How to Create a Successful Exposure Assessment/Industrial Hygiene Sampling Program in the Aggregates Mining Industry
Vulcan Materials Company’s Exposure Monitoring and Occupational Health Program

SECTION 1
Vulcan Materials Company has collected personal exposure monitoring samples on its employees since 1980.

The industrial hygiene program is overseen by the Corporate Director of Industrial Hygiene and Health Services.

As of 2010, the company has 81 certified industrial hygiene samplers trained to collect samples.

At the end of 2010 Vulcan had collected a total of 18,040 personal dust samples, 22,659 personal noise samples, and 443 welding fume samples since the program began.

This comprehensive industrial hygiene program has allowed our company to fully characterize the exposures our employees face while working for our company.
Over the course of Vulcan’s occupational health program development, the sampling strategies for the collection of samples has evolved.

The program will classify all jobs and Similar Exposure Groups (SEGs) across the company into the American Industrial Hygiene Association’s (AIHA) exposure assessment categories using the 95th percentile values for the most recent exposure (past 3-7 years) results. This process is consistent with the AIHA’s latest edition of the publication- *A Strategy for Assessing and Managing Occupational Exposures*.

Each year all exposure data over the past 3 – 7 years is analyzed to identify specific plant job combinations which need to be sampled to establish or better characterize the AIHA categories that a particular plant - job combination or SEG belongs.
In addition, Vulcan has an internal exposure control limit that is stricter than the governmental compliance limit that is used to identify when controls are needed to reduce exposures.

Annual hearing tests are provided to all employees regardless of noise exposure levels and all potentially silica exposed workers are provided the opportunity to participate in the periodic respiratory health medical screening surveys which include chest x-ray and pulmonary function testing.

Vulcan’s occupational health program has been recognized by the US Department of Labor as a leader in the prevention of silicosis and the program has been recognized for many years across the industry as the model program to compare against.
ELEMENTS TO CONSIDER WHEN BUILDING AN EXPOSURE ASSESSMENT and IH SAMPLING PROGRAM

SECTION 2
WHY SAMPLE?

- Protect your employees, so they can maintain the quality of life they deserve
- Comply with enforcement regulations
- Protect yourself from future claims & lawsuits

WHAT IS THE OBJECTIVE?

- To gain a certain level of CONFIDENCE that your process is in CONTROL.
PERSONNEL

• Identify staff within your organization or hire persons with competency and motivation.

• This is work that is very detail oriented. (Education/past experience in a high quality Exposure Assessment/Industrial Hygiene Sampling Program is extremely valuable.)

• Once there is an Exposure Assessment/Industrial Hygiene Sampling Program defined for your company, those team members need to receive specialized training to convey what is expected of them.

• Don’t let the learning end! Ensure health, industrial hygiene, and exposure control skills and knowledge are continuously improved and the message gets out to all levels of the company.
HAZARD/EXPOSURE ASSESSMENT

The 4 pillars of industrial hygiene are Anticipation, Recognition, Evaluation, and Control of workplace conditions that may cause workers' injury or illness.
ANTICIPATION

You need to know/should know some of the hazards at your company.

- What rock type are you working in? Limestone has less silica than Granite or Sandstone.
- You know many of the work practices that are in place at your faculties.

Use this knowledge in the Exposure Assessment/Industrial Hygiene Sampling Program creation process.
RECOGNITION

When someone is at a facility they are making observations constantly.

- Is the water truck running.
- Is someone running equipment that has a climate controlled cab with the door open or window down letting in dust and noise.
- Are the spray bars working.
- Do employees use hearing protection.
- Are employees working in areas that potentially exposes them to health hazards (Dust, Noise, Chemicals).
- What chemicals exist at my facility and what employees are exposed to these chemicals. (Take the time to look at the MSDS for products are used at the facility and many more examples exist.)

