The Facility Strip-Out, Renovation, and Improvement Project Process

Avoiding Environmental Pitfalls

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Principal

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Meet Our Presenter:

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Principal/V.P. and Project Manager, GHD

- Specializes in Decommissioning, Demolition, and Facility Renovation Projects
- Graduate of the University of Michigan with B.S.E. in Civil & Environmental Engineering
- 13 years of experience
- Automotive, mixed manufacturing, pharmaceutical, oil/gas, power utilities, developers, medical, residential, chemical manufacturing, and many more
- Project sizes up to 9 million square feet industrial complexes and >300 acre/600 parcels

Review Session Learning Objectives

1. Understanding of potential environmental risks associated with renovating existing facility spaces
2. Comprehension of environmental regulations that may apply to strip-out, renovation, and improvement projects
3. Planning strategies to address environmental risks associated with these projects

FACILITY RENOVATION

Background

- Many industries have vacant, unused facility square footage
  - Makes industries hesitant to acquire new properties for “green field” construction
- Renovation projects more frequent
- Facility managers need to understand how to conduct renovation in accordance with regulations

Background

- Renovation of existing infrastructure may be more economical than new construction
  - Removal of outdated processes and equipment
  - Major strip-out and renovation construction activities
- Often occurs with minimal planning and limited awareness of environmental risks
- Leads to potentially misidentified demolition debris that may actually be:

asbestos, polychlorinated biphenyl (PCB) waste, lead paint, or hazardous waste

Background – Case Study

- Current active automotive stamping plant
- Originally constructed in 1950s
- 2 million square feet: main floor, basement level, and high bay areas
- Product line changes required installation of newer larger stamping presses
- Scope included removal of concrete and wood block flooring, roof removal, substation alterations, interior paint, etc.

PLANNING

Planning Considerations

Occupancy

- Will facility be occupied during renovation?

Schedule

- Are there any facility shutdown periods?
- What is driving schedule?
  - Equipment delivery
  - Shutdown period duration
  - Production metrics

Planning Considerations

Cost

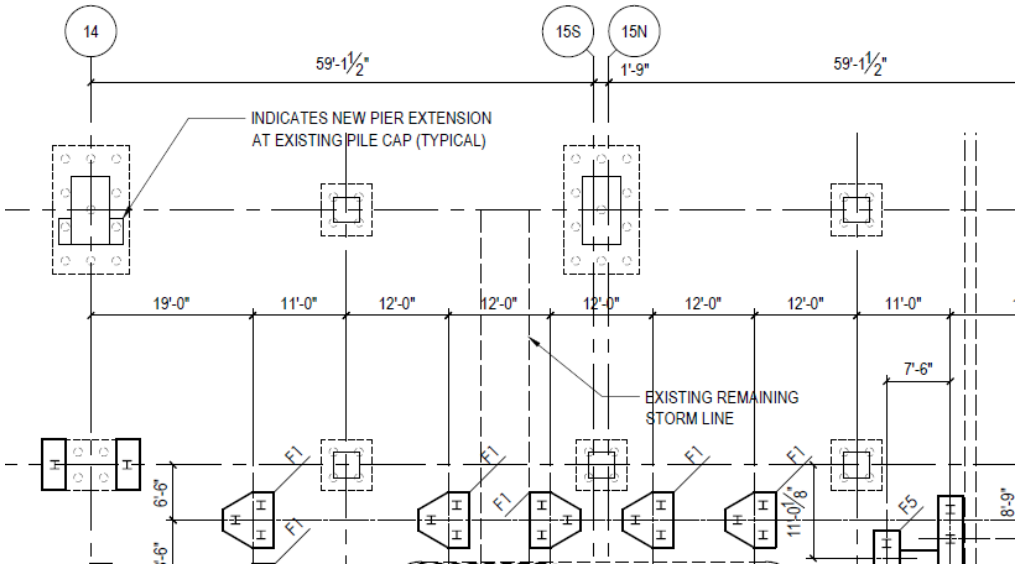
- Accurate costs for environmental work tasks rely on prior, thorough inspection and testing
  - Asbestos abatement
  - PCB mitigation
- “Order of magnitude” costs prepared by experienced professional
  - Should include conservative contingency

Begin with the End in Mind

- What will the final facility conditions be?
- Complete final improvement/install design helpful

