Services and Support in Design and Construction Projects
Objectives

• Identify ways EHS can assist and support project delivery
• Improve understanding of EHS programs and organization
• Explain when and how to best communicate with EHS for various issues
• Help ensure University compliance
Presentation Overview

- EHS leadership and organization
- EHS involvement in project phases:
  - Design
  - Construction
  - Close Out
# EHS Organization: Three Primary Programs

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Campus Occupational & Laboratory Safety: Design
Activities regulated by TDLR

• Report existing mold concerns for renovation projects to the IAQ Inbox (ehs-iaq@austin.utexas.edu)

• Proposed project scope must be reviewed and approved by EHS

• EHS has pre-approved 3rd party IAQ consultants

• Investigation reports must first be delivered as a draft for EHS approval
**DESIGN: WATER INTRUSION AND MOLD GROWTH PREVENTION**

- Green roofs = water intrusion
  - EHS Green Roofing Systems document has recommendations - helpful ideas when designing
- Recommend cement board at wet walls. Avoid moisture resistant gypsum board.
If your project disturbs existing building materials or surfaces, EHS must identify if it contains asbestos or lead?

- **Request an Asbestos & Lead Assessment** (online on EHS homepage)
  - Copy asbestos program manager on all 10-day notifications to the State
Coordinate with EHS for all coring projects including: walls, floors, slabs, and parking lots

Asbestos, lead paint, and silica are all hazardous materials that may be encountered during coring operations

Notify EHS of any geotechnical boring operations
DESIGN: RUBBERIZED ATHLETIC FLOORING

• Rubberized athletic flooring installed from 1962 through the 1990’s have been known to contain hazardous materials, including mercury, arsenic, cadmium and lead.

• Common areas of installation included gymnasiums and cafeterias.

• As recent as 2006, Illinois discovered that a European company poured Hg-containing floor in a private school in Joliet, IL – the SDS did not list Hg.

• Rubberized athletic flooring continues to off-gas mercury throughout its life.
EHS can assist in their design, appropriate location, and operation to ensure that all applicable regulations are followed.
DESIGN: EXHAUST RE-ENTRAINMENT ISSUES

- Stack height > 10 feet higher than roof line or air intake located within 50 feet of the stack.
- For example, a stack placed 30 feet away from an air intake should be at least 10 feet higher than the center of the intake.
This is an example of relocating a fresh air intake from one side of a building to another to avoid bringing contaminated air into a building.
DESIGN: PAT BELOW GRADE AIR INTAKE AND ABUTTING LOADING DOCK

- Idling vehicles, construction activities, chemical and roofing odors all adversely affect the buildings fresh air.
DESIGN FOR SAFETY: WIDOW MAKERS

• Electrical requirements
• Arc Flash rating requirements
• Control on Hazardous Energy (Lock-out/Tag-out)
• Serviceability and maintenance access issues
• Site and surrounding area hazard control
• Confined Spaces
• Fall protection
Avoid designing or building confined spaces by:

- Design instruments or equipment monitored or repaired outside of the space
- Provide built in ventilation
- Provide access for the 95th percentile male
Required for fall heights ≥ 6 ft

- Guardrails or Fall Restraint required for fall heights 6 to 18 feet.
- Fall Arrest* is used when the fall height is ≥18 feet.

* Anchor points cannot be lower than the leading edge.
DESIGN FOR SAFETY: FALL PROTECTION

• Examples:
  • Roof hatch openings
  • Equipment or planters 15’ from a leading (unprotected) edge

• Controls Hierarchy:
  1. remove need to access at height
  2. restrict access (i.e. ≥39” railings)
  3. fall protection system

• Affects PMCS employees, Facilities employees, faculty, staff, contractors, students and general public
LADDER DAVIT SHOWN WITH SELF RETRACTING LIFELINE
EHS can create a safe work environment by:

- Assist with decontaminating and removing lab equipment
- Lab Clearance – certifying that labs are clear of hazardous material
• Equipment must be decontaminated and cleared through EHS prior to being moved or sent to Surplus
  • Refrigerators/Freezers
  • Ovens
  • Fume Hoods
  • Biosafety Cabinets

• Radiation producing equipment (x-ray and laser) require special handling - contact EHS Radiation Safety for regulatory compliance
DESIGN: EHS LAB CLEARANCE

- Previously occupied lab spaces must be cleared by EHS
- Look for this sign posted on lab door
- EHS retains a completed lab closeout form for each lab

The following lab locations have been cleared by EHS as of ______________:  

Building: ________________________________

Room Number(s): ________________________________

Laboratory personnel cannot work in this space after the date listed above.

