

Process Engineering,
Design, Optimisation and
Commissioning

Mineral Sands

The beneficiation of Mineral Sands is a speciality of Dextrait Engineering Services. Our team has extensive experience in the dredging, upgrading, dewatering and processing of heavy mineral sands from early project development through to engineering design, commissioning and operations.

Dextraits' experience includes testwork programs, materials handling design, modular concentrator layout, mineral separation plant design, slimes management, infrastructure and feed preparation specification for various operations.

Mineral Sands Project Experience



Tronox Limited

Cooljarloo South Mine Projects – Western Australia

- Cooljarloo South Mine Expansion Pre-Feasibility Study (PFS) and Definitive Feasibility Study (DFS) including upgrades to two mining dredges, feed preparation plant and floating concentrator. The recommendations from the study were successfully executed and the target plant throughput was exceeded.
- Cooljarloo West Options Study, Engineering and Design for the floating relocation of dredges, feed preparation plant and concentrator.
- Cooljarloo West PFS.
- South Mine Concentrator thickener scoping study.
- Moveable concentrator desktop study.
- Operational project engineering support.



Tiwest JV

Cooljarloo Projects – Western Australia

- Detailed Design and Construction of 500 tph Gravity Concentrator.
- Relocation of North Mine Concentrator PFS.
- Mining Dredge Upgrade Project.
- Cooljarloo tails pumping project.

The beneficiation of Industrial Minerals is a strength of Dextrait Engineering Services. Our team has extensive experience in the processing of heavy mineral sands, solar salt and industrial minerals from early project development through to engineering design, commissioning and operations.

Industrial Minerals Project Experience

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Three Springs Talc Plant Replacement Project – W.A.

- Solaris Salt Pty Ltd**

Solaris Solar Salt Project – W.A.

- Pre-Fesibility Study services, cost revalidation, scheduling, presentations and reporting.
- Preliminary process simulation and equipment list development.

North Shore Washplant Upgrade Project – W.A.

- JV between VDM and ProMet engineers
- Intelligent Piping and Instrumentation Diagrams
- Software Programming and development
- Piping, valve and instrument datasheets

Iron Ore

Iron Ore (Hematite and Magnetite) processing plant design is a speciality of Dextrait Engineering Services. Our team has extensive experience in Iron Ore covering early project development through to process plant design and commissioning. Dextrait's experience includes test work program development and management, flowsheet development, concentrator design, filtration plant design, concentrate storage, handling and ship loading.

Iron Ore Project Experience



Grange Resources

Southdown Magnetite Project – Western Australia

- 32 million tonnes per year of feed producing 7.2 million tonnes per year of magnetite.
- Pilot scale concentrate and pellet test work program development and management.
- Pellet plant order of magnitude study.
- Albany Port - order of magnitude study for concentrate filtration, storage, handling and shiploading.
- Balance of plant engineering and design.
- Project services, cost revalidation, scheduling, presentations and reporting.
- Water study.

Grange Resources

Filtration Study – Tasmania

- Port Latta concentrate filtration and storage study.
- Pellet Plant relocation study.
- Offshore chute replacement and upgrade study.

Gladiator Resources

Zapucay Project – Uruguay

- Concentrate test work program development, management and flow sheet development.
- Process options study.
- Pig iron load out study.
- Concentrator design, capital cost estimate.

Iron Clad Mining

Wilcherry Hill Project – South Australia

- Scoping study engineering, design and capital cost estimate.
- Preliminary design of dry magnetite separation plant.

Iron Ore

Iron Ore Project Experience



Xstrata PLC

Ernest Henry Mine Queensland

- Peer review of magnetite concentrator design.

Gindalbie Metals

Karara Magnetite Project – Western Australia

- Test work program development, management and flow sheet development.
- Process options study.
- Process engineering, concentrator FEED.

Mungada Ridge Hematite Project – Western Australia

- Test work program development, management and flow sheet development.
- Process options study.
- Process engineering, concentrator FEED.

Port Hedland Port Authority Western Australia

- Engineering support for ship loader and sample station design.
- Utah Point berth multiuser facility WA – conceptual design studies.

BHPB Western Australia

Newman JV Beneficiation Plant Upgrade Study

Centrex Metals

Wilgerup Iron Ore Project – South Australia

- Flow sheet development.
- Process options study.

Fortescue Metals Group

Kings Valley Desands Plant

- Process review and options study.
- Flowsheet development, Capex and Opex.
- Gladiator Resources Limited

Papagayo Deposit Project Option Studies – Uruguay

- Review and reporting of historic testwork and feasibility studies.
- Preliminary process simulation and equipment list development.
- Testwork program development, management and reporting.
- Equipment specification.
- Plant arrangement drawings.
- Material takeoff and estimate development.
- Opex and Capex estimates.