Planning – Case Study
Stamping Plant Upgrades

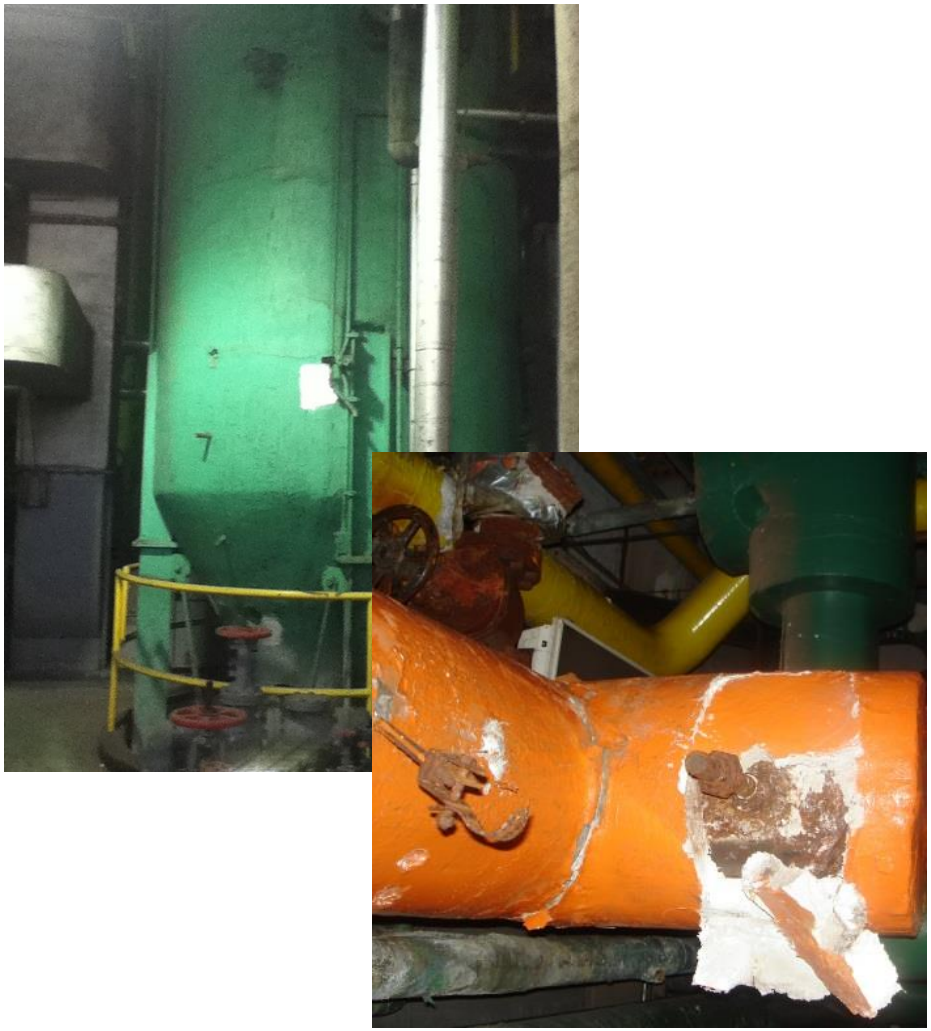
- Locations of upgrade alterations dictate scope of environmental evaluation
- Alterations of renovation scope to include/exclude previous areas can be problematic
- Design-build projects present inherent complications
- “Begin with the end in mind!”



ASSESSMENT

ASBESTOS CONTAINING MATERIALS, PCBS, LEAD BASED PAINT, CHEMICAL AND REGULATED MATERIALS SWEEP, MERCURY

Asbestos Containing Materials (ACM)



- Operation and Maintenance (O&M) ACM surveys not adequate for demolition/renovation
- Survey must meet National Emissions Standards for Hazardous Air Pollutants (NESHAP) requirements
- Destructive testing is necessary
- **Asbestos still present in structures constructed after 1980**

Polychlorinated Biphenyls (PCBs)

- PCB contaminated waste regulated by the Toxic Substances Control Act (TSCA)
- PCB-containing oil transformers common source of spills in older facilities, but often there are others
- TSCA regulates based on release date and original concentration
  - Record retention is key
- **Due to fire resistant and plasticizing properties, PCBs were added to:**
  - **Caulks**
  - **Mastics**
  - **Paints**
  - **Expansion Joints**

