COPPER SX FIRE SAFETY – NO GROUNDS FOR COMPLACENCY

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Following a spate of major fires in copper solvent extraction, the ALTA 2005 Copper Conference included a World Summit on SX Fire Protection. The papers were presented by international experts and remain an important source of information for the cause, protection and prevention of fires in SX plants.

The topic was addressed in depth and covered 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, utilisation of oil and gas industry experience and practice, and the likely impact of the recent fires on the requirements of insurers.

For many years, copper solvent extraction plants had 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 BHP's Olympic Dam Copper-Uranium operation in South Australia. This was followed by 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 was 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 information was made public about the causes of the Morenci and Minera Maria fires. One of the major issues to emerge from the investigations was the ability of the diluent to ignite below the flash point under certain conditions, something not generally realised 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 undoubtedly had a major impact on the view of insurance companies, leading to a need for design changes and more effective fire protection and firefighting facilities. These include 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, and a comprehensive fire protection review of the proposed plant design. Meeting these criteria is feasible, though costly, for new projects. However, it can be very difficult for existing operations, especially those involving the extensive use of HDPE.

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. An important consideration, especially for large plants, is the provision of duplicate, multi-train facilities with sufficient separation to minimise the impact on production in the event of a fire.

Although there has been a greater focus on fire protection in the design of SX plants since the 2005 World Summit, there is no grounds for complacency. For example, while there were no reports of loss of life in the fires discussed at the Summit, there needs to be a continuous emphasis on improving all aspects of personnel safety, emergency procedures and operating practices as well as on minimising the financial loss.

ALTA has now republished the proceedings of the SX Fire Protection World Summit Proceedings for the benefit of the industry, especially for newcomers who have entered the industry since 2005.

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For more information on Copper SX Fire Safety, attend the *Copper SX/EW Basic Principles and Detailed Plant Design Short Course* scheduled for 19 May 2019 in Perth, as part of the ALTA 2019 conference. The short course manual is available from ALTA Publications.

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