Base Metals Experience

Base Metals (Copper, Nickel, Lead and Zinc) processing plant optimisation and design is a familiar commodity to Dextrait Engineering. Our team has extensive experience Nickel, Lead, Zinc and Copper covering early project development through to process plant design and commissioning. Dextraits' experience includes test work program development and management, flowsheet development, concentrator design, plant optimisation, concentrate storage and materials handling.

Base Metals Project Experience



CBH Resources

Endeavor Mine near Cobar – New South Wales

- Paste Plant performance review.
- Tailings reclamation and screening review.
- Tailings filtration study.

Centaur Nickel Pty Ltd

Cawse Nickel Operation – Western Australia

- Plant Operations.
- Metallurgical support .

McArthur River Mining

Heavy Medium Plant Project – Northern Territory

- Full EPCM Services.
- Commissioning and operator training.
- Preparation of training and operation manuals.
- Completion of as-built P&IDs, equipment and instrument lists.

Phase 3 Upgrade – Northern Territory

- Full EPCM Services.
- Commissioning and operator training.
- Preparation of training and operation manuals.
- Completion of as-built P&IDs, equipment and instrument lists.

OM Manganese Limited

Bootu Creek Manganese Project – Northern Territory

- Design, procurement, construction management.

Mt Isa Mining

Concentrator Relocation and Crushing Plant

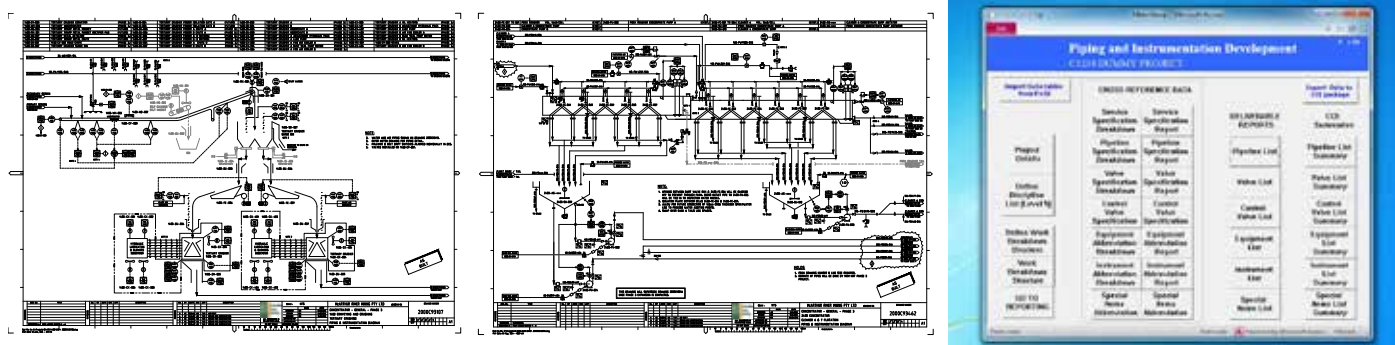
- Scoping study, process flow diagrams, general arrangement drawings and order of magnitude estimates for the new Mt Isa zinc crushing plant, heavy medium plant and concentrator.

Balamara Resources

- Peelwood North Metallurgical Testwork program.

Smart Piping and Instrumentation Diagrams

Dextrait offers the design, drafting and generation of attributable Piping and Instrumentation Diagrams P&IDs that can generate engineering and procurement lists such as equipment, line, valve, special items, instrument and other attributable item lists directly from the diagram. Individual Valve and Instrument datasheets can also be created and updated from the smart database



Rio Tinto Minerals / Dampier Salt Limited North Shore Washplant Upgrade Project with VDM and ProMet Engineers

- Developed Smart Piping and Instrumentation Diagrams P&IDs for the project.
- Provided software programming and database development services.
- Delivered piping, valve and instrument datasheets.

McArthur River Mining Heavy Medium Plant Project

- Provided software programming and database development services.
- Delivered and maintained:
- Piping and Special Items lists;
- Valve and instrument lists and datasheets;
- Tie In lists; and
- Equipment Lists.

McArthur River Mining Phase 3 Upgrade Project

- Provided database management services.
- Delivered and maintained:
- Piping and Special Items lists;
- Valve and instrument lists and datasheets;
- Tie In lists; and
- Equipment Lists.

Dextrait can provide a suite of services from studies to commissioning and handover to ensure an optimal solution for your project.

Metallurgical Testwork

Mike Kevan and the team at Dextrait Engineering Services combine extensive metallurgical engineering, design and construction industry experience to provide a structured approach to Metallurgical Testwork.



