

## **Occupational Hygiene Programs: A Strategy for Demonstrating the Value to Corporate Executives**

**Elyce A. Biddle, PhD  
Senior Research Economist  
NIOSH  
Morgantown WV  
and  
ORC Worldwide  
Washington DC**

**Michael T. Brandt, BS, MS, MPH, DrPH  
Vice President  
AIHA  
Fairfax VA**

### **Introduction**

There can be no argument that the US economy is faltering. Overall, the adjusted gross domestic product—a measure of the overall economic strength of the nation—contracted at a 5.1% pace during the last quarter of 2008. This represented the weakest reporting in 28 years. Business investment fell by just over 20% during the fourth quarter of 2008, marking the largest drop since 1980. The National Association for Business Economics stated that weakening market conditions and soaring commodity prices are squeezing profit margins at companies, and money is tighter than ever. Sadly, it has been speculated that unless conditions change, the current economic slump will be the most protracted since World War II. What this means is that now, more than ever, OEHS professionals must tap their business side, reach into the world of “corporate speak,” and make the case to corporate executive management that critical OH programs are not only necessary, they’re sound investments.

AIHA recognized that in today’s business environment it is becoming increasingly critical to the survival of the industrial hygiene (IH) profession that a strong value proposition is made to support IH programs and activities so that they can compete successfully for limited resources. Without compelling business value information, management is likely to view IH programs and activities as efforts that, while important, are not as high a priority as projects with a clearer connection to the bottom line. As a result, AIHA initiated a multiyear project was to (1) specifically study which mechanisms allow OEHS professionals to demonstrate business impact of occupational health programs at their organizations, and (2) create a strategy that provides the basis for efficient and effective demonstration of the value of occupational health activities. This

project was a six-phase intensive study that analyzed the qualitative and quantitative impacts of occupational hygiene.

At the 2008 AIHce, new research findings were introduced, including an approach that enables industrial hygienists to demonstrate that, by protecting the health of workers and the community, they simultaneously safeguard an organization's license to operate and provide competitive business advantage. This new strategy was presented by the funding partners, the principle contractor, and the research team<sup>1</sup> at the opening session and in separate training sessions.

The most telling results came from in-depth case studies of select participating companies. These reviews provided concrete examples of ways in which OH activities can greatly affect the corporation in a positive manner and helped to refine the strategy using unique ways to evaluate the value proposition of occupational hygiene activities. This presentation outlines that strategy and provides an overview of the case studies that were developed to show the value of occupational hygiene programs and preventive measures.

## Case Studies

### Case Study: Aircraft Priming and Finishing

*Hazard Identification:* The manufacturing process evaluated was a rework operation in which hand sanding of imperfections in the primer coat on aircraft parts by manufacturing operators, resulted in additional in-process rework and hazardous chromate exposures to employees. This, in addition to the long-term goal of eliminating hexavalent chromium primer from aircraft manufacturing processes, led industrial hygienists and product and manufacturing engineers to research alternative materials.

*Hazard Intervention:* A successful solution to the problems was one that reduced the hazard of employee exposure to chromate dust while enabling the company to meet its production and quality goals. A non-chromate-based primer was selected and tested. Implementation resulted in improved quality of the finished product, reduced rework, reduced cycle time, increased productivity, and increased customer satisfaction. The hazard intervention demonstrated that a non-chromate-based primer could satisfy both the business and employee protection goals.

*Key Benefits of the Intervention:* By using a non-chromate-containing priming paint to achieve the business and health protection objectives, the company:

- Reduced paint chipping, which resulted in eliminating the need to rework chromate-primed parts and, consequently, a significant labor productivity savings and elimination of worker exposure to chromate dusts
- Reduced the level of respiratory protective equipment required from full-face, powered, air-purifying respirators (PAPRs) to half-face, negative pressure air-purifying respirators, significantly reducing costs.

