



BASE METALS (FLOTATION)

Independent Metallurgical Operations Pty Ltd (IMO) has extensive experience in the development of process flowsheets for a wide range of sulphide base metals projects. Our team has significant expertise in the design and management of flotation testwork programs, project development and operation of flotation plants.

Our scope of services ranges from sample selection, ore characterisation and mineralogy, through to management of metallurgical testwork, process aspects of scoping and feasibility studies and client representation onto plant commissioning, ramp up and process plant optimisation.



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METALLURGY
Quality Metallurgical Testwork

PROJECT	CLIENT	OUR WORK
<p>Forrestania Nickel WA</p> <p>Spotted Quoll, WA</p>	Western Areas NL	<p><u>Forrestania Project:</u> Recruitment of all process plant and laboratory personnel. Services included plant commissioning, plant upgrade and contract plant operation over a two-year period.</p> <p><u>Spotted Quoll:</u> Metallurgical testwork program (flotation and ore sorting).</p>
T3 Project, Botswana	Sandfire Resources NL (former MOD Resources Ltd)	<p>Management of copper DFS testwork program including circuit optimisation and variability sample testing. Process plant design direct input including capital and operating costs.</p> <p>Study management of the scoping study including process engineering and management of other disciplines. Generation of bulk concentrates using pilot plant equipment.</p>
Kambalda Nickel Project, WA	Lunnon Metals	Client representation and testwork management of flotation testwork to test suitability to Kambalda Nickel Concentrator's (KNC) standard flotation test conditions.
Earaheedy Project, WA	Rumble Resources	Flowsheet development testwork (incl. flotation and ore sorting testwork) for Tonka zinc-lead-silver prospect.
Antapaccay Copper Project, Peru	Glencore Peru	Open circuit and locked cycle Cu optimisation testwork program onsite in Peru which improved both grade and recovery on a number of different (including oxide) ore bodies.

▶ Please contact us for more details on how we can provide you with assistance and support to your project.

www.indmetops.com.au

IMO Consulting & Operations

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BASE METALS (FLOTATION) continued (1)

PROJECT	CLIENT	OUR WORK
Lubalisi Project, Tanzania	Rift Energy	Metallurgical testwork (gravity concentration sighter test work, magnetic separation) on project's ore bearing nickel, cobalt, manganese and chromium.
Dugald River Zinc Project, QLD	MMG via Manildra Group	Assessment of the response of the Dugald River Project Ore in depressing carbonaceous minerals during flotation, utilising a range of Manildra supplied reagents such as dextrin, acid modified starch and native wheat starch activated using caustic soda.
Mt Isa, Queensland	Xstrata Copper	Technical support on strategic testwork programs. Project management and preparation of the metallurgical accounting program for the flotation circuit.
Confidential Project	Squadron Resources	Nickel concentrate refinery process review with the aim of generating a saleable nickel sulphate product.
West Musgrave Project, Western Australia	Cassini Resources	Gravity beneficiation testwork to upgrade low grade nickel ore.
Broken Hill Pb / Zn Mine, NSW	Perilya Ltd, (Formerly Zinc Corporation / NBHC)	Pb and Zn flotation plus oxide treatment circuits operation over a seven year period working as Plant Metallurgist at both circuits and Superintendent at the Retreatment Plant.
Century Zinc Mine, Queensland	New Century Resources Ltd	Zinc flotation circuit operating and commissioning. Circuit commissioning ramp up via hands on operation resulting in the circuit producing a saleable concentrate.
Song To and Boh Yai Silver-Lead-Zinc Mine, Thailand	Metal Tiger plc	Detailed analysis of the historical plant data, generating silver, lead and zinc grade and recovery regressions. Testwork program generation for both a bulk concentrate and separate lead and zinc concentrates from composites with varying silver, lead and zinc grades and mineralogy.

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PROJECT	CLIENT	OUR WORK
<p>Tawny Lead Zinc Project, Nigeria</p> <p>Imperial Project, Nigeria</p>	Symbol Mining	<p><u>Tawny Project:</u> Engineering Study, to assist client with sourcing equipment locally in country.</p> <p><u>Imperial Project:</u> Beneficiation Flowsheet Development Testwork assessing the hand sorting and gravity amenability of lead/zinc ore from the Project.</p>
Perrinvale Project, WA	Cobre Ltd	VHMS sighter testwork program, assessing the characteristics of the project's ore and its amenability to heap leach, ore sorting and flotation processing.
Confidential Project	Reore	Scoping study level mineral characterisation and testwork on Indonesian nickel/cobalt/scandium laterite ore.
<p>Gabanintha Project, WA</p> <p>Bryah Basin Manganese JV, WA</p>	Bryah Resources	<p>Amenability testwork (low intensity magnetic separation followed by sulphide flotation) to produce a saleable concentrate of sufficient sulphur, nickel and cobalt grade.</p> <p>Testwork management and conduction of ore sorting testwork to upgrade the manganese ore.</p>
Romang Is Polymetallic Project, Indonesia	Robust Resources	Testwork scoping, design and management of metallurgical testwork program for sulphide flotation producing separate lead and zinc concentrates.
Endeavour Mine, New South Wales	CBH Resources Ltd	Provision of technical expertise in plant optimisation and further operator training for Lead/Zinc flotation circuit.
Border Lead/Zinc Project, Namibia	Sabre Resources	Interpretation of metallurgical testwork data to develop a conceptual flowsheet. This included generating a block flow diagram and producing a preliminary design criteria.
Develin Creek Base Metals Project, Queensland	Zenith Minerals	Testwork management design for flotation and characterisation, of a copper, zinc, silver and gold deposit.

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BASE METALS (FLOTATION) continued (3)

PROJECT	CLIENT	OUR WORK
Lanfranchi Nickel Project, WA	Cherish Metals	Independent review of the development options of four nickel deposits to identify potential mining and processing strategies for exploitation of those nickel deposits.
Doolgunna Copper Project Western Australia	Sandfire Resources NL	Completion of the metallurgical component of the PFS and scoping studies. Delivered process flow diagrams, process design criteria and capital and operating costs.
Kroussou Project, Gabon	Apollo Minerals Ltd	Metallurgical testwork to develop a flotation process flowsheet for the processing of the lead-zinc ore.
Nova Ni-Au-Co Operation, Western Australia	Independence Group NL	Onsite process plant technical operations support. Process plant troubleshooting, project management, optimisation and reporting. DFS metallurgical testwork including parameter optimisation and bulk concentrate generation conducted at IMO sister business, Metallurgy Pty Ltd under Nova Project FS team management.
Block 4 and 5 Copper Projects, Oman	Savannah Resources plc	Completion of PFS level process engineering package including capital and operating cost estimate. Copper PFS testwork program management. Testwork flowsheet and circuit design to produce a saleable copper concentrate from a number of pits within the project. Generation of a high grade zinc concentrate from a copper flotation tails. Generation of saleable concentrates using pilot plant equipment.
Kou Sai Project, Cambodia	Geopacific Resources	Completion of PFS level Metallurgical testwork, providing inputs into a Capital and Operating Cost estimate at $\pm 35\%$ conducted by IMO.
Otjozondu Deposit, Namibia	Shaw River Manganese	Metallurgical data review, recommendations and testwork design and management.
Achmmach Project, Morocco	Kasbah Resources	Development of a flotation reagent scheme for fine tin flotation, including a gravity finish, resulting in a saleable tin concentrate.
Mt Angelo Copper / Zinc Project, Western Australia	Cazaly Resources Ltd	Scoping Study testwork management, generation of a high-grade zinc and saleable copper concentrates from two different composites.

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