

OWCP's Response to the National Institute of Medicine's Report on the Site Exposure Matrix

The Site Exposure Matrix (SEM) is a relational database used by the Division of Energy Employees Occupational Illness Compensation (DEEOIC) in adjudicating Part E claims. It includes lists of toxic substances used at DOE facilities and associated health effects from exposure to those substances. SEM users can filter data to identify toxic substances with a known health effect by different criteria including job category, work process or building locations. Given the expansive amount of data maintained in the database, SEM is a key resource for assembling customized toxic substance exposure data for determining compensability for Part E claims. For this reason, the DEEOIC contracted with the National Institute of Medicine (IOM) of the National Academies to assess the accuracy and completeness of the SEM. DEEOIC tasked IOM with making recommendations to improve the scientific veracity and usefulness of the database in claim adjudication.

On March 27, 2013, IOM released its report, *Review of the Department of Labor's Site Exposure Matrix Database*. In its 122-page report IOM made three major recommendations.

1. Use supplemental information sources for the Site Exposure Matrix database.

The committee provided several ideas for data sources, in addition to Haz-Map, that DEEOIC could utilize to provide a more comprehensive picture of the adverse effects associated with exposure to the toxic substances. They included ideas to expand the database to account for routes and levels of exposure.

IOM did not make specific recommendations as to which sources of information were best suited for use by the DEEOIC in supplementing SEM, nor did they address the issue of how to resolve discrepancies between multiple well-regarded scientific sources. As such, DEEOIC continues to research and identify source material for use in updating SEM from a variety of resources. However, DEEOIC must evaluate the utility of each new sources of information to determine both the scientific validity of new data and its applicability to the claims adjudication process.

As part of enhancements to the information that DEEOIC should consider making available in SEM, IOM recommended adding nature, extent and duration of exposure data. DEEOIC evaluated this, but decided that that it would not be feasible to accomplish in SEM because of the fact that this assessment changes depending on the circumstances of the individual employee's medical and employment history. Alternatively, DEEOIC has set up a process to obtain customized employee-specific evaluations of the routes

and levels of exposure. DEEOIC executed a new contract in the summer of 2016 with Banda International Group (BGI) to have them conduct employee-specific industrial hygiene assessments (in addition to those already completed by federal industrial hygienists). To date, DEEOIC has submitted over 400 employee referrals for BGI exposure assessment with approximately 110 completions. While still in early stages of implementation, DEEOIC expects exponential increases in BGI completed referrals in the coming months.

2. Improve the structure and function of the Site Exposure Matrix database.

DEEOIC designed SEM to provide a customizable employee toxic substance exposure profile by allowing for a comparative analysis of available facility toxic substance data to an employee's verified DOE work history. IOM made recommendations to include more reference guidance as to the source of exposure data relating to toxic substances. In addition, it suggested changing search functionalities to make searches more flexible with regard to broader search criteria that were not specific to a particular facility.

In response to these suggestions, DEEOIC has greatly improved filtering methodologies to allow for significantly more refined search outputs based on the application of multiple variables such as health effect, labor category, building, etc. With regard to references and citations, DEEOIC has expanded the use of citations regarding the underlying science relating to direct disease links. Moreover, DEEOIC continues to evaluate the references utilized in Haz-Map to determine their applicability in the SEM.

IOM also suggested that DEEOIC evaluate the application of more global search results that were not facility specific. This has proven not to be feasible, except with regard to the "construction, all sites" option, which allows a user to see the typical substances to which workers in the construction trades would have expected exposures. With regard to other labor categories, there is not standardization across the DOE atomic weapons complex. It is not uncommon for employees in a labor category at one site to perform very different work functions from someone with the same or similar title at a different DOE site, thus resulting in a very different exposure profile. This works against creating generalizations regarding operations that occurred across the DOE atomic weapons industry.

