Exposure Reconstruction for the Epidemiologic Study

Progress Report
October 2005

Research Team

Full Time

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Research Team

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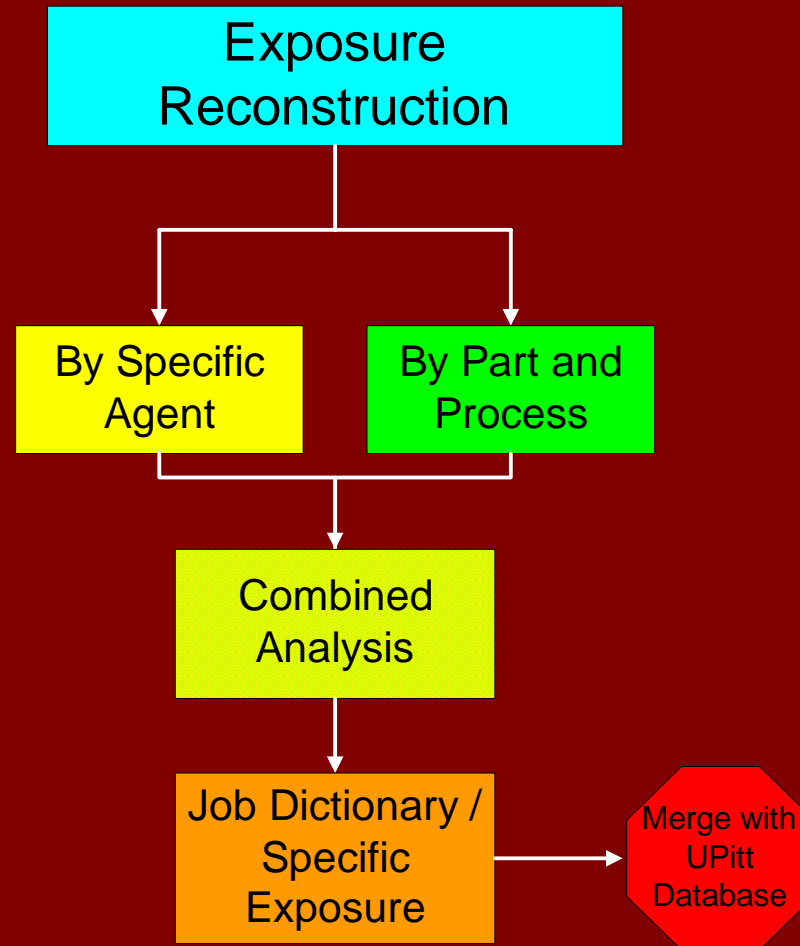
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Outline

- General Study Approach

- Study Components

- Study Progress

- Projected Study Timeline

General Study Approach

- Exposure reconstruction: Characterization of occupational exposures in space and time to inform the epidemiology study

General Study Approach

Study Components:
Exposure by Part

- Part Dictionary
  - Includes all "part families" from P&W manufacturing and refurbishment, 1952-2001

  - Examples: hollow fan blades, vanes, shafts

  - Part families determined along with P&W engineers ("part family owners") and employees

Study Components: Exposure by Process

- Process Dictionary
  - Includes all processes at P&W facilities, 1952-2001

  - Examples: milling, grinding, welding, coatings, NDT

  - Data sources: Summary of Operations, Time Series Studies

Study Components:
Exposure by Specific Agent

- 7 primary agents selected based upon extensive toxicological considerations

  Ionizing radiation related
    1) Direct
    2) Thoriated Nickel / Thoriated Tungsten
    3) Radioactive Particles

  Metalworking fluid
    4) Water soluble
    5) Oil based

   Other
    6) Hexavalent Chromium
    7) Nickel

Study Components: Job Dictionary

- Job Dictionary
  - Contains all possible job titles recorded for workers during the study period

  - Examples: Plater, Aircraft Powerplant Mechanic, Toolmaker, Jig Borer Operator, Foundry Process Operator

  - Data sources: UPitt job history database, P&W hourly job descriptions, union contracts

Study Components:
Geographic Information System (GIS)
Spatial Database

- Created to determine location of parts, processes, and agents in time and space

- Provides central integration of all data

- Data sources: blueprints, layouts on microfilm and data tape, company space allocation records