This is the most basic form of selecting potential issues you need more information on.
EVALUATION

At this point you know some of the potential issues and you have seen some of the potential issues that exist at your facilities, now you need to gather more scientific information about these potential issues to put a number on these potential exposure opportunities.

This will require industrial hygiene sampling. After sampling you will be able to prioritize what needs to be assessed and corrected more accurately.
Upon identifying issues that need to be controlled it is our reasonability as a good employer to take steps to eliminate or control potentially harmful exposures to our employees.

This step can entail creation of engineering controls, implementation of administrative controls or as a last resort use of personal protective equipment (PPE) to eliminate or control an exposure.

Engineering controls consist of a lot more, but here are some examples enclosed booth/cab, installing spray equipment to wet down your process, using quieter motors in a process to reduce noise, change plant configuration to lower exposures.
GETTING PLANTS READY

• If you have not done exposure assessment and/or sampling at a plant, it is important to take the time to help the employees at the plant understand that sampling is going to be conducted in a manner that will help them understand what IH Sampling entails. Communicate how it will affect them and that they are expected to operate the way they normally would operate as if no one was being sampled.

• When introducing the program at the plant level it is important to convey no one will lose their job due to results of sampling and this is being done because the company puts an emphasis on worker wellbeing and wants to meet or exceed applicable government regulations related to health.

• It is very important in this phase to ensure everyone knows that it is very important that when a person is sampled they need to be exposed to the normal environment in the manner that they are normally exposed to on any given workday.
• For samples other than direct read instruments (noise dosimeter, and some chemical monitors) you will need to select a quality lab to do your analysis.
• Labs that have AIHA and/or ISO certification are normally reputable.
• Check pricing for analysis
• Ensure format of lab results will be provided in a manner you can use.
• Ensure you know what chain of custody the lab requires for submitted samples.
• Ask about sample turn around times.
• If a contractor is used, verify what type of lab they use. If they cut corners with a cheap lab your samples may not be useful.
SAMPLING EQUIPMENT

• Sampling equipment can be costly but without quality well maintained equipment, the sampling work you do could be worthless.

• Ensure persons doing sampling are very well trained in the correct use of equipment.

• Create a system to verify original equipment manufacture specification for equipment factory recertification calibration are meet.

• Sampling equipment can be rented from some providers.

• Contractors can be used to conduct sampling and in the contract it can be stipulated they provide sampling equipment.

• Working with a person that has Industrial Hygiene and/or Safety, Health and Environmental education/degree as well as professional certifications (Certified Safety Professional CSP, Certified Industrial Hygienist CIH) to select the correct equipment for your needed testing is very important to ensure your time and resources are not directed in an inappropriate manner.
SUBSTANCES TO SAMPLE

• Silica
• Welding Fume
• Diesel Particulate Matter
• Noise
• Asbestos
• Many Other
We all have limited resources so we need to know how to best apply IH sampling resources. Utilizing proven science, industrial hygiene expertise and statistics will greatly help you apply your limited resources to get the best bang for your buck when doing IH sampling.
DEVELOPING A SAMPLING STRATEGY

The way in which you choose to sample and in what order

Prioritize:

What do you know that could be a potential overexposure? What do you think is a potential overexposure? What types of constituents are the employees exposed to? How bad are the health effects of the constituents? How often are employees exposed? What controls are in place to prevent exposure? What jobs/tasks do you not know enough about but need more hard data to understand. Make a ranking for the question you ask then total up the ranking to find the very high priority items that need to be sampled.
USE A PROVEN METHOD

- NIOSH SAMPLING METHOD (Yellow Book)
  - Statistics Driven

- AIHA Sampling Strategy (Uses SEG & Classifications)
  - Use of Similar Exposure Groups (SEGs) to analyze sampling information can be a useful tool in some cases. When this tool fits your situation it can greatly help with prioritization of sampling.
  - AIHA exposure categories are a great simple tool to help utilize powerful statistics to help validate and direct sampling efforts.
    - 0 – Trivial (>1%)
    - 1 – Highly Controlled (1% - 10%)
    - 2 – Well Controlled (10% - 50%)
    - 3 – Controlled (50% - Limit)
    - 4 – Poorly Controlled (Above Limit)
  - Using statistics to put confidence levels around your data is a great way to know you are in control with fewer samples as well as find jobs that are highly variable which can cause uncertainty that needs to be controlled.
DATA MANAGEMENT

• How samples are evaluated and stored is very important.

