

Case study

Managing controls for potential exposures



Exposure control at Escondida copper cathode plant in Chile.

We manage our exposures and the potential health impacts by identifying risks, maintaining risk profiles for harmful agents, complying with exposure limits and monitoring the health status of our employees. Potentially harmful exposures at our workplaces may include noise, silicon, radon, diesel particulate matter (DPM), nickel and sulphuric mist, coal mine dust and musculoskeletal stressors. The following outlines some of the activities we have undertaken to reduce our occupational exposures.

Silica control at Western Australia Iron Ore (WAIO)

The catchphrase of our education campaign for respirable crystalline silica is, 'If it's silica, it's not just dust!' The small size of respirable dust particles allows them to travel all the way to the lower part of the lungs. In the case of silica dust, the build-up of these particles over 10–30 years causes fluid build-up and scar tissue in the lungs, cutting down the ability to breathe. This is called silicosis.

In the past six years, we have dramatically reduced our exposures by adopting wet drilling practices and continuing our focus on reducing potential exposure to silica dust. Further work to identify and examine causes of dust generation and measures to educate and raise awareness have continued to reduce our potential exposures.

An example of this work was a real time study into dust monitoring, where we aimed to identify likely causes of dust generation and how we could apply further controls. A combination of dust monitors worn by drillers and 'offsiders' and video recording to pinpoint the activities during a monitored 'spike', helped to identify the source of dust, the timing, how far the dust spread and who was affected.

The study showed specific activities, besides drilling, that generated dust and could result in potential exposure to silica. As a result, we provided further education to raise awareness about activities that generate dust and how to minimise potential exposure and increased the requirement for P2 dust masks as an interim measure until we can further reduce exposures to an acceptable level.

Change to diesel exhaust limit at Olympic Dam

Prolonged exposure to DPM from diesel engine exhaust can lead to short-term and long-term health impacts and recent health studies suggested that there are health risks from diesel exhaust at lower levels than indicated by previous research. In response, we are taking a precautionary approach by reducing our occupational exposure limit from 0.1 mg/m³ to the lowest level technically feasible. This work has been initiated voluntarily by BHP Billiton and applies across all of our operations.

At our Olympic Dam operations, the changes include a requirement for personnel to wear respiratory protective equipment (RPE or dust masks) in designated areas of underground mines. Further activities to reduce diesel exhaust exposure include:

- using high-quality, low-sulphur diesel fuel;
- exploring improved engine design and exhaust treatment;
- replacing older diesel equipment with new technologies;
- replacing open cabin machinery and vehicles with enclosed cabin equipment with fitted air filtration;
- measuring cabin air pressure to ensure the cabin continues to provide effective protection;
- installing diesel exhaust filtration devices to heavy underground machinery;
- verifying the effectiveness of exhaust treatment by measuring raw exhaust emissions;
- ventilating mine areas where diesel equipment is in use.

Acid mist control at our Copper operation in Chile

Electrowinning is the process used to recover metals from a liquid solution using an electric current. The electrowinning process generates acid mist, potentially exposing people working inside the tankhouse to a carcinogenic health risk. Our Escondida operation has significantly reduced a potential health risk for employees at the electrowinning tankhouse by:

- using a surfactant to minimise the generation of acid mist
- covering the liquid solution with balls to prevent mist escaping
- covering the liquid solution with hoods to capture any escaping mist and having an automatic washing system to ensure optimum hood performance is maintained
- using positive air pressure respirators for workers in the tank house.

The performance of the respirators was verified by testing acid mist levels inside and outside the respirator.

These controls have reduced exposures to less than a quarter of our occupational exposure limit for acid mist.

Mitigating harmful noise at our Shenzi production platform

In petroleum operations, many offshore workers face ambient noise levels that can potentially cause permanent hearing loss. Noise abatement strategies and personal protective equipment (PPE) are required and BHP Billiton uses site-specific design strategies to reduce noise below potentially harmful levels when combined with PPE. Our Shenzi platform in the Gulf of Mexico presents greater than average noise management challenges, making it a test bed for control strategies.

A current project successfully reduced the noise levels by 10 decibels, a significant achievement that, combined with PPE, safeguards our workers against potential hearing loss. (Note that the decibel scale is logarithmic, therefore a 10-point noise difference reflects a tenfold change.)

Working closely with the vendor, we developed a solution that involved multi-layer insulation around the noisy piping. A similar approach was taken to address the noise issue with the main generators, with our design team collaborating with a range of suppliers to create a cost-effective fit-for-purpose solution.