EHS Personnel Signature: ________________________________

For questions, contact EHS Lab Safety at 512-471-3511.
DESIGN: COMMON PROJECT DELAY CAUSES

- Avoiding contacting EHS until issues arise
- Building ventilation capacity
- Flammable load restrictions (NFPA-45) per floor
DESIGN: LAB REQUIREMENTS

General (including BSL1)

• Minimum ACH requirements
• Negative pressure
• Hand washing sink
• Emergency equipment
  • Eyewashes/showers
• Easily cleaned
  • No carpets/rugs/fabric chairs
• Furniture capable of supporting anticipated loads
• Bench tops impervious to water and resistant to heat and chemicals
• Opening windows require screens

Room Pressure Monitor Indicator
DESIGN: LAB REQUIREMENTS

• BSL2 (in addition to BSL1 requirements)
  • Self-closing doors
  • BSCs located away from airflow disruptions
    • Doors
    • Air supply and exhaust
    • Heavily traveled areas
  • Opening windows are not recommended

• BSL3
  • Consult with EHS
DESIGN: EMERGENCY EQUIPMENT

- ANSI Z.358.1
- Ten second travel time (55 ft)
- Tepid water temp 60-100F
- Consult with EHS for proper location
- Eyewashes
  - Deck mounted swing-out type preferred
- Safety showers
  - Floor drain
  - Alarmed
- Drench hoses do not replace eye washes
DESIGN: FUME HOODS

- UT Austin Approved Low-flow hoods:
  - Kewaunee Supreme Air LV
  - Labconco Protector Xstream

- 75 ft/min velocity at 18 inches

- Reference UT Laboratory Fumehood Standard

- Airflow monitor alarm (must be calibrated)

- Cabinets beneath flammable/corrosives storage

- Hoods located away from air supply, doors, corner wall

- Exhaust fans installed outside building envelope
DESIGN: BIOSAFETY CABINETS (BSC)

• Preferred Class II Type A - exhaust into room through a HEPA filter for better energy management and ease of certification

• Hard ducted Class II Type B - generally not allowed, must be approved by EHS
DESIGN: CHEMICAL STORAGE

• Free-standing or beneath a chemical hood
• Flammable cabinets
• Acid (or corrosives) cabinet
• General chemical storage – lipped shelves
**DESIGN: GASES**

- Gas cabinets
  - Toxics/pyrophorics
  - Ventilated
  - Sprinklered
  - Monitoring
- Firmly secured
DESIGN: GAS DETECTION/EQUIPMENT MONITORING

• Gas monitoring
  • Toxic Gases (e.g. hydrogen sulfide, chlorine)
  • Oxygen deficiency (liquid nitrogen, helium)
    • Localized alarm
  • Flammable

• Equipment monitoring/alarms
  • Emergency power for certain equipment, e.g., -80 freezers
DESIGN: SPECIALITY SPACES

- Vivariums (animal housing)
- Medical clinics
- Compounding pharmacies
- Retail pharmacies
- Flammable gas storage rooms
- Environmental rooms/chambers (light, humidity, temperature)
Campus Occupational and Laboratory Safety: Construction
CONSTRUCTION: SITE CONTROL

- Protect pedestrians at project perimeter (falling objects and construction vehicle traffic)
- Do not create hazards that leave the site (odor, dust, noise)
CONSTRUCTION: ODORS, SMOKE & SILICA

• **Odorous Chemicals** guidance document: Lists potentially odorous products to be avoided.
• New silica exposure standard
• Contact EHS with any concerns not addressed in the Odorous Chemical document
CONSTRUCTION: RFI’S

RFI = un-reviewed change to original design
CONSTRUCTION: OCCUPIED LAB SPACES

• Within occupied spaces
  • Functional/operational lab equipment
  • Outages
  • Chemicals, lab apparatus, and other materials removed
  • Sensitive lab equipment moved or covered

• Adjacent to occupied spaces
  • Risk to occupants in adjacent spaces
    • Hallways, rooms directly above and below, rooms next door
    • Outages (fume hood systems, HVAC, electrical systems)
CONSTRUCTION: INCIDENTS AND DISCOVERED HAZARDS

• **Incident reporting** – any unplanned or undesired event or occurrence, whether it results in injury, illness, disease, death, loss of regulated material, damage to property, environmental spill/release or near miss.

