mercury guideline has acted as an eye opener to the industry, and has enabled the industry to better control mercury exposure.

CS-121-07
WhyQuiet? The Drivers behind the Design of Quieter Offshore Facilities in Australia

R. Nocco, Chevron, San Ramon, CA; A. Chandran, W. Powyrs, B. Chesson, Chevron, Perth, Australia.

Situation/Problem: This paper outlines the legal, commercial and ethical drivers for why decisions were made during the Front-end Engineering and Design (FEED) phase of the Wheatstone offshore production platform to ensure that operational noise risks are as low as reasonably practicable (ALARP). The presentation will provide: an overview of the current occupational health and safety (OH&S) legislation, including noise mitigation requirements for new offshore facilities in Australia; a cost comparison of implementing engineering noise controls during early FEED, as opposed to late FEED and finally, after retrofitting them to an existing operating facility, and an examination of ethical considerations for proposed operators, such as occupational hearing loss and social responsibility.

Resolution: This presentation will explain what drivers must be considered by offshore operators during design of a new facility in Australia, to: Address compliance issues involving current and future noise management legislation, improve economic value, and ensure best practice hearing conservation in the industry.

Results: Not only have the requirements of current noise management legislation been satisfied, but operational costs have been significantly reduced through the strategic implementation of engineering noise controls at FEED. This will ensure that future reliance on administrative controls and personal hearing protectors to prevent occupational hearing loss is minimized over the operational life of the facility.

Lessons Learned: Very significant cost savings are available through early (design stage) attention to engineering noise controls. The Wheatstone offshore production platform has successfully demonstrated that it managed facility noise risks to a level that is ALARP, a best practice in the Australian offshore petroleum industry.

Podium Session 122
Risk Assessment/Risk Management Research

Tuesday, May 21, 2013, 2:00 PM – 4:30 PM

SR-122-01
Cumulative Exposures to Dusts and Asbestos Fibers from Drywall Finishing

F. Boelter, R. Jones, Y. Xia, L. Dell, ENVIRON, Chicago, IL.

Objective: Develop an algorithm for the reconstruction of exposures to dusts and asbestos fibers resulting from drywall finishing activities and implement the algorithm using hypothetical work histories for four categories of workers – drywall specialist workers, general contractors, hobbyists, and other trades workers as by-standers. Asbestos fibers were present in some joint compounds until 1978.

Methods: Based on a survey of contractors (n = 11) and observations at job sites (n = 4), we characterized time-activity patterns for drywall finishing. Characteristic work histories for drywall specialist workers, general contractors, and hobbyists were discussed. For each worker category, a previously developed mathematical model was applied using stochastic methods to estimate the probability distribution of 8 h TWA exposures to respirable dusts. An empirically derived factor (0.044 f/cm^3 per mg$_{rd}$/m^3 unadjusted) is applied to estimate corresponding asbestos fiber exposures.

Results: We found that the proportion of workdays spent finishing drywall joint compound, and the rate of finishing work varies substantially between workers based on skill and work tasks. The exposure reconstruction algorithm has 5 steps. Exposures to asbestos fibers are approximately 5% of respirable dust exposures, but these values have been determined for a specific joint compound. We will illustrate the magnitude of exposure

variability between the worker categories, and sensitivity of model predictions to the magnitude and variability of defined input parameters.
Conclusions: The distributions of 8 h TWA dust and asbestos fiber exposures estimated for the four worker categories are compared to historical exposure data, while the cumulative exposure estimates are used to evaluate health risks. Work history features that influence exposure estimation are identified.

SR-122-02
Cumulative Risk Assessment Approaches for Use in Community and Occupational Settings

P. Williams, E Risk Sciences, LLP, Boulder, CO; S. Dotson, NIOSH, Cincinnati, OH; A. Maier, Toxicology Excellence for Risk Assessment, Cincinnati, OH.
Objective: Health risk assessments have evolved to focus on cumulative risk assessment (CRA). CRA involves assessing the combined risk from co-exposure to multiple chemical and non-chemical stressors for varying health effects. The purpose of this presentation is two-fold: (1) describe existing frameworks and methods that have been used to evaluate cumulative risks, and (2) highlight recent and ongoing efforts to extend CRA beyond traditional contexts, including occupational settings.
Methods: We reviewed the historical context and CRA framework developed by the EPA. We also reviewed available methods and tools, including aggregate/cumulative exposure models and advanced dose-response and risk characterization techniques, and their applications. Additionally, we researched ongoing initiatives and novel approaches for conducting CRAs in community and occupational settings.
Results: CRA's have been conducted for a number of chemical groupings, such as pesticides, dioxins, and phthalates. These assessments have relied on dietary and residential aggregate/cumulative exposure models such as Deem/Calendex and CARES, and methods that combine the effects of chemicals that have a common mode of action using toxic equivalency factors (TEFs) or relative potency factor (RPFs). However, past assessments have been limited and have not accounted for all of the factors envisioned for a complete and comprehensive CRA. Efforts to extend CRAs beyond traditional contexts include (1) a greater emphasis on community-based assessments (e.g., EPA's C-FERST tool), (2) accounting for occupational risk factors (e.g., NIOSH's Total Worker Health program), (3) integrating chemical and non-chemical stressors, and (4) using biomarkers to identify common exposure and effect metrics.
Conclusions: Although many challenges remain, CRA has the potential to improve the risk assessment process and allow for a more comprehensive evaluation of the interaction between different stressors and their combined impact on human health. There are many opportunities where industrial hygienists can help advance the principals and practice of CRA.

SR-122-03
Use of Modified Delphi Method as a Process for the Development of Occupational Exposure Limits

A. Plaza, NASA JSC, Houston, TX; L. Whitehead, G. Delclos, University of Texas School of Public Health, Houston, TX.
Traditional approaches to setting Occupational Exposure Limits (OEL) are not systematic in nature, and are not as transparent as may be desired, and require a long evaluation process. On the other hand, on-orbit occupational exposures for astronauts and spaceflight participants can be very different from those experienced by workers performing similar tasks in workplaces on Earth because exposures are continuous over long orbital and, eventually, interplanetary missions.
Objective: A modified Delphi method to reach consensus is proposed as an alternative strategy to develop OELs in a more efficient, systematic, expeditious and transparent manner.
Methods: A standard questionnaire format and data structures were developed to provide information and elicit responses from an expert panel. A pilot study served to validate the questionnaire and data structure

ABSTRACTS

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