

Exposure Reconstruction for the Epidemiologic Study

**Progress Report
October 2004**

University of Illinois at Chicago
Division of Environmental & Occupational Health Sciences

Study Progress

Efforts to date would have been impossible without the overwhelming support and cooperation from the Pratt & Whitney unions and management.

We would like to thank all persons involved for the help, information, documents, and courtesy we have received.

Researchers

- Nurtan Esmen (Professor)
 - Principal Investigator – Development of exposure reconstruction strategies, exposure models and general scientific direction of the exposure reconstruction research
- Steven Lacey (Assistant Professor)
 - Principal Scientist – Data collection, implementation of the exposure reconstruction strategies
- Kathleen Kennedy
 - Project Manager – Supervision of the project staff, data management, data collection, day to day operation of the research

Researchers

- Peter Scheff (Professor)
 - Investigator – Source receptor relationships for manufacturing operations
- Sabri Cetinkunt (Professor)
 - Investigator – Characterization of manufacturing operations
- John Franke (Assistant Professor)
 - Investigator – Machine working fluids

Researchers

- Irina Dardynskaia (Associate Professor)
 - Investigator – Design and analysis of ionizing radiation exposures
- Maria Gutierrez (Doctoral RA)
 - Worker interview questionnaire and analysis; classification of time apportionment data
- Raul Espinosa (Doctoral RA)
 - Construction of time dependent facility histories; development of time dependent geographic information system for operations

Researchers

- Julia Lippert (Master's RA)
 - Organize ionizing radiation records by source and process; assist in generation of descriptive statistics of historic exposure estimates; quantify purchase inventory
- Maya Barr (Master's RA)
 - Construct company operations timeline to compliment spatial information system; synthesize investigator notes and abstract company publications
- Jennifer Palmer (Master's RA)
 - Organize MWF records by fluid type and process; assist in generation of descriptive statistics of historic exposure estimates; quantify purchase inventory

Exposure Reconstruction Data

- Plant layout information to identify operations in space and time (Time dependent geographic information system – TGIS)
- Process information by part family (Current information collection is complete; historical information collection and historical projections will start this year)
- Contaminant information sources (identified, more than 60,000 pages of IH information copied by OU)
- Collection of old process machinery brochures started

Development of Facility Histories

- East Hartford
- North Haven
- Middletown
- Southington – Aircraft Road & Newell Street
- Cheshire
- Manchester Foundry
- Rocky Hill
- Berwick ME (Cross over and operational information)
- Meriden CT, West Palm Beach FL, Columbus GA.

Plant Layout Information

- Blueprints in hardcopy format; currently we are examining ~ 10,000 blueprints on CDs to develop operations GIS
- Documentation of operations in space and time (complete)
- Documentation of machine procurement in space and time (identified)
- Development of spatial database (structure and programming in development)

Process Information

- Part families and shared services
 - Captured current methods and representative summary operations to form skeletal process structure (complete)
 - Capture historical process change milestones (in progress)
 - Investigate detailed operations on as needed basis (planned)

Contaminant Information

- 7,500 agents in MSDS database
- More than 60,000 pages of ESH/IH data and information copied by OU (complete)
- Several thousand pages of ionizing radiation information being copied (in progress)

Contaminant Information

- Collect the available biochemical and/or health information (in development)
- Develop a multiple exposure vector (in development)
- Develop specific exposure information for metal working fluids (in development)
- Develop specific exposure information for ionizing radiation (in development)

Worker Interviews

- Develop details of operational information and work practices (Primary)
- Worker recall of operations relative to documented operations (Calibration)
- Quantitative and qualitative analysis of interview data (Quantification)
- Validation (Merge with documents)

Comparing Outcome by Parts & Processes: Parts

- Linking worker to part family and specific parts
- This is treating each part as “contaminant” and analyzing outcomes based on “exposure to part”
- This step will determine a set of independent part related inputs to the outcome analysis
- Method development started
 - Data to connect an individual to a part

Comparing Outcome by Parts & Processes: Processes

- Linking worker to operations performed
- This is treating each operation as a “contaminant” and analyzing outcomes based on “exposure to operation”
- Method development started
 - Assigning quantitative historical changes
 - Data to connect an individual to a process