• **Found chemicals/hazardous items**
  Do NOT throw away or pour down the sink—proper disposal through EHS is required.
Campus Occupational and Laboratory Safety: Close Out
CLOSE OUT: ASBESTOS AND LEAD REPORTING

• EHS needs copies of:
  • all inspections
  • abatement specifications
  • abatement close-out reporting

• DOT training required to sign asbestos waste manifests

• Copy the Asbestos Inbox (ehs-asbestos-lead-program@austin.utexas.edu) on all communications
CLOSE OUT: OCCUPATIONAL SAFETY

- Arch Flash documentation
- Control of Hazardous Energy procedures
- Fall protection certification package:
  - system drawings
  - anchor inventory
  - system load calculations
  - structural building drawings
  - inspection requirements
- On-site fall protection system training for users
- Confined space inventory
CLOSE OUT: LAB COMMISSIONING

No signage. No test and balance. No commissioning. No science!!!
CLOSE OUT: TAKE-AWAYS

• EHS required to activate or commission lab spaces

• EHS Requirements:
  • Design for a safe environment
  • Documented for institutional knowledge
Environmental Programs: Design
DESIGN: ENVIRONMENTAL SITE ASSESSMENTS (ESAs)

• EHS coordinates for a consultant to perform an ESA for new UT land acquisitions, including locations outside of Austin, such as Marine Science Institute, McDonald Observatory, Winedale etc.

• Further review may be required if historical records uncover concerns.

• Contact EHS Environmental Programs if you have:
  • Buried tanks
  • Industrial use site e.g. UT Elementary School
  • Any PRC project with ground disturbance or excavation
• Sites over Edwards Aquifer must comply
• Recharge Zone, Contributing Zone and Transition Zone
• Any site disturbance, sanitary sewer projects, ASTs and USTs
• Must coordinate through EHS to determine requirements and apply
• May need plan prepared by engineer and geologist
• Applies to projects at JWC, WPR (Recharge Zone)
• Applies to PRC (Transition Zone) – AST and UST only
**DESIGN: CHEMICAL AND BIOLOGICAL WASTE REMOVAL**

- EHS environmental programs collects:
  - Regulated waste
  - Chemicals
  - Biological waste
  - Non-green-tipped fluorescent bulbs
  - Mercury (found in lab p-traps or thermostats)
  - Used oil
- PM to ensure that containers are tagged, and form is downloaded & emailed to: EHS-HazardousMaterials@austin.utexas.edu
- Some lab areas may require special cleanup and decontamination by a 3rd party vendor coordinated through EHS (cost associated)
• Notify EHS of any proposed pretreatment devices or modifications to existing devices
• Pretreatment devices include grease traps, oil water separators, lint traps, grit traps, pH adjustment (acid neutralization), etc.
• Must comply with City of Austin Voluntary Agreement/UT Wastewater Discharge Permit
DESIGN: FOOD SERVICE

- Notify EHS when:
  - New food service establishment proposed
  - Existing food establishment being renovated or modified
  - Grease waste system or grease trap will be added

- Must comply with City of Austin Voluntary Agreement/ UT Wastewater Discharge Permit

- PM to complete and submit pretreatment device form, plans, and menu
DESIGN: FOOD SERVICE

• Design must comply with Texas Food Establishment Rules (TFER)
  • Three compartment sinks
  • Finishes that are smooth/durable/easily cleaned

• Plumbing Requirements
  • Grease trap approval through Environmental Programs
  • Air gaps/RPZ
  • NO garbage disposals or food grinders
DESIGN: EROSION AND SEDIMENTATION CONTROL FOR CONSTRUCTION ACTIVITIES

- Projects disturbing < 1 acre of soil must have a written, site specific Erosion and Sedimentation Control Plan.

- Projects between 1-5 acres must post a Small Site Notice and have an on-site Storm Water Pollution Prevention Plan.

- Projects disturbing > 5 acres of soil must file a Notice of Intent, post a Large Site Notice, and have an on-site Storm Water Pollution Prevention Plan.

- Projects with no soil disturbance, such as interior renovations, are exempt from this requirement.
• UT’s municipal separate storm sewer system (MS4) permit requires building projects to minimize discharge of pollutants from areas of new development and redevelopment.
• Incorporate features that improve storm water runoff quality and reduce quantity
• Low impact development features: pervious pavement, detention areas, bio swales, rain garden
DESIGN: WATER QUALITY & POOLS

• Pools must comply with Texas Health and Safety Code Chapter 757 Pool Yard Enclosures

• Pools must comply with Texas Administrative Code Chapter 265 for Pool Rules

• Pool construction and all major remodels of existing pools must comply with current code. Old rules and grandfather clauses no longer apply after a major remodel.

