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Occupational Exposure Database for the Electric Power Industry: Feasibility, Current Practices, and Specifications

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Occupational Exposure Database for the Electric Power Industry: Feasibility, Current Practices, and Specifications

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National Jewish Health, Division of Environmental and Occupational Health Sciences

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ABSTRACT

The Electric Power Research Institute (EPRI) occupational exposure database project aims to build on previous research done in the area of occupational exposure assessment by collecting information on chemical, physical, and biological exposures not addressed in earlier efforts. The major focus of the overall pilot project is to describe current exposure assessment practices in the electric power industry and the methods companies currently use to store and process data. The project objectives include defining of current industry practices in quantitative exposure assessment, review of best practices for electronic capture of industrial hygiene data collection and coding, evaluation of commercially available industrial hygiene exposure databases, and development of technical specifications for an industry-wide occupational exposure database. This technical update describes the development of a survey to assess current industrial hygiene data collection, management, and use and also reviews current recommendations for occupational exposure databases.

Keywords
Occupational health
Occupational safety
Exposure database
Industrial hygiene

CONTENTS

1
INTRODUCTION

Background

The electric power industry aims to maintain a balance between safety and health resources and business needs. Exposure databases have potential for financial savings by decreasing exposure monitoring, reducing the number of workers wearing personal protective equipment and streamlining analysis and reporting of industrial hygiene data. A substantial challenge in occupational health, not unique to the electric power industry, is to create a sustainable mechanism for exposure assessment.

This pilot project aims to build on previous EPRI and industry experience in occupational exposure assessment, such as hexavalent chromium and other metals in welding fumes, by expanding research to focus on other chemical, physical and biological exposures. The major focus of this project is to describe current exposure assessment practices in EPRI member facilities and the methods companies use to store and process data. The combination of this information with previous EPRI experience will allow us to create specifications for an exposure data management system that could be used at these facilities.

Objectives

To complete this project, a number of objectives were established:

- Define current industry practices in the following areas in qualitative and quantitative exposure assessment, management of exposure, job description, and work process data, and use of quantitative or qualitative exposure data for work planning activities
- Review of best practices for industrial hygiene data collection and coding
- Define specific exposure database needs of member organizations
- Develop data dictionary and functionality characteristics of a database meeting the needs of EPRI member organizations
- Evaluate currently available exposure database solutions to determine whether they meet the needs of EPRI member organizations
- Recommend a path forward for implementation of an exposure database system for EPRI member organizations

Methods

To define current industry practices, we conducted phone interviews with key electric power industry industrial hygiene professionals to develop an email survey for distribution to industrial hygienists and environmental, health, and safety departments at electric utilities, including EPRI member organizations. More detail on the contents and rationale supporting the email survey are presented in Chapter 2. The results from the email survey will allow us to define current industry practices in terms of exposure assessment, data collection and storage, and uses of exposure

assessment data. This will allow us to best determine the needs of the electric power industry and help ensure the success of an industry-wide exposure database.

A review of best-practices was conducted through a search of published literature, presented in Chapter 3. The focus of the review was on recommendations for the essential data elements that should be collected and stored with exposure measurements.

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CURRENT ELECTRIC POWER INDUSTRY PRACTICES FOR INDUSTRIAL HYGIENE DATA COLLECTION, MANAGEMENT AND USE

After conducting telephone interviews with key electric power industry industrial hygienists, we developed an email survey to assess current industry practices in industrial hygiene data collection, data management, and use of data. In addition, we asked questions to help define the critical features of an industry-wide exposure database, sections of which are described below. A full version of the questionnaire is included in Appendix A.

Email Survey Description

Individual Respondent and Facility Background Information

The email survey contains a number of questions to determine the job function and tenure of the respondent completing the questionnaire as well as the type and size of the company including:

- Description of main job (e.g., industrial hygienist, safety professional, manager, etc.)
- Number of years worked in a health and safety capacity at the company
- Staff size of health and safety department at the company in terms of industrial hygienists and safety professionals
- Types of work environments for which the respondent has responsibility (e.g., generation, transmission, distribution, etc.)
- Types of power generation methods for which the respondent has responsibility (e.g., coal, natural gas, hydroelectric, etc.)
- The number of employees in all locations in the company

Industrial Hygiene Data Collection

This section of the survey focuses on the number and types of industrial hygiene samples that are collected at the respondent's company in a typical year including:

- Number of personal chemical exposure samples
- Number of noise dosimeter samples
- Number of different workers sampled for chemical and noise exposures
- Percentage of industrial hygiene samples related to routine and outage work
- Types of air samples collected in terms of personal and area samples
- Percentage of industrial hygiene samples collected by company personnel and contract industrial hygienists
- Number of personal samples collected for various chemical agents (e.g., asbestos, silica, chromium, etc.)

