

## **PROPOSED BACTERIAL HEAP LEACHING OF ORE SORTER PRODUCTS AT ANAX METALS' INNOVATIVE WHIM CREEK PROJECT**

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### **ABSTRACT**

Anax Metals Limited ("Anax") is planning to re-commence mining and processing operations at the historic Whim Creek mining centre located 120 km southwest of Port Hedland, with a vision to developing a strategic polymetallic ore processing hub in the Pilbara.

The Whim Creek Project is a joint venture between Anax (80%) and Develop Global Limited (20%). Oxide ore was mined from Whim Creek and Mons Cupri volcanic-hosted massive sulphide (VMS) deposits by Straits Resources Limited (now Aeris Resources Ltd) in the mid-2000's and processed through a heap leach and SX/EW plant to produce around 15,000 tpa of copper cathode. Much of the heap leach infrastructure remains.

Anax acquired its interest in the Project in late 2020. In April 2023 a Definitive Feasibility Study ("DFS") to produce 10,000 to 12,000t of copper equivalent metal per year from sulphide ore was completed. The Whim Creek DFS flowsheet to treat copper-zinc-lead sulphide ores with significant precious metals credits is innovative, incorporating two stages of sensor-based ore sorting prior to further metallurgical processing. The first stage primary ore sorters will upgrade the ROM ore into higher grade pre-concentrates which will then be processed in a new purpose built copper-zinc-lead concentrator to produce saleable sulphide concentrates.

The rejects from the Primary ore sorters will be further treated in a secondary ore sorting circuit to produce a 'middlings' pre-concentrate and barren rejects that potentially can be used as commercial aggregates. It is intended to treat the middlings pre-concentrates in the existing heap leach circuit (after refurbishment) to produce copper metal (from SX-EW) and a separate zinc sulphate by-product stream. The Whim Creek copper mineralisation is primarily chalcopyrite and therefore Anax believes that the proposed heap leach operation will need to incorporate bacterial leaching in order to achieve satisfactory copper recoveries.

This paper describes the proposed innovative pre-concentration circuit, the bacterial heap leach test work undertaken by Anax using ore sorter middlings pre-concentrates generated in ore sorting test work, as well as discussing the refurbishment requirements and circuit modifications likely to be required for a re-start of the existing heap leach and SX-EW infrastructure.

The bacterial leaching test work was conducted using native bacterial cultures extracted from remnant fluids in the Whim Creek pits. Column leaching test work has produced excellent results, as announced by Anax in June 2023<sup>1</sup>. The tests confirmed that bacterial column leaching test work delivered 79-80% copper extraction and over 90.

zinc extraction from the ore sorter middlings. Bioleaching test work is ongoing with larger column tests underway and optimisation of conditions to further improve both copper and zinc extraction. Meanwhile, Anax has progressed studies into the refurbishment of the heap leach and SX-EW infrastructure, the key elements of which are also described in this paper.

**Keywords:** *Whim Creek, bacterial heap leach, bioleaching, chalcopyrite ore.*

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<sup>1</sup> "Bioleaching Success to Boost Whim Creek Metal Production", Anax Metals Ltd, ASX release, 18 June 2023