• Budget for EHS to witness water quality sample collection for a project
Environmental Programs: Construction
CONSTRUCTION: EDWARDS AQUIFER PROGRAM REQUIREMENTS

- Recharge Zone, Contributing Zone and Transition Zone
- Construction notification required
- Stop work if sensitive feature e.g. cave or geologic formations are encountered and call EHS
- Applies to projects at JWC, WPR (Recharge Zone)
- Applies to PRC (Transition Zone) – AST and UST only
CONSTRUCTION: STORMWATER PROTECTION

• Notification of Construction Activities Form
• EHS inspects on a regular basis. Review of erosion control plan or SWPPP, records, inspection documentation and ensures best management practices (BMPs) are in place.
• Common discharges to storm sewer: fire sprinkler system drain down, or draining a pool or fountain
• Common sanitary sewer discharges: chill water loop or air handler unit. A sanitary sewer system discharge may take up to a week or longer for approval. Plan accordingly.
• NEW! The contracted chemical provider must be permitted by City of Austin.
• Discharge Request form is on EHS website
CONSTRUCTION: DYE TESTING

- Confirms there are no cross connections between sanitary sewer and storm water.
- Cross connections have been found
- Dye test form and procedure (developed with Utilities & Energy Management)
CONSTRUCTION: UNFORESEEN ENVIRONMENTAL ISSUES

- Stop work and notify EHS if the following is encountered:
  - Environmental contamination
  - Underground storage tanks
  - Caves or sensitive geologic feature
- Notify EHS of any spills
- Regulatory requirements must be followed!
CONSTRUCTION: FOOD SERVICE PERMITTING

• Kitchen must pass opening inspection before operating

• EHS and UEM must inspect pre-treatment device installation

• Do not make major changes to approved design plans without consulting EHS, particularly to permanent fixtures like plumbing
CONSTRUCTION: WATER QUALITY & POOLS

• Pools must pass an opening inspection
  • Plans for pool must have been submitted and approved before construction begins

• Water:
  • Testing for bacteria and chlorine levels for new piping and after breaks or repairs
  • Interior sampling for occupant concerns
Environmental Programs: Close Out
CLOSE OUT: ENVIRONMENTAL

- Dye test complete
- Discharge requests complete and approved
- Pretreatment device final approval from EHS Director (after EHS inspection of device)
- Site re-vegetation
- SWPPP paperwork/ large project Notice of Termination (NOT) filed through EHS
- Small site notice close out
CLOSE OUT: FOOD SERVICE & WATER QUALITY

- EHS witnessing and approval required for water testing and before building occupancy
  - BAC-T

- Opening food inspection must pass
  - Permit to operate will be issued
  - First health inspection non-scored
CLOSE OUT: POOLS

• Once opening inspection is passed, pools will be issued a permit to operate. An initial inspection should occur once more within that school year and once a year from then on
Animal Make Safe: Design, Construction, Close Out
DESIGN, CONSTRUCTION, CLOSE OUT: ANIMALS

- Integrated pest management should be considered during design.
- “Design/build out” features of structures that are attractive to pests.
- Be aware of existing exclusion measures during design and construction or repair work.
- Check that exclusion devices have been replaced if removed.
- Make sure exclusion measures are to specifications.
Radiation and Laser Safety: Design
• Prior to renovation or demolition, areas where radioactive materials have been used must be tested and cleared by EHS Radiation Safety.

• Radiography (x-rays) for buildings, typically used in concrete structures, must be approved by EHS Radiation Safety. Ground penetrating radar is NOT radiography and does NOT require approval.
Unshielded radioactive sources require physical shielding.
Radioisotope fume hood selection and requirements
Laboratories with class 3B and 4 lasers must plan for laser shielding, among other requirements.
Magnetic Resonance Imaging (MRI) and x-ray machines are typically self-shielding, but additional precautions may be needed.
• Restricted areas where radio frequency exceeds exposure limits from transmitter
• Restricted areas where magnetic field presents health and safety hazards
• Nuclear magnetic resonance (NMR) and magnetic resonance imaging (MRI)
• Class 3B or 4 lasers are potential hazards and are regulated by the State of Texas

• Optics or air tables, curtains or other laser barriers indicate lasers may be used

• Indicate laser location and type, as well as safety features in plan, such as ‘Laser in use’ light, curtains and other barriers
• Locations housing radioactive materials must be securable
• Additional features such as dry storage wells, fixed lead shielding, concrete vaults, etc.
• Fume hoods must have 100 lfpm at hood face. Interiors do NOT have to be stainless steel.
• Some hoods may require filtration to capture unbound materials
Radiation and Laser Safety: Construction
CONSTRUCTION: WORK IN LASER SPACES

- Confirm with lab personnel that lasers are deactivated before work
- Control of dust, debris, particulates is VERY important
CONSTRUCTION: RADIOACTIVE DEVICES IN BUILDINGS

- Building devices may contain RAM:
  - Smoke detectors
  - Self-luminous exit signs

- Often identified with trefoil radiation symbol

- When encountering these items, contact Radiation Safety for proper handling and disposal.
Radiation and Laser Safety: Close Out
• Radioactive materials authorization
• Laser authorization
• X-ray machine commissioning
TAKE-AWAYS

• Identify ways EHS can support project delivery

• Improve understanding of the EHS programs and organization

• Understand when and how to best communicate with EHS for various issues
Thank You!

Environmental Health & Safety

512-471-3511
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