3. Establish an expert advisory panel for the Site Exposure Matrix database.

The IOM stated in their report that the responsibilities of such a panel could include peer review of new health effect links in SEM that are based on Haz-Map and other supplemental sources. The IOM acknowledged an advisory

panel could undertake several approaches to institute a peer review process for SEM. The DEEOIC has not had the resources to pay for an advisory panel made up of experts to peer review all of the links added at this time. With the formation of the Advisory Board on Toxic Substance and Worker Health, DEEOIC is looking forward to recommendations as to how such peer review could take place.

Other actions taken in response to IOM recommendation -

- IOM report at page 65, identified one concern about SEM that relates to informational gaps. It specifically referenced incomplete or inconsistent exposure profiles based on location and job.

DEEOIC has worked to fill these gaps in multiple ways. Since the publication of the IOM report, there have been 656 revisions to the underlying spreadsheets comprising the SEM. In addition, there were 13,697 toxic substances in SEM when the IOM report was published. There are now 16,705 substances in SEM. Some of these changes are minor and can include changes or additions of just a few cells in the underlying SEM data spreadsheets (often resulting from a claim-specific submission). Other spreadsheet updates have been major, involving the addition of thousands of rows of data.

- IOM report at page 68, states “...diseases associated with certain occupations (labor categories), regardless of specific substance, could be added to SEM if those occupations are known to have been conducted at a site.”

Direct Disease Linked Work Processes have been added to SEM for 93 labor categories. For example, Arc Weld Aluminum is now linked to toxic pneumonitis and COPD.

- IOM Report at page 69 states, “However, including information on the health effects of a mixture based on the components of the mixture, instead of using available health effects information on the whole mixture, is inconsistent with existing guidance for assessing the risk of chemical mixtures.”

Mixture health effects in SEM are now based upon studies relating to the whole mixture.

- Pages 82-85 of the IOM report provided tables containing a selection of potentially missing links between toxic substances and disease.

The following links, referenced by IOM in these tables are now contained in SEM:

Asbestos and Ovarian Cancer
1,3-butadiene and Leukemia and Non-Hodgkin's Lymphoma
Coal tar pitch volatiles and lung cancer
Diesel exhaust and lung cancer
Formaldehyde and leukemia
o-toluidine and urinary bladder cancer
Trichloroethylene and kidney cancer
Tetrachloroethylene (perchloroethylene) and Solvent, acute toxic effect
Toluene and Encephalopathy, chronic solvent effect and Solvent, acute toxic effect
welding fumes and metal fume fever

- “The committee urges DOL to reconsider the epidemiologic and medical surveillance studies conducted on DOE workers to inform substance-disease links in SEM.” (p. 74)

DEEOIC incorporated these studies to the fullest extent possible, but it continues to evaluate new and relevant scientific evidence. For example, the IOM indicated that a Fernald Study looked at cancer mortality associated with trichloroethylene, cutting fluids and kerosene. All these substances are included in the Fernald SEM profile.

- “The committee also finds that the evidence for chemical-radiation interactions for substances in SEM is not strong enough to make conclusions about causal associations at this time, although research is ongoing. As new information becomes available, these issues should be reassessed. (IOM report p. 73).

DEEOIC continues to face challenges regarding application of synergism in exposure and causation analysis because of the disparate scientific information available. This is one area of research that DEEOIC needs assistance in determining the most viable method for incorporating synergistic health effects in the claim evaluation process.

- Pages 78 and 79 of the IOM report provide additional potential sources of information for links between toxins and disease.

While IOM and members of its evaluation committee have suggested that DEEOIC incorporate other sources of scientific data into the SEM, the specificity of the recommendations has been lacking. It is relatively straightforward to identify “potential” sources of new health effect and other scientific data. However, those sources of information must be vetted for both credibility and usefulness, which is both a time-consuming and resource intensive activity. Additionally, it is not uncommon for the scientific literature to be divided on such issues and any such conflicts

would need to be resolved. DEEOIC continues to rely on Haz-Map as the best option as a source of health effect data. While there has been criticism as to DEEOIC's reliance on Haz-Map and criticism of there being gaps in the applied health links, specific recommendations as to viable alternatives has not been forthcoming. DEEOIC welcomes any recommendations regarding new and credible sources of health effect data.

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