# SPATE OF SX PLANT FIRES ROCKS COPPER INDUSTRY

For many years, copper solvent extraction plants have been relatively free from significant fires, attributed mainly to the use of organic diluents with a high flash point. However, the situation changed dramatically in 1999, when a major fire occurred at Western Mining's Olympic Dam operation in South Australia. Since then there have been three more major fires, including a second at Olympic Dam, plus one each at Phelps Dodge Morenci in Arizona and Mariquita Minera Maria in Mexico.

Static electricity is said to have been the most likely cause of the second Olympic Dam fire, and may also have played a part in the first. No public information is available as yet about the causes of the Morenci and Minera Maria fires. One of the major issues to emerge from the investigations so far is the ability of the diluent to ignite below the flash point under certain conditions, something not generally realized by the copper industry. This can occur when there is an aerosol caused by turbulence, which can occur at weirs, pipe discharges and agitators.

These fires will undoubtedly have a big impact on the view of insurance companies, who will inevitably demand design changes and more effective fire protection and fire fighting facilities, which could lead to significant cost increases. Possible changes could involve greater spacing between SX mixer-settler trains, avoidance of the commonly used high density polyethylene (especially for piping), reduction and control of static electricity, and more stringent safety and operating procedures. Meeting these criteria is feasible, though costly, for new projects. However it could be very difficult for some of the existing operations, especially those involving the extensive use of HDPE, which include many in Chile.

An SX plant fire can lead to significant cost for the replacement of equipment and expensive organic reagents. However, this could be dwarfed by the financial implications of loss of production during the rebuilding period, which can be lengthy. Undoubtedly, there will be increased emphasis in the future on providing duplicate, multi-train, facilities with sufficient separation to minimize the impact on production in the event of a fire. Fortunately, there have been no reports of loss of life in the fires to date. However, there obviously needs to be a thorough review of all aspects of personnel safety, emergency procedures and operating practices for both existing and future operations.

The topic will be addressed in depth by international experts during a special segment of the upcoming ALTA 2005 Copper Conference to be held in Perth during May 18-20$^{th}$ 2005. Papers will be presented on the lessons learned

from recent fires, designing and operating SX plants to alleviate the risk of fires, fire protection systems, the role of static electricity, utilization of oil and gas industry experience and practice, and the likely impact of the recent fires on the requirements of insurers.

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