- Number of other types of samples collected such as noise, EMF, and heat stress

Industrial Hygiene Data Management

This section of the survey focuses on how the respondent's company currently manages industrial hygiene data. The section contains different logic or survey paths for respondents who only collect hard copy data and those who enter their data in an electronic system. For those using an electronic system, either for some or most of their data, the survey includes questions on the following:

- The number of years worth of industrial hygiene data that are entered into their current electronic system
- The approximate number of samples contained in their current electronic system
- The types of industrial hygiene data entered into their current electronic system (e.g., chemical air samples, noise samples, wipe samples, EMF samples, etc.)
- Whether samples collected by outside personnel such as industrial hygiene consultants are entered into their current electronic system
- Whether their current electronic system is a stand-alone system or whether it is networked across the department, site, or corporation
- The degree of integration of their current electronic system in terms of connections with personnel, occupational medicine, safety and health training, or other facility databases
- Whether their current electronic system is a commercial package or custom-built application and follow-up questions for each of these options

For those respondents who have not implemented an electronic system, the survey includes a question to identify the perceived implementation barriers at the facility.

Industrial Hygiene Exposure Assessment and Data Analysis

This section of the survey focuses on how industrial hygiene data is used at the respondent's facility regardless of whether an electronic system has been implemented. Answers to questions in this section will help determine the necessary functionality of an industry-wide database in terms of reporting and data analysis. The section includes questions on:

- The types of reports or data analyses generated at the facility such as employee notification reports, average exposure by chemical agent or job title, and more sophisticated analyses such as process control statistics or control banding analyses
- The specific uses of industrial hygiene data analyses and reports at the facility such as compliance with regulations, establishing medical surveillance or personal protective equipment requirements, or benchmarking against other internal or external facilities

Industry-Wide Database Features

This section of the survey focuses specific features of a potential industry-wide database and their importance to the respondent including:

- Rating of specific data fields in terms of their importance for inclusion in an industrial hygiene database
- Rating of specific database features such as ability to transfer data, ability to link the database to other facility databases, ease of data entry, and data analysis capabilities in terms of their importance in adopting an industrial hygiene database
- Rating of specific reporting and analysis capabilities such as employee notification of sampling results, periodic sampling reports by chemical agent or job title, and statistical analysis in terms of their importance in adopting an industrial hygiene database
- Types of data that would likely be entered into an exposure database (e.g., chemical samples, noise samples, wipe samples, etc.)
- Whether the respondent would use an industry-wide database if it was available
- The biggest concerns regarding the implementation of an industry-wide database
- How an industry-wide database would help the respondent

Email Survey Administration

In the first phase, this email survey will be electronically administered with invitations sent directly by EPRI staff to all EPRI OHS program member companies in December 2011. Anyone defining themselves health and safety representatives for their company will be eligible to complete the survey. Every effort will be made to ensure that each company only receives one invitation to respond. The names and companies of individuals completing the survey will be optional. Internet protocol (IP) addresses of respondents will be collected to prevent duplicate questionnaires. Periodic review of responses will be made and up to three notices will be sent within the 1st quarter of 2012. In subsequent rounds of the survey, a wider audience will also be sent the survey to gain a broader snapshot of exposure data and handling practices in the electric power industry.

Email Survey Results

This email survey results will be presented in the final report for this project.

3
BEST PRACTICES FOR INDUSTRIAL HYGIENE DATA MANAGEMENT

The primary goal of this project is to develop specifications for an efficient data collection and management system that encourages aggregate analyses and identification of predictive factors to aid in the development of prevention and control strategies. First and foremost, this system must be useful for individual industrial hygienists in the electric power industry. As such, this system should be designed around the confines of traditional exposure assessment and give industrial hygienists a better understanding of worker exposures to chemical, physical, and biological agents. This process allows for more efficient and effective risk management. The American Industrial Hygiene Association (AIHA) has thoroughly documented the best practices for exposure assessment as outlined below [1].