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<sup>1</sup> Funding partners included the American Industrial Hygiene Association and the American Board of Industrial Hygiene. The principle contractor was EG&G Technical Services. The research team included Dee Woodhull, Stephen Newell, and Reepa Schroff of ORC Worldwide; Elyce Biddle of the National Institute for Occupational Safety and Health; Tom Rancour of Rancour & Associates, LLC, and Tom Cecich of TFC & Associates.

- Avoided costly changes to the facility's exhaust ventilation system

*Financial Metrics:* The substitution of non-chromate-containing primers resulted in an after-tax net present value savings of \$504,694 over the 5-year duration of the project evaluation.

*Value Contribution:* This industrial hygiene-initiated project demonstrated key contributions that industrial hygienists can make to the value of the company: 1) industrial hygienists can provide unique expertise to solve problems that other professionals are not qualified to address; and 2) eliminating the hazard through material substitution significantly reduces the risk profile of the work being performed and consequently the costs of managing that risk.

### Case Study: Furnace Repair- Heat Stress

*Hazard Identification:* Imminent furnace failure would lead to a shutdown that would cost the company millions in lost revenue. The operation involved high ambient temperatures, extreme heat sources, high humidity, direct physical contact with hot objects, and strenuous physical activities that had a high potential for inducing heat stress in employees engaged in the work. The immediate goal was to repair the furnace while it was operating and to perform the work on-schedule and without illness or injury.

*Hazard Intervention:* The abatement plan involved changes in the PPE, administrative controls, and engineering controls, although the latter was the more effective level of control. The project team consisting of industrial hygiene, maintenance engineering, and operations performed "what if" analyses to anticipate potential hazards and to understand the potential consequences of hazard control on worker health protection and on the operation of the furnace. Once the analysis was complete, the team recognized that personal protective equipment, administrative controls involving heat stress management through employee rotation, remote handling and replacement of refractory brick, and establishing a hot zone and cool down tent was important for maintaining a safe environment. It is important to note that thoughtful planning through the scenario exercises and careful execution of the work plan resulted in a positive outcome, both in terms of health protection and production.

#### *Key Benefits of the Intervention:*

- Employees were protected from exposure to heat stress and injury through the use of engineering controls, PPE, remote handling of materials, and heat stress management.
- There was no shutdown of the process, which would have caused an \$8-10 million loss and there was no impact on production rates during the repair process.
- New methods for heat stress reduction were developed that could be used in other areas of the plant.

*Financial Metrics:* The lost production parameter is most important. Additional process staff costs were minimal with approximately 12 hours of additional work required. The total cost for mechanical repair would be \$150,000 if a shutdown occurred for 7 days.

*Value Contribution:* This case demonstrates that protecting employee health and maintaining production goals can be achieved simultaneously, without having to compromise one for the other.. It also supported two additional key findings of this study: 1) reducing hazards through a combination of engineering and administrative controls contributes to business value. 2) Industrial hygienists contribute expertise that supports the business process.

### Case Study: Radiation Safety Management

*Hazard Identification:* Ionizing radiation can create a considerable health risk to affected workers if it is not properly controlled. On a delayed coking process at a petroleum plant, level gauges containing a radiation source were installed inside a coking drum to control the amount of coke added to the drum. Industrial hygienists were assigned the responsibility of assuring the safe operation and maintenance of the measuring gauges, maintaining the license governing the use of the nuclear source, training the installers and maintainers of the gauge, and maintaining their qualifications to manage nuclear sources.

*Hazard Intervention:* The installers and users of the radiation devices were trained as to the process hazards, including exposure to radiation, and to follow procedures to safely maintain and operate a gauge containing a nuclear source.

*Key Benefits of the Intervention:* The radiation safety program enabled the company to automate the delivery of accurate amounts of coke to the coking drum. This solution allowed the plant to take advantage of the price margin that delayed coking offers.

*Financial Metrics:* The \$10 per barrel profit margin that delayed coking enables is worth \$81,250,000 per year, based on production of 125,000 barrels a day. This provides a profit of \$1.25 million per day on the 65 days per year that the coker is operated.

