Completed:		
Type of Barrier Affected by Work				
Smoke Partition:	Smoke Barrier:		Fire Partition:	Fire Barrier:
Penetration Corrected as Part of the Work:	Yes	No	If Yes, UL System Utilized/Notes:	
New Penetration				
Building:	Floor:		Area:	
Time Started:		Time Completed:		
Type of Barrier Affected by Work:				
Smoke Partition:	Smoke Barrier:		Fire Partition:	Fire Barrier:
Penetration Corrected as Part of the Work:	Yes	No	If Yes, UL System Utilized/Notes:	
New Penetration				
Building:	Floor:		Area:	
Time Started:		Time Completed:		
Type of Barrier Affected by Work:				
Smoke Partition:	Smoke Barrier:		Fire Partition:	Fire Barrier:
Penetration Corrected as Part of the Work:	Yes	No	If Yes, UL System Utilized/Notes:	
New Penetration				
Building:	Floor:		Area:	
Time Started:		Time Completed:		
Type of Barrier Affected by Work:				
Smoke Partition:	Smoke Barrier:		Fire Partition:	Fire Barrier:
Penetration Corrected as Part of the Work:	Yes	No	If Yes, UL System Utilized/Notes:	

Safety and Infection Control Management Plan for Construction, Renovation, and Modernization Projects

Penetration Corrected as Part of the Work:	Yes	No	If Yes, UL System Utilized/Notes:
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