OREAS

Certified Reference Materials

WORDS FROM THE MD

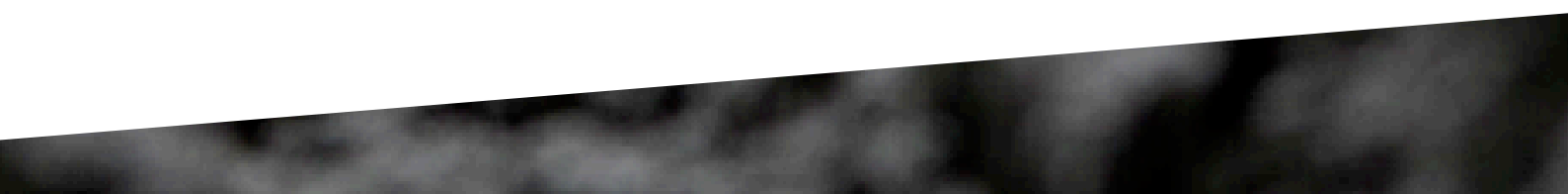
Dr Paul Hamlyn
Managing Director

I founded ORE Research & Exploration (ORE) in 1986 with the first Certified Reference Material (CRM) produced in 1988. The CRMs were prepared using a simple laboratory vibratory ring mill, sieving machine and cement mixer operating out of my brother-in-law's single-car garage. From these humble beginnings the company has grown into a major supplier to the international mining and analytical industries with a reputation second to none.

In 2012 we relocated for a sixth time to a 10,000 square meter site housing an impressive array of state-of-the-art preparation, packaging and ware-housing facilities.

Our range of OREAS CRMs are considered by industry experts across the spectrum from explorers to analysts to be of the highest calibre. The homogeneity of our gold CRMs has recently been demonstrated in an independent study by a leading geochemist to be best-in-class.

When ORE first began producing CRMs, their benefit and use in mining was understood by few in the industry. A difficult and protracted period of education ensued. Following the introduction of the JORC, NI 43-101 and SAMREC Codes it became mandatory for mining companies to provide quality assurance to their reported mineral resources and mineral reserve estimates. This could only be achieved through the extensive and responsible application of CRMs. Shortly thereafter their use became widespread throughout the industry and today all astute geologists appreciate the role CRMs play in adding value to and promoting productivity in their operations.



WHO WE ARE

ORE Research & Exploration Pty Ltd is an Australian company whose core business is the manufacture of OREAS and Custom Certified Reference Materials (CRMs). Since 1988 our products have been used for quality control in greenfields exploration, resource definition, near-mine exploration, grade control, metallurgical laboratories and commercial analytical laboratories.

We have the largest dedicated mining CRM production facility in the world, supplying over 1300 customers in 105 countries. The highly respected OREAS range is prepared from natural ore and rock materials and features over 170 off-the-shelf CRMs covering most major styles of mineralisation. ORE is ISO 9001 accredited and the supplier of choice for matrix-matched (custom) CRMs for over 170 advanced projects and mining operations worldwide.

Three geochemists with over 100 years' of combined experience are on staff to guide our customers in the preparation, certification, selection and application of CRMs. Our dedicated technical staff

are highly trained with many years of experience and attention to detail in all aspects of CRM preparation. Our customer service personnel are constantly receiving praise from our many loyal customers for their courteous and friendly manner and prompt dispatch of orders, generally within 24 hours of placement.

We have pioneered a number of technological advances that enable us to produce CRMs to a level of homogeneity unrivalled in the industry. As one of the longest established producers, we've forged a proud history of innovation with many industry firsts, including: guaranteed homogeneity on any ore type, low cost single-use unit packaging, inert gas packaging, SuperCRMs® (see below) and gold CRMs in single batch sizes of 5 tonnes.

In addition, a comprehensive range of R&D programs are currently in progress to consolidate our position at the forefront of CRM production technology. Our dedicated CRM facility has the following capabilities:

- Temperature and humidity controlled ovens for drying materials including reactive sulphides
- Large capacity rotary drier up to 2,000kg/hr
- Crushing and milling equipment with capacity of 80-150kg/hr
- Vibratory and rotary sieving machines
- 10 blending machines with capacities from 10 to 2400 litres for homogenisation of pulps
- 2 proprietary rotary splitters with capacity up to 20+ tonnes for homogenisation of rock chips
- Multiple fully-automated packaging lines (jars and single-use foil sachets) with nitrogen flushing (capacity of up to 50,000 sachets/day)
- Nitrogen-flushed vacuum packaging, small to large (200 litre) scale
- Warehousing capacity of over 1000 pallets

WHAT WE DO

We manufacture and stock a comprehensive range of over 160 tonnes of ready-to-use OREAS CRMs covering gold, platinum, silver, copper, nickel, iron, zinc, lead, uranium, rare earth elements, tin, tungsten, manganese, barren/lithogeochem, chip, and many more.