The engineers at Dextrait have provided testwork services on the following clients:

McArthur River Mining

- Bond work index tests.
- Rheology tests.
- Full EPCM Services.

Balamara Resources

- Bond work index tests.
- Sulphide flotation program.
- Thickening and filtration.

Gladiator Resources

- Bond work index tests.
- LIMS, WHIMS and SLON tests.
- Full magnetite concentrate test work program development, management reporting.

Grange Resources

- Designed, costed, managed and reported on the Southdown Magnetite Project Pilot Plant Project. Project value \$1.1M.
- Full magnetite concentrate test work program development, management reporting.
- Supervision of vendor testwork in the USA.

Luzenac/Rio Tinto Minerals

- Bond work index tests.
- Rheology tests.



The Metallurgical Testwork management services provided by Dextrait include:

- Metallurgical Testwork Program development, management, analysis and reporting.
- Sample selection and preparation in conjunction with exploration Geologists.
- Sample program development for existing operations.
- Equipment selection and process improvement.
- Pilot plant program development and bulk sample preparation.

Policies and Practices

Health and Safety

Dextrait is committed to ensuring all operations and activities are conducted in a manner that does not adversely affect the health and safety of any person. Dextrait's management is totally committed to ensuring a safe and healthy working environment for all personnel and contractors and strongly believe that all accidents are preventable.

Dextrait has an enviable Safety record. Dextrait has not recorded a single Lost Time or Medical Treatment incident since being founded. Our Corporate Health & Safety Policy is communicated to all employees and contractors upon commencement of employment. Dextrait Management is responsible for implementing this policy and for ensuring complete compliance with the required OH&S legislation, standards, procedures, training, audits and risk assessments.

All Dextrait employees and contractors know they are responsible and accountable for their own actions and for the health and safety of others in the workplace.

Our Commitment

Dextrait Engineering Services commits to:

- Ensuring that the way in which Dextrait conducts its operations does not put the health and safety of any person at risk;
- Providing safe, healthy and secure workplaces for employees, contractors and visitors;
- Providing appropriate health, safety and security information and training;
- Promoting the well-being of employees;
- Consulting with employees and contractors on workplace health, safety and security related issues;
- Achieving continuous improvement in health and safety by establishing and reviewing measurable targets and objectives, and reviewing the operation and performance of our health and safety initiatives;
- Complying with relevant health and safety legislation, and
- Providing adequate resources to achieve these objectives.

Quality

Through structured communication, Dextrait's management, employees and contractors ensure client needs and requirements are understood. We maintain an effective Quality Management System (QMS), which is regularly reviewed and updated to improve the effectiveness of service to clients.

Dextrait Quality Objectives:

- Ensure compliance with all relevant statutory, mandatory, environmental, occupational health and safety requirements.
- Provide project management services that ensure quality, cost-effectiveness and timely delivery on every project.
- Provide quality, robust, fit-for-purpose and cost-effective engineering designs for clients.

All team members have individual responsibility for understanding and applying this Quality Policy in the performance of their tasks.

Company management is fully committed to Dextrait Quality Policy through active participation in quality improvement activities and leadership by example.

Environment

Through effective and responsible environmental management across all business, Dextrait is committed to minimising the environmental impact of its activities. It is our principal objective to create a culture and environment that ensures all natural environmental and community heritage risks are identified and mitigated through the provision of resources, processes, education and a demonstrated commitment to Environmental Policy.

All Dextrait employees and contractors have a responsibility to take reasonable care of the environment and to instigate remedial action where environmental risks are identified.

By adhering to these principals we will achieve our environmental objectives and ensure Dextrait, as a company, has made its contribution towards a better, greener planet.

Dextrait Engineering Services Expertise

Commodity Expertise

As a multi-displined engineering company, Dextrait has extensive experience in a diverse range of commodities and industry areas. The following commodities are highlighted to demonstrate areas of focus and expertise.

Specialist Expertise:

- Mineral Sands, Industrial Minerals and Iron Ore Plant Engineering & Design
- Process Review and Improvement Planning
- Brownfield Upgrade Engineering & Design
- Testwork Design, Management and Reporting

Metallurgical Expertise

Dextrait's Process Engineering Team is able to provide assistance and add value at the beginning of a project with metallurgical testwork program development and management.

Metallurgical Services:

- Evaluation and Validation of Prior Testwork
- Development and Management of Metallurgical Testwork Programs
- Interpretation and reporting of Testwork Results
- Development of Process Flowsheets and Mass Balance
- Process Design
- Determination of Mass Recovery Rates
- Process Simulation (LIMN/Bruno)
- Process Optimisation
- Commissioning Management and Assistance

Project Management

Our Project Managers have extensive experience and expertise in managing EPC and EPCM, Brownfield and Greenfield projects within Australia.