- *Start:* Establish the exposure assessment strategy
- *Basic Characterization*: Gather information to characterize the workplace, work force, and environmental agents. Understand the tasks performed and controls in place.
- *Exposure Assessment:* Should include dates, name of the industrial hygienist, similar exposure groups (SEGs), exposure controls in place, exposure rating, health effects rating, uncertainty rating, and acceptability judgement
- *Further Information Gathering:* Implement prioritized exposure monitoring or the collection of more information on health effects so that uncertain exposure judgments can be resolved with higher confidence.
- *Health Hazard Control:* Implement prioritized control strategies for unacceptable exposure.
- *Reassessment:* Periodically perform a comprehensive re-evaluation of exposures. Determine whether routine monitoring is required to verify that acceptable exposures remain acceptable.
- *Communications and Documentation:* Reports and records are needed to ensure workplace findings are effectively communicated.

This systematic approach will generate large amounts of data, especially when collecting information that characterizes the workplace, work force, and the environmental agents. An appropriately designed electronic database should assist an industrial hygienist with all steps in the exposure assessment process. However, careful consideration of how the data will be used is required when designing and implementing an exposure database to ensure appropriate collection and organization of information. There have been numerous recommendations on the appropriate data elements that should be included in occupational databases. This chapter will review those recommendations.

Results of occupational exposure measurements are affected by many factors, including measurement duration, location of measurement, and measurement strategy. Key information and data elements that provide an understanding of raw numbers within a specified context aids interpretation and value of the data [2]. In addition, future uses of industrial hygiene data in epidemiology studies require documented methods and strategies of data collection to allow

interpretation of exposures across large cohorts of workers. The American Conference of Governmental Industrial Hygienists (ACGIH) and AIHA formed a Joint Task Group on Occupational Exposure Databases to enumerate a standardized list of data elements, uniformly defined to minimize misunderstandings, that are fundamental to an occupational exposure [3]. The primary goal of these recommendations was to define exposure-related variables with precise definitions to allow and encourage aggregate analyses of exposure data across work-sites and industries. For simplicity, the data elements that were developed by this Task Group as important information that should be collected during any exposure assessment were organized into 13 data groups, summarized below in Table 3-1. The Task Group identified both essential and optional data elements. Essential elements were considered those variables necessary to aid data usage and to understand and control exposure levels and their variability. Optional elements pertained to site-specific aspects not common to all databases, or non-essential to pooled uses of data. Each data group contains elements or variables logically associated. The Task Group recommendations were peer-reviewed by a wide range of experts to ensure their feasibility and flexibility to match the needs of different data collectors and users.

Table 3-1
AIHA-ACGIH Joint Task Group Recommended Data Groups [3]

Data Group		Summary Contents
A.	Facility/Site Information	Basic descriptive information regarding the facility or site.
B.	Survey Tracking Information	Summary survey identification and tracking information.
C.	Work Area Information	Information about the area(s) where the exposure measurements /assessments were performed (location, type, ambient conditions).
D.	Employee Information	Information about the employee(s) whose exposure was assessed/measured, nature of job, exposure groups
E.	Process and Operation Information	Information about process(es), operation(s), exposure source(s).
F.	Chemical Agent Information	Information about the chemical agent(s) monitored.
G.	Exposure Modifier Information	Information about modifiers of exposure (representativeness, pattern, frequency, work load).
H.	Sample Information	Information about the sample(s) (reason, date, duration, type).
I.	Sampling Device Information	Information about the sampling device used.
J.	Engineering Controls Information	Information about engineering controls (type, condition, usage).
K.	Personal Protective Equipment Information	Information about respirators; gloves; protective clothing; hearing, eye, face, and foot protection.
L.	Chemical Exposure Results	Concentration measured, TWA estimates, limit of detection.
M.	Noise Exposure Results	Noise exposure estimates (frequencies, intensities, intermittences).

Collaboration between the Task Group and the Working Group on Exposure Registers (WG) created by the European Foundation for the Improvement of Living and Working Conditions were established in effort to promote harmonized data between countries. The WG identified and recommended key categories of information and the data elements, which would constitute the core information for the storage, and exchange of workplace exposure measurements on chemical agents [2]. Ten key categories along with data elements, shown below in Table 3-2,

were identified by the WG to facilitate development of exposure data collection forms and databases, and assist retrieval, analysis, and exchange of exposure information.