Lead Based Paint (LBP)

- Paint may be deemed hazardous per Resource Conservation Recovery Act (RCRA) criteria
- Evaluation of RCRA metals in paint, not just lead
- Paint on structural surfaces and equipment should be tested
- LBP may restrict use as fill
- **Materials covered with LBP, if removed, must be in compliance with OSHA**

Chemical and Regulated Materials Sweep

- Fluorescent lights and ballasts
- Batteries
- Tritium exit signs
- Refrigerants/chlorofluorocarbons
- Unused chemicals/products
- Process/waste lines
- Storage tanks and their contents
- Mercury-containing devices

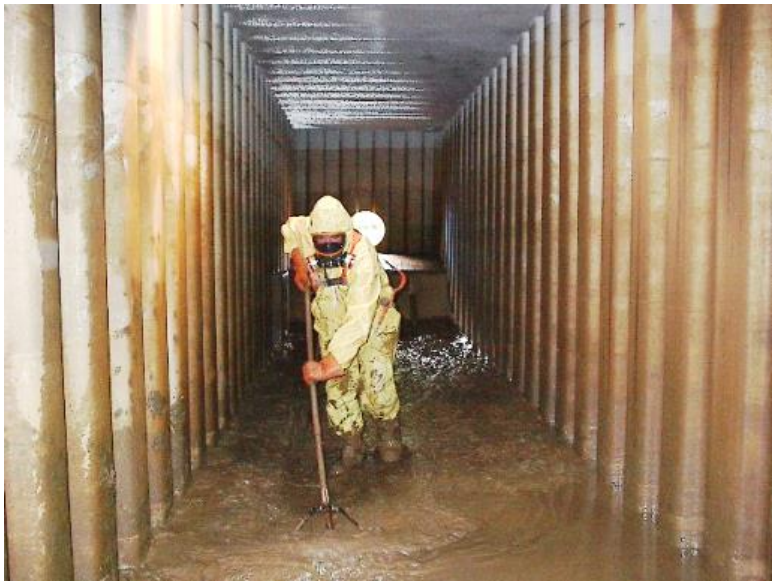
Mercury

- Industrial facilities commonly have elemental mercury devices
  - Thermostats
  - Level controllers
  - Mercoid switches
- Mercury vapor monitoring and inspection in:
  - Laboratories
  - Powerhouses
  - Air handling units

    Office areas

Prior Inspection

- Careful inspection prior to renovation and demolition helps prevent
  - Unforeseen environmental conditions
  - Exasperated environmental impacts
  - Health and safety risks
  - Additional costs



Assessment – Case Study
Stamping Plant Upgrades

- Inspect “hard to reach places” – often source of unforeseen conditions and Change Orders
- Conduct thorough testing while areas are accessed
- May be more expensive to reach
  - Confined spaces
  - Elevated areas
  - Active operations

INTERPRETATION OF FINDINGS

Asbestos: PLM vs TEM

- Bulk asbestos samples analyzed by Polarized Light Microscopy (PLM)
- PLM not suitable for non-friable organically bound (NOB) materials
  - Floor tiles, mastics, caulks
- Transmission Electron Microscopy (TEM) more appropriate for NOB materials
- “Point counting” for PLM analysis with low asbestos results