• There are many ways to compare samples to the exposure limits. It is recommended that sample exposure limits be adjusted to shift worked which will give you a better understanding of the true exposure. Use of a Severity Ratio is a very simple yet powerful tool to help communicate the exposure levels.

• Data needs to be stored in a manner that allows quick, complete and accurate retrieval of past sampling data.

• Past samples are a large part of an Exposure Assessment/Industrial Hygiene Sampling Program so you need to have them available in a way they can be leveraged as a useful resource.

• Keep historic data it is very useful.

• For larger companies or facilities that take a large amount of samples a database for managing sampling information is recommended.
COMMUNICATION of RESULTS

• Ensure your program has a process in place to get results back to employees in a timely manner and in an understandable format.

• It is a good practice to ensure all employees get every sampling result communicated back to them. This helps them feel they are an important part of the process, which they are.

• Accommodate for persons that don’t read English or speak English.
COMMUNICATION of RESULTS

Personal Exposure History Chart

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Division: MW          Substance: 002002 RESPIRABLE SILICA

<table>
<thead>
<tr>
<th>Date</th>
<th>Plant Name</th>
<th>Sample Number</th>
<th>P</th>
<th>U/R</th>
<th>Sev Ratio</th>
<th>Shift Time</th>
<th>Shift Adjusted Exposure Limit</th>
<th>Exposure Result</th>
</tr>
</thead>
<tbody>
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<td>10/21/10</td>
<td>FRANKLIN QUARRY</td>
<td>201.0</td>
<td>N</td>
<td>R</td>
<td>0.068</td>
<td>660</td>
<td>0.073 M5/M3</td>
<td>0.005 M5/M3</td>
</tr>
</tbody>
</table>
EXPOSURE CONTROLS for OVEREXPOSURES

• It is very important to identify and control overexposure situations. *(Engineering, Administrative, PPE controls)*

• To ensure all known overexposure situations are being continuously controlled, it is imperative that a system to track, monitor and communicate about the hazards related to overexposure situations is systematically built into your program.

• Creation of internal limits that are lower than ACGIH or other Government exposure limits which account for error in sampling equipment variation and lab analysis methods is a good practice.

  – 76% Severity Ratio – Noise
  – 81% Severity Ratio – Respirable Dust
  – 88% Severity Ratio – Respirable Silica
  – 88% Severity Ratio – DPM
  – 100% Severity Ratio – Total Welding Fume
BUILD an I.H. ARMY

RARE VIEW
A rarely seen picture of the inside of an actual Can-o-Whoopass
BUILD an I.H. ARMY

• Each operation has persons that if done correctly can be recruited to form an army that is continuously attacking Industrial Hygiene issues.
• Train people to recognize Industrial Hygiene issues and how to correct or report such issues.
• Purchase Radio Shack sound level meters SLMs for the plant so they can take rough noise measurements.
  – Fixed Equipment
  – Mobile Equipment
• Tap in to the wealth of knowledge your employees have. There are a lot of Industrial Hygiene issues that when empowered the right employee can create a very simple quality solution for given a chance.
• Make Industrial Hygiene part of how you do business at all levels and make Industrial Hygiene part of everyone’s job responsibilities.
• Recruit leaders! Make upper management understand Industrial Hygiene and worker health is imperative to doing business. Get persons that have good leadership qualities involved in your Industrial Hygiene process.
THANK YOU

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