The goal of the US Task Group and the European WG was to ensure that both quantitative data and complementary information about determinants of exposure are collected in a standardized fashion across different work sites, companies, agencies, and other institutions. Accordingly, data can be utilized in risk assessment, surveillance, epidemiologic research, and benchmark development. WG generated 34 data elements as compared to approximately 80 essential data elements established by the Task Group. However, both the US and European data elements were established with sufficient flexibility, which allows for inclusion of other data elements in individual databases for better interpretation of data based on those needs and resources [2;3].

In 1993, Gomez described the rationale and strategy to develop a national occupational exposure databank to strengthen exposure assessment for successful continuity in research, epidemiological investigations, surveillance, and policy and program design and evaluation [4]. Accurate capturing and coding of information, which describes the exposure determinants of the raw exposure measurements, play a pivotal role in the development of a database. The utility of the database is greatly increased when methods are implemented for systematically coding information. For example, workers may be aggregated by a variety of characteristics, with job title, work area, and task. Loomis et al. illustrated the challenges that surface when organizing and classifying work history data [5]. Job titles are an essential descriptive component that provides information about exposure to hazards in the workplace. In order to effectively use job title as a surrogate for specific exposures, homogenous exposure groups or similar exposure groups must be identified and subsequently aggregated.

Similar exposure groups (SEGs) are created to circumvent the practical challenges and temporal variability in measuring exposures of every worker [6]. The SEG concept groups workers based on similarities of agents used and tasks performed so that characterization of exposure is representative of everyone in the group. Suggested strategies for SEGs include classifying by task, process, and/or environmental agent. Data aggregation becomes even more difficult when considering jobs with a high proportion of non-routine work tasks such as construction, maintenance, and cleanup workers. For these types of jobs, it has been recommended to create task lists and classify exposure assessment activities by task [7;8].

Table 3-2
Key Categories and Data Elements Identified by the European WG [2]

Category	Definition	Data Element	
Premises	Any place including any installation on land, any offshore installation, any tent or movable structure, a vehicle, any vessel, aircraft, or hovercraft where an economic activity is undertaken	Name of the premises (occupier) Address Economic activity (code) Size of enterprise: small, medium, or large	
Workplace	The defined area or areas in which the monitored worker's activities are carried out	Department Work area Process (free text) Process code	
Worker activity	The profession, job, and work tasks associated with the monitored worker	Profession/occupation (free text) Profession/occupation code (ILO code) Job title Tasks (code)	
Product	The description of any commercial product, any chemical intermediate, or any by-product which contains the chemical agent monitored	Product Identifier	
Chemical agent	Any chemical element or compound, on its own or admixed as it occurs in the natural state or as produced by any work activity, whether or not produced intentionally and whether or not placed on the market.	Name of the substance (agent) measured CAS no. EEC no.	
Exposure modifiers	The workplace factors that are likely to influence an exposure measurement result.	Exposure Pattern	• Continual • Intermittent • Occasional
		Pattern of control	• Full contaminant • LEV • Segregation • Dilution ventilation • Other
Measurement strategy	The type of air sampling approach used to obtain the quantitative exposure measurement result.	Representative survey Worst-case survey Other types of survey	
Measurement procedure	The procedure for sampling and analyzing one or more chemical agents in workplace air, including storage and transportation	Sampling: Date of sampling Sample No. (reference No.) Sampling device (code) Type of sample: Personal, Fixed Point, Source Sampling times (24-hour clock) Duration of sampling (minutes) Duration of exposure (minutes) Sampling method (code) Analytical : Analytical method (code)	
Results	The quantitative airborne concentration of a chemical agent in workplace air	Measured concentration Unit (mg/m^3, ppm, etc.) Sample status: associate sample, single sample	
Reference		Report Reference	

4
FUTURE WORK

Using information gained from survey responses on current exposure assessment practices and the methods companies use to store and process data in the electric power industry, we will develop specifications which include a data dictionary and functionality characteristics for an exposure database for the electric power industry. The data dictionary will include recommendations for coding specific data elements such as job title, job task, and exposure control measures to allow for future industry-wide data analyses. The specifications will be compared against commercially-available exposure databases to determine whether they meet the needs of the power industry. Based on this evaluation, we will provide recommendations on a path forward for the implementation of an exposure database system for the electric power industry in a future final report.

5
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A
APPENDIX (EMAIL QUESTIONNAIRE)

Electric Power Research Institute (EPRI) Exposure Database Project

Industry-wide Exposure Database for the Utility Industry

Thank you in advance for your time in completing this survey.

