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Engineering-in sustainability through the application of SUSOP[®]

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ABSTRACT

There are considerable challenges in developing new resource projects that meet the ideals of sustainability. The high-level principles of corporate sustainability policies cannot be easily integrated into project management systems. In addition, existing systems do not readily deliver innovative solutions to address key sustainability issues, such as significantly reduced carbon emissions, minimal environmental impacts, and maintaining the societal 'licence to operate'.

SUSOP[®] (SUStainable OPerations) is an approach for the integration of sustainable development principles into the design and operation of industrial processes. Somewhat analogous to HAZOP (Hazard and Operability Studies), SUSOP[®] is a systematic and rigorous framework for identifying and evaluating sustainability opportunities and risks within the organising architecture of a sustainability framework.

This approach has been tested and enhanced through application to real case studies in the minerals industry. The results, both at the conceptual and pre-feasibility phases, have led to significant insights for identifying and evaluating options that enhance an operation's contribution to sustainability and its long-term business case.

This paper discusses the need for an approach such as SUSOP[®], presents the key outcomes from its development with particular reference to the case study learnings, and highlights the practical ways for incorporating sustainability into project management systems.

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Keywords: SUSOP[®]; Sustainable design; Sustainability; Resource processing

1. Introduction

Sustainable development (SD) is an important concept in the minerals industry for securing an ongoing licence to operate and improving environmental, economic and social performance. Many companies and organisations representing industry, such as the International Council on Mining and Metals (ICMM, 2003) and the Minerals Council of Australia (MCA, 2004), have adopted sustainability principles and policies for establishing commitment to resource development in a socially and environmentally responsible manner. Likewise, the Institution of Chemical Engineers has promoted the

development of processes that meet sustainable development aspirations and put forward its Sustainability Metrics (IChemE et al., 2003). Furthermore, a number of conceptual process engineering based approaches have attempted to integrate aspects of sustainability into design (Azapagic et al., 2006; Stewart et al., 2003) but these have not been adopted as common practice (as discussed in the following section).

However, considerable challenges exist in applying high-level sustainability principles for practicing engineers developing a new resource project or running the day-to-day activities at an operational site. Instead of the sustainability principles being inherently integrated into corporate systems,

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