*Value Contribution:* The intervention demonstrates that industrial hygienists have unique scientific and technical expertise that is essential to the operation of some key processes. The IH's skill in radiation protection practices enabled the company to reap millions of dollars of revenue.

### Case Study: Foundry Lead Exposure

*Hazard Identification:* Scrap metal purchased from suppliers was contaminated with lead. The foundry melted the contaminated metal for use in making engine blocks, releasing lead-containing fumes and exposing workers in the foundry.

*Hazard Intervention:* The company examined its supply chain and implemented an alternative scrap metal supply process. The redesigned supply process required the metal suppliers to meet new more stringent scrap metal purchasing requirements and verify that the source metal was free of lead contamination. The foundry verified that lead-free scrap metal was being supplied by conducting spot checks, inspections and selected sampling and analysis.

*Key Benefits of the Intervention (top three):* As a result of this solution, the workers were no longer exposed to airborne lead, compliance with the OSHA lead standard was no longer required (including ongoing medical monitoring and workplace air sampling for lead), and the subsequent need for a capital investment to upgrade the local exhaust ventilation system was not required.

*Financial Metrics:* A cost analysis of the need to provide medical monitoring, air sampling, greater levels of PPE, and improving the local exhaust ventilation showed that the estimated 5-year cost associated with these changes was a net present value of (\$20M). By eliminating the lead from the supply chain, which required hiring scrap metal inspectors, writing new supplier specifications and requirements, and retaining employees resulted in a 5-year NPV of (\$1M), a significant cost avoidance.

*Value Contribution:* The industrial hygienist contributed value by working with plant engineering and procurement to redesign the supply chain process that resulted in substantial cost savings and cost avoidance.

## **Lessons Learned**

In some cases, management is aware of the need for certain actions but is distracted by a multitude of other issues associated with operating the business or organization. Even in highly responsible organizations, management may delay taking action if it has the perception that employees are adequately protected by PPE. OEHS professionals can be catalysts to enable organizations to make process or business changes that not only protect employees but also result in significant business improvements that can save money and contribute to an organization's competitive advantage.

Integrating OEHS professionals into the planning of operations at the right time is of key importance. Early communication of the hazards by industrial hygienists to the management level will allow for the interventions to be more efficient and less risky. Management needs to learn where OEHS professionals fit in the process and where they can be most effective.

By providing an essential function to a highly profitable process, industrial hygienists contributed value. Without them, the company could not have implemented a more cost-effective production process.

## **Making the Business Case: Key Findings**

Most OEHS professionals knew very little about cost or business data and how to access it. A general approach was needed to help those within the field characterize their work in terms of the value they bring to the table, expressed in both quantitative and qualitative terms.

IHs and other OEHS professionals cannot work in a vacuum. Being seen as a part of the business or, just as important, realizing their role as a member of the overall business team, is central to demonstrating the impact they have on the organization.

The most significant impacts on the business were not those OH areas that have been traditionally tracked. Affecting the business process, designing process improvements to reduce or eliminate worker exposures, implementing hazard and engineering controls, and including occupational hygienists on business teams all demonstrate a stronger business result in analysis than the "standards" of the costs of injuries and illnesses, workers' compensation, and reduced fines and penalties.

Evaluating the value proposition of OH in an organization really is specific to that individual company, which is why an overarching approach and strategy to defining the business case for OH is so important. The strategy developed on behalf of AIHA (Exhibit 1), by ORC Worldwide together with EG&G,, takes a general approach to address these specific issues and even prompts the individual to consider all of the possibilities. In eight steps, it walks OEHS professionals through ways to examine different methods of looking at the value they contribute to the organization. The strategy starts with the identification of business objectives and IH hazards, moves through the evaluation and prioritization of value opportunities, and then transitions into the assessment of risk reduction. From there, the IH approaches the value proposition, identifies appropriate changes, and assesses the impact of the decision. Last, but certainly not least, the strategy helps the occupational hygienist determine the value and present the value proposition.

**Exhibit 1. This is the process flow for developing an OH/IH Value Strategy.**