The Electric Power Research Institute (EPRI) has contracted with industrial hygienists at National Jewish Health to develop technical specifications and recommendations for an industry-wide occupational exposure database. In order to ensure that this database will meet the needs of occupational health and safety professionals in the utility industry, we are asking for a few minutes of your time to complete an online survey. The results of this survey will guide the recommendations made to EPRI and help ensure that the proposed database will provide value to professionals in the field and assist in the goal of worker protection.

Information collected in this survey will remain confidential and will only be analyzed in aggregate. Entry of personal identifying information is optional. Computer IP addresses will be stored with the questionnaire answers to prevent analysis of duplicate survey results.

In order to progress through this survey, please use the following navigation links:

- Click the Next >> button to continue to the next page.
- Click the Previous >> button to return to the previous page.
- Click the Exit the Survey Early >> button if you need to exit the survey.
- Click the Submit >> button to submit your survey.

If you have any questions, please contact Mike Van Dyke at VanDykeM@NJHealth.org.

Electric Power Research Institute (EPRI) Exposure Database Project

Survey Eligibility Question

Are you a health and safety representative for your company?

- ◯ Yes
- ◯ No

Electric Power Research Institute (EPRI) Exposure Database Project

Background Information

How would you describe your main job?

- ◯ Safety and Health Manager
- ◯ Industrial hygienist
- ◯ Safety Engineer
- ◯ IH Technician
- ◯ Other (please specify)

How long have you been employed in a health and safety capacity at this company?

Years

Approximately how many of each of the following health and safety personnel are employed by your corporation? (in all locations)

Industrial Hygienists

Industrial Hygiene Technicians

Safety Professionals

Other

Which of the following work environments do you have responsibility for as part of your job? (check all that apply)

- ☐ Generation
- ☐ Transmission
- ☐ Distribution
- ☐ Transformer Substation
- ☐ Distribution Substation
- ☐ Maintenance Shop
- ☐ Administrative Workers

Electric Power Research Institute (EPRI) Exposure Database Project

If power generation, which of the following generation methods does your health and safety job cover? (check all that apply)

- ☐ Coal fired generators
- ☐ Natural gas fired generators
- ☐ Oil fired generators
- ☐ Hydroelectric generators
- ☐ Wind generators
- ☐ Geothermal generators
- ☐ Solar generators
- ☐ Not applicable

Approximately how many employees does your company have? (in all locations)

Employees _____

Electric Power Research Institute (EPRI) Exposure Database Project

Industrial Hygiene Data Collection

We are interested in current exposure assessment activities at utility companies. This information will help us determine the volume and types of IH exposure data that could potentially be entered into an industry-wide exposure database.

In a typical year, about how many PERSONAL chemical exposure IH samples are collected at your company?

◯ Not applicable

◯ Number

In a typical year, about how many noise dosimeter samples are collected at your company?

◯ Not applicable

◯ Number

In a typical year, about how many different workers are sampled using personal (breathing zone) chemical exposure samples?

◯ Not applicable

◯ Number of Employees

In a typical year, about how many different workers are sampled using noise dosimeter samples?

◯ Not applicable

◯ Number of Employees

Electric Power Research Institute (EPRI) Exposure Database Project

For a typical year, please estimate the percentage of your company's IH samples (both chemical and noise) that are related to the following types of work.

Routine operations	
Scheduled maintenance (not outage)	
Scheduled outage	
Forced or emergency outage	
Other	

For a typical year, please estimate the percentage of your company's chemical hazard assessment IH samples for each category below.

Area samples	
Personal samples	

For a typical year, please estimate the percentage of IH samples (both chemical and noise) at your company are collected by individuals in the following categories.

Company industrial hygienists	
Company safety personnel	
Other plant personnel trained to take samples	
Contract industrial hygienists	
Other	

Electric Power Research Institute (EPRI) Exposure Database Project

For a typical year, please estimate the number of personal industrial hygiene samples collected at your company for each of the following agents.

	0	1-10	11-20	21-50	>50
Total Dust (PNOC)	◯	◯	◯	◯	◯
Asbestos	◯	◯	◯	◯	◯
Coal dust	◯	◯	◯	◯	◯
Silica	◯	◯	◯	◯	◯
Arsenic	◯	◯	◯	◯	◯
Cadmium	◯	◯	◯	◯	◯
Chromium	◯	◯	◯	◯	◯
Lead	◯	◯	◯	◯	◯
Manganese	◯	◯	◯	◯	◯
Beryllium	◯	◯	◯	◯	◯
Mercury	◯	◯	◯	◯	◯
Benzene	◯	◯	◯	◯	◯
Other Organic Solvents	◯	◯	◯	◯	◯
Isocyanates	◯	◯	◯	◯	◯
Bioaerosols (mold, bacteria, endotoxins)	◯	◯	◯	◯	◯

For a typical year, please estimate the number of samples collected at your company for each of the following physical agents.