Project Services:

- Project Development
- Project Definition
- Project Management
- Project Execution
- Contract Negotiation and Management
- Client's Representative / Owner's Engineer
- Construction Management
- Cost Estimating, Cost Control and Scheduling
- Procurement, Expediting and Logistics

Engineering and Design

Dextrait offers detailed engineering and design covering all disciplines including process, mechanical, civil, structural, electrical instrumentation and control. Our team of engineers and designers have many years of experience in their respective fields and can provide design and engineering to the level of detail required to suit a particular study or project, from conceptual models through to fully detailed process plants.

Engineering & Design Services:

- Conceptual Engineering and Design
- P&ID Development
- Detailed Engineering and Design
- 3D Modelling, Basic Animation and Fly Throughs
- Equipment Selection
- Engineering Audits
- Plant Evaluation and Condition Reports
- Plant Upgrades
- Engineering Reviews
- Development and Management of Metallurgical Testwork Programs

Study Expertise

Dextrait understands the processes and challenges clients face when taking projects from Scoping Level through to Operating Plants. Through past involvement on various projects, our Management Team is highly experienced and confident at every step of the project cycle.

We have a complete understanding of metallurgy, mining, minerals processing, material handling and transportation (solids and liquids), port facilities and supporting infrastructure.

Study Services and accuracy:

- Order of Magnitude/ Scoping Studies $\pm 30\%$
- Pre-feasibility Studies $\pm 25\%$
- Definitive Feasibility Studies $\pm 15\%$
- Bankable Feasibility Studies $\pm 10\%$

Dextrait can provide a suite of services from studies to commissioning and handover to ensure an optimal solution for your project.

HAZOP, Safety and Risk Management

HAZOP (AS IEC 61882 compliant)

We conduct HAZOP (HAZard and OPerability) studies for clients including all aspects of preparation, facilitation, scribing (minute taking), report preparation and if requested, recommended action tracking and closeout.

Our HAZOPs are conducted in accordance with the guidance of AS IEC 61882. Typically we use our in-house excel based HAZOP templates record the HAZOP minutes and produce the reports. The use of commonly available software encourages collaboration and sharing of records following the reviews.

HAZID/ Technical Risk Assessments

We conduct HAZID (HAZard IDentification) studies for clients including all aspects of preparation, facilitation, scribing (minute taking), report preparation and if requested, recommended action tracking and closeout.

HAZIDs are typically focussed at the identification of hazards to health, safety and the environment that might arise from carrying out an activity. They typically include the steps from AS/NZS ISO 31000 of hazard identification and risk assessment.

SIL Studies/ Functional Safety

We provide a wide range of services related to "Functional Safety" as described in AS IEC 61511 (for Functional Safety in the Process Industries) and AS 62061 (for Machinery Safety). This includes Safety Integrity Level (SIL) studies to determine target SILs for Safety Functions (using both LOPA and Fault Tree methods), design of Safety Functions and Safety Instrumented Systems (SIS) including the instrumentation, programmable hardware and software logic, determination of achieved SIL and Proof Test Intervals, Factory and Site testing and commissioning of the Safety Instrumented System.

Dextrait understands the processes and challenges clients face when taking projects from Scoping Level through to Operating Plants. Through past involvement on various projects, our Management Team is highly experienced and understand the risks to be examined at each stage of the project cycle.

Process Safety Management

We provide consulting services in regards to "process safety management", including improvements on how organisations manage safety related to the nature of the chemical or other transformational production processes. We have provided advice on the management systems to systematically manage the hazards and risks of chemical processes.

Enterprise Risk Management

We conduct enterprise or business level risk assessments. These risk assessments are targeted at identifying organisational goals and aspirations and identifying and assessing the threats and opportunities related to these. These risk assessments conform to the general requirements of AS/NZS ISO 31000 ("Risk Management").

Typically these risk assessments have included meetings and facilitated workshops to allow participants familiar with an organisation to raise risk issues and discuss the risk controls that the organisation has to address these. We also have experience in the establishment of risk management systems that apply to an enterprise, organisation or some part of it. This includes establishment of procedures, policies, risk criteria, risk matrices and risk registers.

Project Risk Management

We conduct project risk assessments. This is similar in approach to the Enterprise/Business risk assessment in regards to process and deliverables – however the focus is on identification and risk assessment of threats and opportunities to the objectives of a project. Often this involves gaining the input and cooperation of multiple stakeholders in a project.

Occupational Health & Safety

We provide assistance to establish setup, improve, communicate or audit safety management systems. We are familiar with the requirements of AS 4801:2001 and how this standard can be made to work in a practical setting.



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