Management and Disposal of PCBs per TSCA

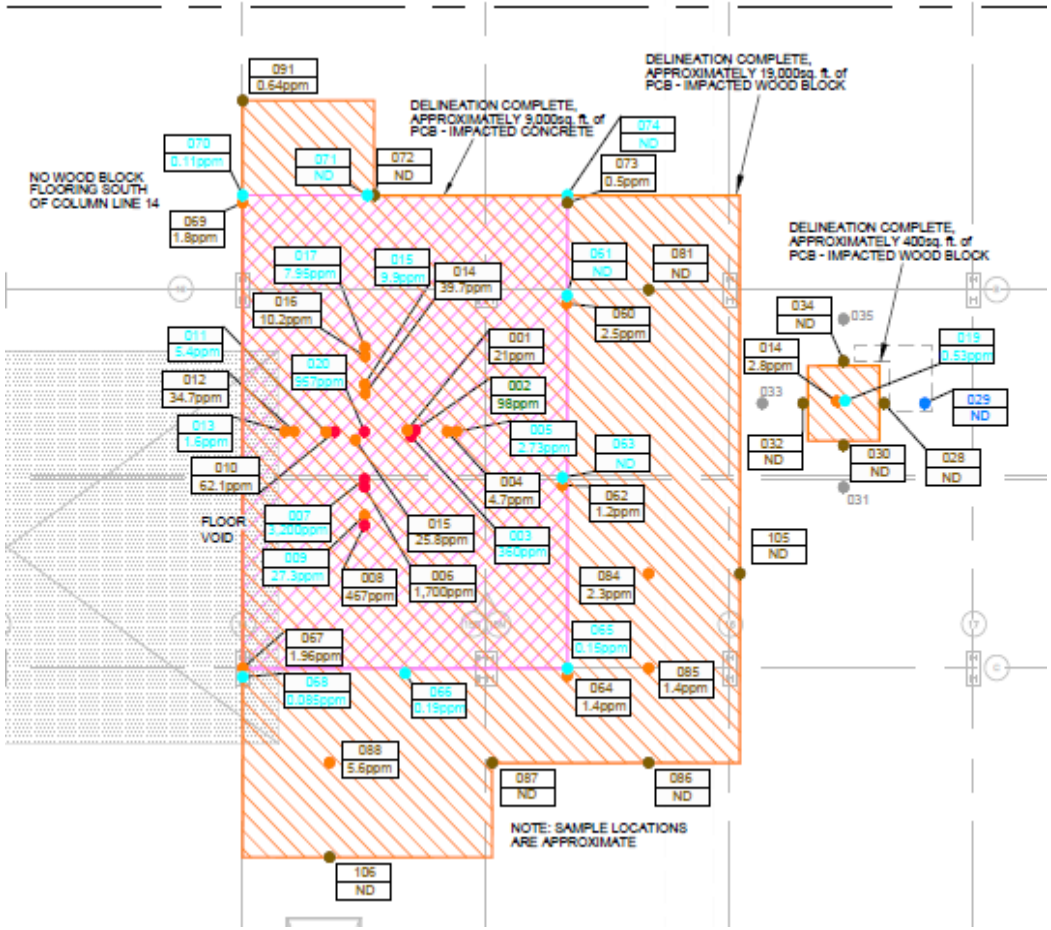
- Are PCBs present due to a release of PCB-containing oil?
- What date was PCB-containing oil released?
- What was the original concentration of the PCB-containing oil when released?
- Which TSCA-approved method will be used to mitigate/dispose of the PCB impacts?
- Are the impacted materials:
  - Solid non-porous (i.e. unpainted metal, glass)
  - Solid porous (i.e. painted metal, concrete, soil)
  - Liquids (aqueous or non-aqueous)
- Were the materials manufactured with PCBs as an additive ingredient?
- Were the materials impacted by leaching from PCB Bulk Products?

Other Constituents

- Metals
- Volatile Organic Compounds (VOCs)
- Semi-Volatile Organic Compounds (SVOCs)
- Toxic Characteristic Leaching Procedure (TCLP) analytical results compared to RCRA criteria
- “Totals” analytical results compared to 20xRCRA criteria

Interpretation – Case Study
Stamping Plant Upgrades

- Multiple locations of PCB Impacts
- Differentiate between bulk product and remediation waste
- Mitigation strategies varied based on:
  - Nature of impacts
  - Future use of area
  - Cost implications