	0	1-10	11-20	21-50	>50
Noise (dosimeter samples)	◯	◯	◯	◯	◯
EMF	◯	◯	◯	◯	◯
RF/Microwave	◯	◯	◯	◯	◯
Heat stress (WBGT or other)	◯	◯	◯	◯	◯
Vibration	◯	◯	◯	◯	◯

Electric Power Research Institute (EPRI) Exposure Database Project

Industrial Hygiene Data Management

We are interested in how you currently store your IH data. This information will help us determine whether an industry-wide database will provide value to companies in the utility industry.

How does your organization currently store and retrieve IH data?

◯ Hard copy or paper only

◯ Electronic only (Note: hard copy can be collected originally and used as backup, but all data routinely used is entered into an electronic system)

◯ Both (some electronic and some hard copy)

Electric Power Research Institute (EPRI) Exposure Database Project

About Your Electronic IH Data System

How many years of IH data are in your current electronic data system?

Years

Approximately how many IH samples (noise and chemical exposure) are in your current electronic data system?

Years

Which types of IH data are currently entered into your IH data system?

	N/A	None	Some	Most	All
Chemical/aerosol exposures	◯	◯	◯	◯	◯
Noise samples (dosimeter results)	◯	◯	◯	◯	◯
Noise samples (sound level meter)	◯	◯	◯	◯	◯
Wipe samples	◯	◯	◯	◯	◯
Bulk samples	◯	◯	◯	◯	◯
Direct reading samples (four gas meter, detector tubes, etc.)	◯	◯	◯	◯	◯
EMF samples	◯	◯	◯	◯	◯
RF or microwave samples	◯	◯	◯	◯	◯
Vibration samples	◯	◯	◯	◯	◯
Heat stress samples (WBGT or other)	◯	◯	◯	◯	◯
Ergonomic assessment results or measurements	◯	◯	◯	◯	◯

Electric Power Research Institute (EPRI) Exposure Database Project

Which of the following chemical exposure and noise samples are currently entered into your IH data system?

	N/A	None	Some	Most	All
Samples collected by company IHs	◯	◯	◯	◯	◯
Samples collected by company safety personnel	◯	◯	◯	◯	◯
Samples collected by other plant personnel trained to take samples	◯	◯	◯	◯	◯
Samples collected by contract or consulting industrial hygienists	◯	◯	◯	◯	◯
Samples collected on contractor personnel	◯	◯	◯	◯	◯

Which of the following best describes your current IH data system?

- ◯ Stand alone (only accessible on one computer)
- ◯ Networked within EHS-related departments only
- ◯ Networked within the site or facility
- ◯ Networked corporate-wide
- ◯ Internet-based (accessible from anywhere)
- ◯ Other (please specify)

Is your current IH exposure database system integrated with or connected to other data systems within your company? (Check all that apply)

- ☐ Personnel/Human Resources databases
- ☐ Occupational medicine databases
- ☐ Other databases for physical hazards (e.g., noise, EMF)
- ☐ Other databases for safety/accidents/incidents
- ☐ Hazard inventory databases (e.g., MSDS files)
- ☐ Safety & Health training databases
- ☐ None of the above
- ☐ Other (please specify)

Electric Power Research Institute (EPRI) Exposure Database Project

Which of the following best describes your current IH data system?

- ◯ Commercial IH database (Medgate, OpenRange, etc.)
- ◯ In house, custom-built exposure database (Microsoft Access, Excel, etc.)

Electric Power Research Institute (EPRI) Exposure Database Project

About Your Commercial IH Data System

What is the name or manufacturer of your commercial database system?

- ◯ Medgate
- ◯ IHS
- ◯ Datapipe/Knorr
- ◯ Open Range Software
- ◯ Spiramid
- ◯ Dakota Software
- ◯ KMI
- ◯ ProcessMap
- ◯ SAP EHS Management
- ◯ Other (please specify)

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About Your Custom-Built IH Data System

Which of the following best describes your custom-built IH data system?