Study Components:
GIS Spatial Database

- Provides the ability to manage spatially referenced information
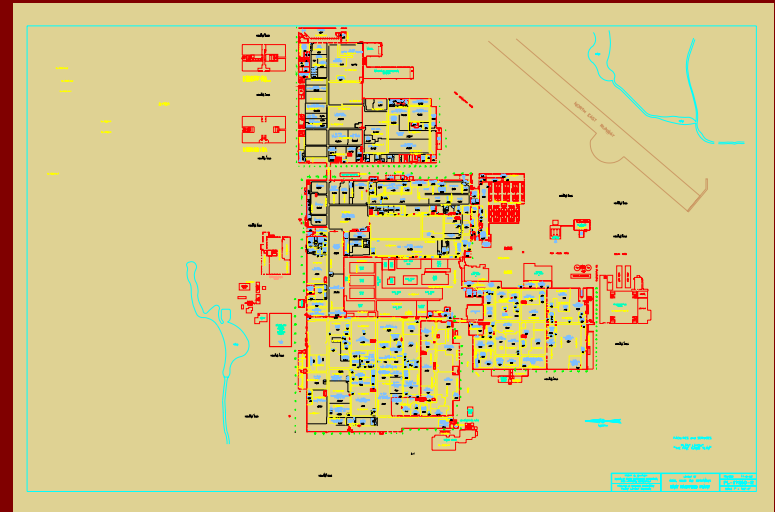
- A means to communicate plant-wide properties
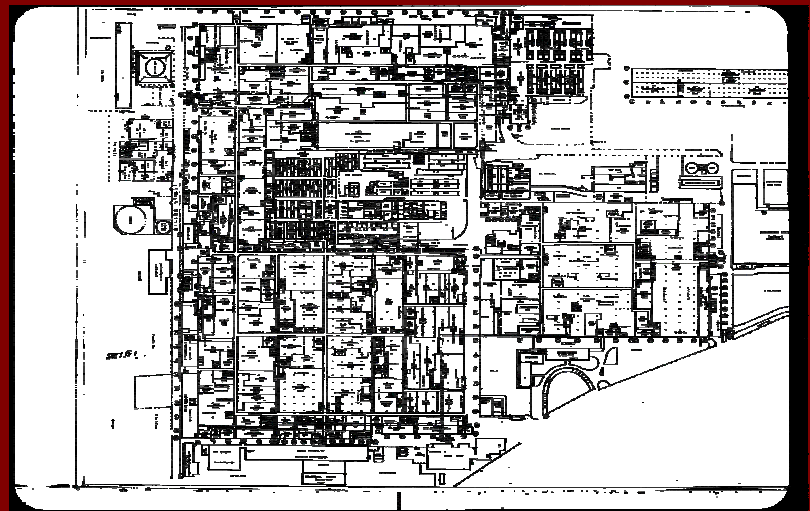

Aerial view of East Hartford

Study Components:
GIS Spatial Database

Data sources:

- hand drawn schematics

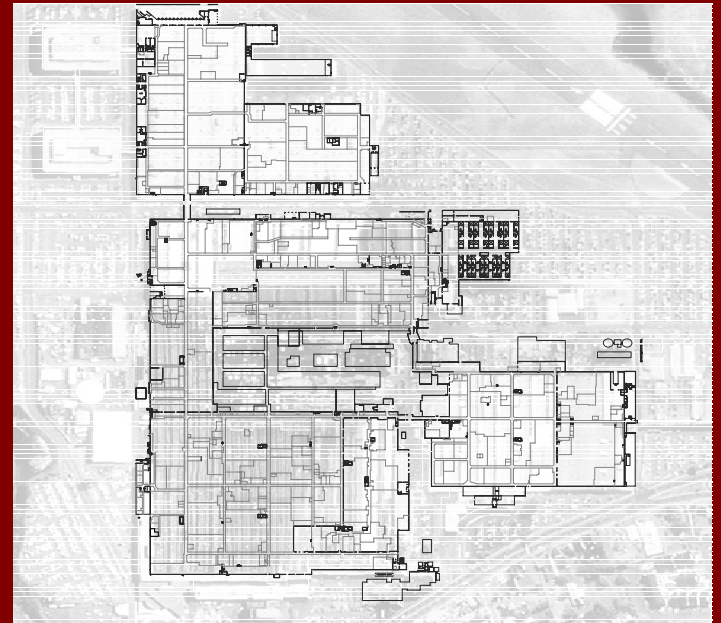- CAD drawing files

- company space allocation records

CAD drawing file

Hand drawn schematic

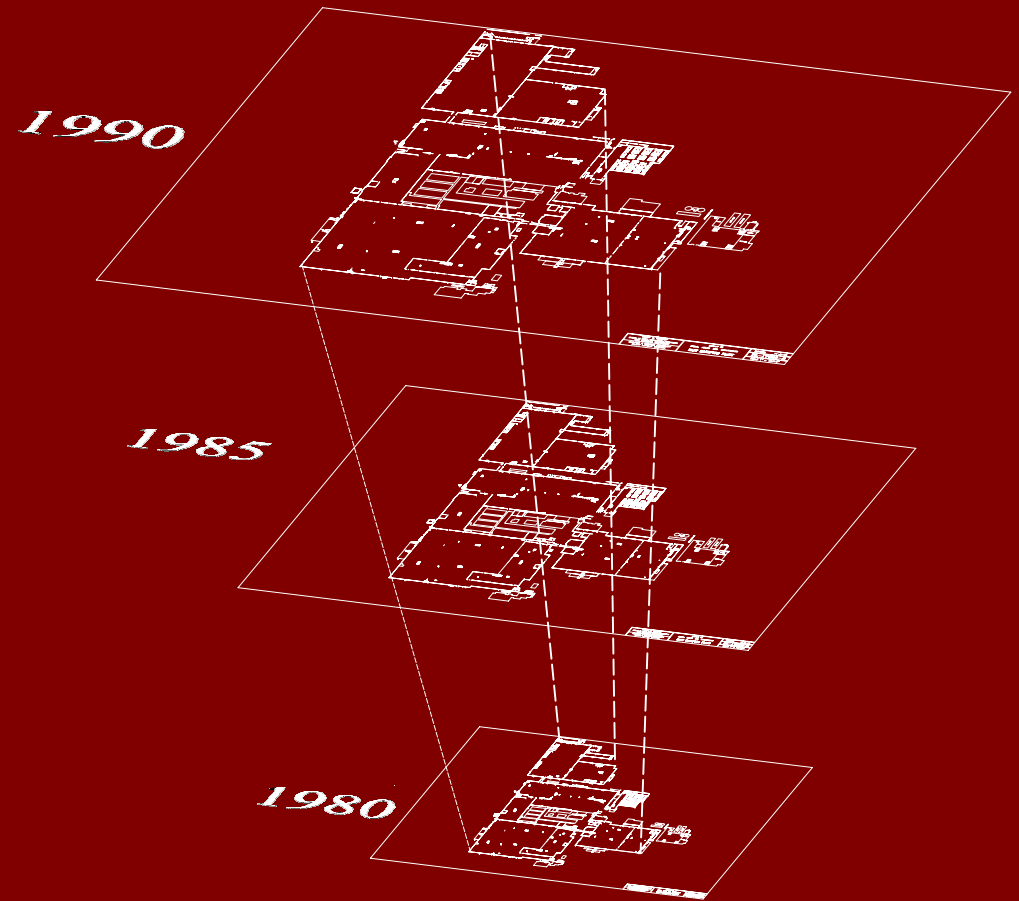# Study Components:
GIS Spatial Database

• Allows spatial distribution analysis of parameters of interest such as:

   - departments

   - parts

   - manufacturing processes

East Hartford: department layout

Study Components:
GIS Spatial Database

- Ability to compare spatial distributions of parameters of interest at different points in time

Temporal Analysis

Study Progress

Study Component	Percent Completed
Part Dictionary	75
Process Dictionary	20
Job Dictionary	2
GIS Spatial Database	25
Primary Agents: Hexavalent Chromium	25
Ionizing Radiation (3)	20
MWF (2)	30
Nickel	0
Secondary Agents: MPI	30
Exposure Analysis	5

UIC Projected Time Line – Exposure Reconstruction

Task*	Record Discovery & Location	Part / Process Meetings (part owners)	Data Collection & Entry	Integrated GIS Database Construction	Job Dictionary Reduction	Exposure Determination	Statistical Analyses
Year 1 [OU] (2002-2003)	▨						
Year 2 [UIC] (2003-2004)	▨	▨	▨				
Year 3 (2004-2005)	▨	▨	▨	▨	▨		
Year 4 (2005-2006)	▨		▨	▨	▨		
Year 5 (2006-2007)			▨	▨	▨	▨	
Year 6 (2007-2008)					▨	▨	▨
Year 7 (2008-2009)						▨	▨

*One-on-one worker interviews: start contingent upon completion of extended funding agreement.

Acknowledgement

- Study progress has been possible due to the support and assistance of P&W union members, employees, and management.

- We would like to thank all who have assisted us by providing information, data, and documents and greatly appreciate their efforts.