

Current Water Quality Conditions at the Historic Rum Jungle Mine Site, Northern Australia

Paul R. Ferguson¹, Christoph Wels², and Mike Fawcett³

¹Robertson GeoConsultants Inc., Vancouver BC, CANADA pferguson@rgc.ca

²Robertson GeoConsultants Inc., Vancouver BC, CANADA cwels@rgc.ca

³NT Department of Resources, Darwin NT, AUSTRALIA Mike.Fawcett@nt.gov.au

Abstract

Rum Jungle was one of Australia's first major uranium mines and produced approximately 3,500 tonnes of uranium oxide and 20,000 tonnes of copper in the 1950s and 1960s. After mine closure, acid rock drainage and the mobilization of metals in mine waste led to significant impacts on local groundwater and the nearby East Branch of the Finnis River. Some attempts were made to rehabilitate the site in the 1970s and 1980s but water quality conditions have deteriorated over the last 30 years.

A new rehabilitation plan for the site is currently being developed by the Mining Performance Division of the Northern Territory Department of Resources and a comprehensive site investigation is underway to assist in its development. One aspect of this site investigation is the identification of major contaminant sources to receiving waters and the characterization of current groundwater and surface water quality conditions prior to further rehabilitation. This paper summarizes this aspect of the site investigation and thereby provides an overview of our current understanding of the extent of ARD impact at the site.

Key Words: tailings, waste rock, acid rock drainage, groundwater quality, mine rehabilitation, Australia

Study Area

Location & Climate

The historic Rum Jungle Mine Site is located in Australia's Northern Territory (NT) about 105 km by road south of Darwin near the township of Batchelor. Local climate is considered tropical/monsoonal with 1500 to 2500 mm of annual rainfall and a distinct wet season that lasts from November to April. 90% or more of annual rainfall occurs during that period and no sustained rainfall is observed from May to October.

Mean maximum temperatures at the site typically range from 31°C in July to 37°C in October and savannah woodlands (predominantly *Eucalyptus* trees and various grass species) surround the mine site (Taylor *et al.* 2003).

Local Geology

The study area is located in the Rum Jungle mineral field of northern Australia (McCready *et al.* 2004). Specifically, the Rum Jungle Mine Site is situated in a triangular area of the mineral field that is bounded by the Giant's Reef Fault to the south and by east-trending ridges of the Crater Formation to the north. This triangular area is known as The Embayment and it lies on the shallow-dipping limb of a northeast-trending, southwest plunging asymmetric syncline that has been cut by northerly-dipping faults.

The geology of site is comprised of granites of the Rum Jungle Complex and meta-sedimentary rocks of the Mount Partridge Group (Figure 1). Note that rocks of the entire Mount Partridge Group have been folded, faulted and metamorphosed to sub-greenschist facies but the original stratigraphic succession has been preserved. Brittle failure associated with deformation has produced a number of faults that follow the northeast-southwest structural trends of the Rum Jungle Mine Site.

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