- ◯ Microsoft Access based system
- ◯ Microsoft Excel or other type of spreadsheet(s)
- ◯ Microsoft SQL based system
- ◯ Oracle based system
- ◯ PeopleSoft based system
- ◯ Filemaker Pro based system
- ◯ Other (please specify)

Who designed and built your custom IH electronic data system?

- ◯ EHS Staff
- ◯ Company IT staff/programmer
- ◯ Outside programmer/IT consultants
- ◯ Other (please specify)

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Reasons an Electronic System Has Not Been Adopted

Why hasn't your company adopted a electronic data system for your IH data? (check all that apply)

- [ ] Too expensive
- [ ] Not enough time
- [ ] Not enough IH samples to justify an electronic system
- [ ] Not enough staff to enter data into an electronic system
- [ ] Haven't found electronic systems useful
- [ ] Other (please specify)

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IH Exposure Assessment and Data Analysis

We are interested in the ways that IH data are used in your company. This information will help us determine the functionality necessary in an industry-wide exposure database.

What types of reports or data analyses do you generate with your IH data? (Check all that apply)

- [ ] None
- [ ] Employee or management notification of sampling results
- [ ] Average exposures by chemical agent
- [ ] Average exposures by defined work areas
- [ ] Average exposures by defined work tasks or processes
- [ ] Average exposures by job titles or job title groups
- [ ] Average exposures by specific time periods
- [ ] Analysis to identify homogeneous or similar exposure groups (HEG's or SEG's)
- [ ] Process control statistics
- [ ] Graphs of exposure distributions by chemical agent
- [ ] Graphs showing exposure levels over time
- [ ] Control banding analyses
- [ ] Other (please specify)

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In general, how are the analyses or reports of your IH data used at your company? (check all that apply)

- [ ] We do not use analyses or reports at our company
- [ ] To assure compliance with government regulations
- [ ] To present data to management to assure EHS performance
- [ ] To establish personal protective equipment requirements
- [ ] To establish engineering control requirements
- [ ] To establish medical surveillance or screening requirements
- [ ] To initiate safety and health investigations
- [ ] To update and improve health and safety policies and procedures
- [ ] To update and improve health and safety training
- [ ] To prioritize exposure control expenditures
- [ ] To justify resource allocation
- [ ] To benchmark against other internal or external facilities
- [ ] Other (please specify)

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Industry-Wide Database Features

EPRI is considering developing an industrial hygiene database specifically for users in the utility industry. As you would be a potential user of this database, your input on its design and functionality is critical.

Please rate the following data fields on their importance for inclusion in an industrial hygiene database.

	Not Important	Somewhat Important	Very Important	Critical
Reason sample was collected (i.e., suspected overexposure, routine assessment, employee complaint)	◯	◯	◯	◯
Sampling time	◯	◯	◯	◯
Pump flow rate	◯	◯	◯	◯
Pump or instrument serial number	◯	◯	◯	◯
Type of sampling media	◯	◯	◯	◯
Laboratory analysis method	◯	◯	◯	◯
Name of Laboratory analyzing sample	◯	◯	◯	◯
Laboratory limit of quantification	◯	◯	◯	◯
Name or ID of person collecting sample	◯	◯	◯	◯
Sampled employee's job title	◯	◯	◯	◯
Sampled employee's department	◯	◯	◯	◯
Type of respirator used	◯	◯	◯	◯
Type of canister on respirator	◯	◯	◯	◯
Type of body protection	◯	◯	◯	◯
Type of hand protection	◯	◯	◯	◯
Type of eye protection	◯	◯	◯	◯
Type of foot protection	◯	◯	◯	◯
Type of head protection	◯	◯	◯	◯
Type of ventilation (i.e., local exhaust, general dilution, etc.)	◯	◯	◯	◯
Engineering controls (i.e., pre-work washdown, wetting method, etc.)	◯	◯	◯	◯
	◯	◯	◯	◯

Location description of sampled activity (i.e., indoors, outdoors, confined space, etc.)	◯	◯	◯	◯
Building of sampled activity	◯	◯	◯	◯
Room number of sampled activity	◯	◯	◯	◯
Type of activity or task (i.e., welding, painting, etc.)	◯	◯	◯	◯
Frequency of activity (i.e., daily, weekly, monthly, etc.)	◯	◯	◯	◯
Type of material involved (i.e., specific welding rod, specific paint or coating, etc.)	◯	◯	◯	◯
Extrapolated 8-Hour TWA	◯	◯	◯	◯
Relevant Exposure Limit	◯	◯	◯	◯

How would you rate the following factors in terms of their importance in adopting an IH exposure database?