DESIGN

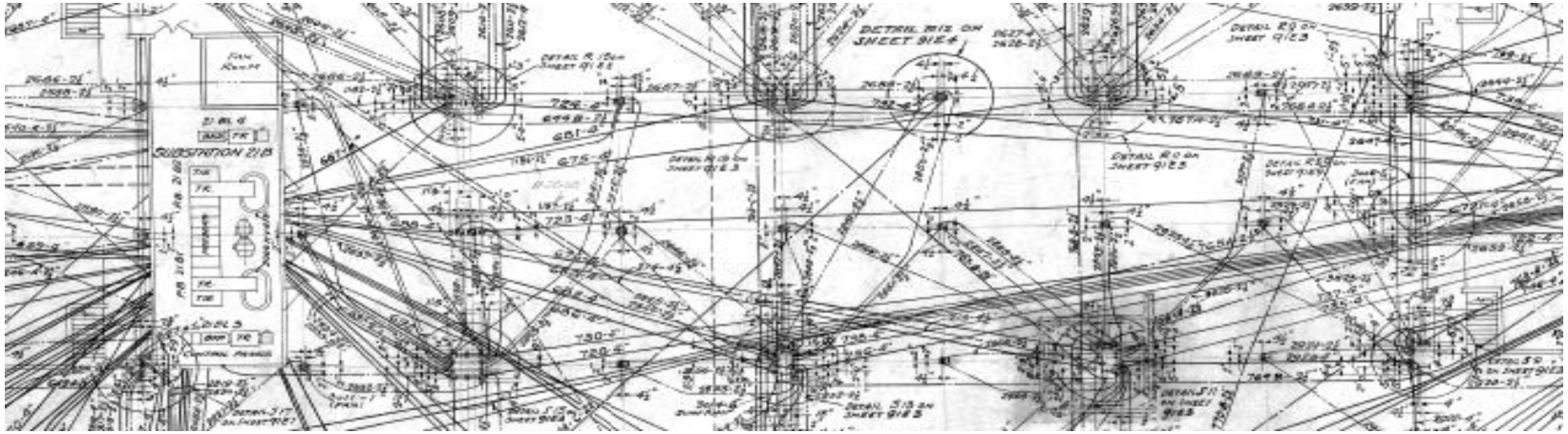
Project Design

- Preparation of detailed scope of work, including environmental issues
  - Asbestos abatement
  - PCB impacted material mitigation
  - Universal waste removal
- Environmental information provided to bidders at contractor's risk
- Prepare technical specifications for abatement, removal, and cleaning

Project Design

- Prepare a bid form
  - Unit rates for various waste streams' transportation and disposal
- Include engineering controls
  - Work area barriers and curtains
  - Perimeter air monitoring
  - Off-shift work hours
- Bidders should be qualified to perform environmental scope
  - If not general contractor, then qualified sub
- Interview contractor prior to contract award

Design – Case Study
Stamping Plant Upgrades



- Design should include consideration of health and safety aspects unique to renovations
- Historical drawings should be included in the bid package - disclosure of current conditions

IMPLEMENTATION

Project Implementation

- Permits and notifications
  - NESHAP requires asbestos notification of demolition and renovation projects
  - NESHAP notification is waived for:
    - Small renovation projects (per NESHAP size requirements)
    - Projects that do not involve a load-bearing structure
  - **NESHAP notification is required, if size requirements are met, even if an ACM survey did not identify ACM in the work area**
- Nuisance Ordinances
- Communication with facility occupants
- Unforeseen conditions
- Oversight

Oversight

- Trained and qualified professional to oversee environmental scope
  - Confirms work is performed per specifications
  - Verifies work complete for quality and payment
  - Monitors compliance with health and safety requirements
  - Reviews contractor written means and methods
  - Serves as liaison between contractor and owner
    - As well as other facility occupants
  - Oversight professional contracted directly by owner

Implementation – Case Study
Stamping Plant Upgrades

- Active stamping plant – interface with plant forces
- Aggressive schedule driven by press delivery date
- No health and safety incidents, environmental conditions mitigated

CONCLUSION

Facility Renovation - Avoiding Environmental Pitfalls

- Common pitfalls
  - Environmental conditions
  - Health and safety concerns
  - Schedule delays
  - Cost overruns

In order to minimize, use structured approach for success:

1. **Planning**
2. **Assessment**
3. **Interpretation**
4. **Design**
5. **Implementation**

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CEU Test Questions

1. Asbestos is not present in structures constructed after 1980.
2. PCBs were historically added to building caulks, expansion joints, and even paints.
3. Removal of materials covered with lead based paint requires compliance with OSHA requirements.
4. Asbestos NESHAP state notification of demolition/renovation is never necessary for structural member renovation projects if the facility does not contain asbestos.
5. The five steps to a successful facility renovation project are Planning, Assessment, Interpretation, Design, and Implementation.

CEU Test Answers

1. False
2. True
3. True
4. False
5. True