	Not Important	Somewhat Important	Very Important	Critical
Ability to transfer data (offsite or from existing systems)	◯	◯	◯	◯
Cost/affordability	◯	◯	◯	◯
Ability to link the database to occupational medicine department databases	◯	◯	◯	◯
Ability to link the database to personnel/human resources databases	◯	◯	◯	◯
Ease of data entry	◯	◯	◯	◯
Ease of report generation	◯	◯	◯	◯
QA/QC features	◯	◯	◯	◯
Data analysis capabilities	◯	◯	◯	◯
Flexible report generation capabilities	◯	◯	◯	◯

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How would you rate the following reporting and analysis capabilities in terms of their importance in adopting an IH exposure database?

	Not Important	Somewhat Important	Very Important	Critical
Employee notifications of sampling results	◯	◯	◯	◯
Periodic sampling reports by chemical agent (i.e., exposures by chemical by month, year, etc.)	◯	◯	◯	◯
Periodic sampling reports by employee or job title (i.e., exposures by chemical by month, year, etc.)	◯	◯	◯	◯
Basic statistical analysis by chemical agent (i.e., mean, median, standard deviation, etc.)	◯	◯	◯	◯
More advanced statistical analysis by chemical agent (i.e., upper tolerance limit, exceedance fraction, upper confidence limit, etc.)	◯	◯	◯	◯
Analysis to identify homogeneous or similar exposure groups (HEG's or SEG's)	◯	◯	◯	◯
Graphical analyses such as exposure distributions by chemical agent or graphs showing exposure levels over time	◯	◯	◯	◯
Ability to perform control banding analyses	◯	◯	◯	◯

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What types of data would you most likely enter into an exposure database?

	Unlikely	Maybe	Probably	Very Likely
Chemical/aerosol exposures	◯	◯	◯	◯
Noise samples (dosimeter results)	◯	◯	◯	◯
Noise samples (sound level meter)	◯	◯	◯	◯
Wipe samples	◯	◯	◯	◯
Bulk samples	◯	◯	◯	◯
Direct reading samples (four gas meter, detector tubes, etc.)	◯	◯	◯	◯
EMF samples	◯	◯	◯	◯
RF or microwave samples	◯	◯	◯	◯
Vibration samples	◯	◯	◯	◯
Heat stress samples (WBGT or other)	◯	◯	◯	◯
Ergonomic assessment results or measurements	◯	◯	◯	◯

Would you use an industry-wide exposure database if available?

◯ Yes

◯ No

◯ Maybe

Would you be willing to enter your exposure data into an industry-wide database developed and maintained by a non-profit industry research group such as EPRI (assuming appropriate security and privacy protections were in place)?

◯ Yes

◯ No

◯ Maybe

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What would be your biggest concerns regarding the implementation of an industry-wide IH database? (check all that apply)

- ☐ Privacy of workers
- ☐ Protection of confidential business information
- ☐ Ease of use
- ☐ Ability of lawyers to subpoena exposure data
- ☐ It would not provide relevant data for use at my company
- ☐ Other (please specify)

Assuming an industry-wide IH database (IWD) currently existed where you could view exposure data by chemical agent, job title, or job task across the entire utility industry, please indicate your agreement with the following statements.

	Strongly Disagree	Disagree	Agree	Strongly Agree
The IWD would help me to better assess exposures of my workers.	◯	◯	◯	◯
The IWD would help me better target my IH and sampling resources.	◯	◯	◯	◯
The IWD would provide benchmark data to assess performance in controlling exposures	◯	◯	◯	◯
The IWD would provide data to help justify additional exposure assessment at my facility.	◯	◯	◯	◯
The IWD would provide data to help justify resources for upgraded exposure controls.	◯	◯	◯	◯
The IWD would improve the quality of subsequent industrial hygiene data that is collected.	◯	◯	◯	◯

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Survey Complete

Thank you for taking the time to complete our survey.

If you are not a health and safety staff member at your company, we apologize for sending this to you by mistake. We would appreciate it if you could forward our email message to the appropriate person in your company.

Though completely optional, we would appreciate your name and email in case we have additional questions for you regarding the implementation of an industry-wide exposure database.

Please feel free to contact us directly at VanDykeM@NJHealth.org if you have questions.

What is your first name?

What is your last name?

What is your email address?

In what geographic area is your company located?

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