All OREAS CRMs are made from natural ores and geological materials and cover a broad range of mineralisation styles, e.g. epithermal, orogenic and Archean greenstone-hosted gold, porphyry and IOCG copper-gold-moly, epithermal silver-gold, polymetallic VMS, BHT and SEDEX silver-lead-zinc, etc. We also specialise in the preparation of matrix-matched (custom) CRMs from client-supplied materials.

Our latest product line, OREAS SuperCRMs®, enables control over a range of analytical methods for complete ICP-OES and ICP-MS element suites (up to 179 certified analytes) within a single CRM:

- 4-acid digestion (up to 49 elements)
- Aqua regia digestion (up to 44 elements)
- Fusion - borate and peroxide (up to 44 elements)
- Borate fusion XRF majors and traces (up to 22 elements)
- Infra-red combustion furnace (C and S), Loss On Ignition

This makes OREAS SuperCRMs® highly versatile and an essential tool for pathfinder and lithogeochemical applications.

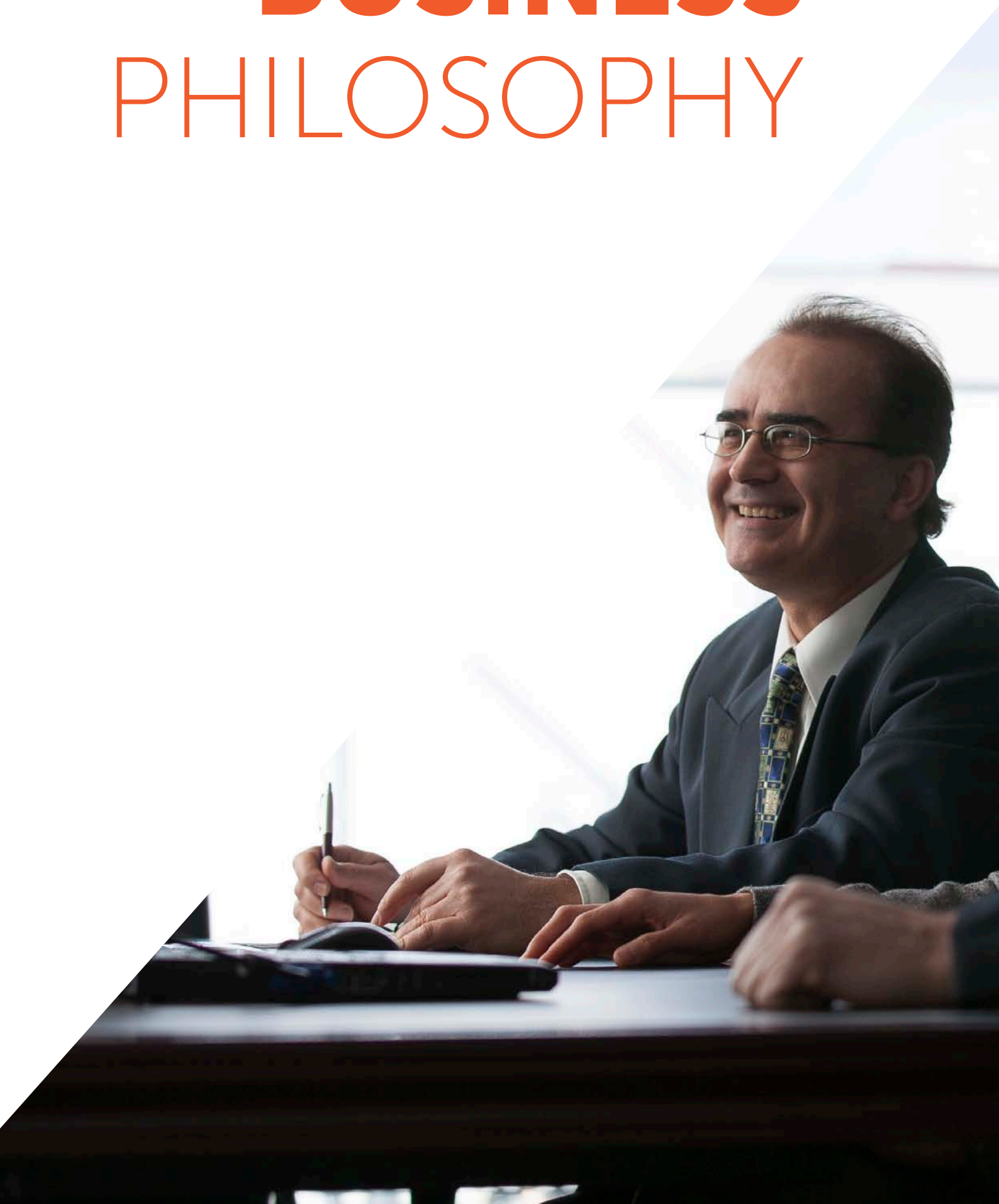
Portable XRF kits are also available covering eight thematic commodities and mineralisation styles or customers can design their own customised kit.

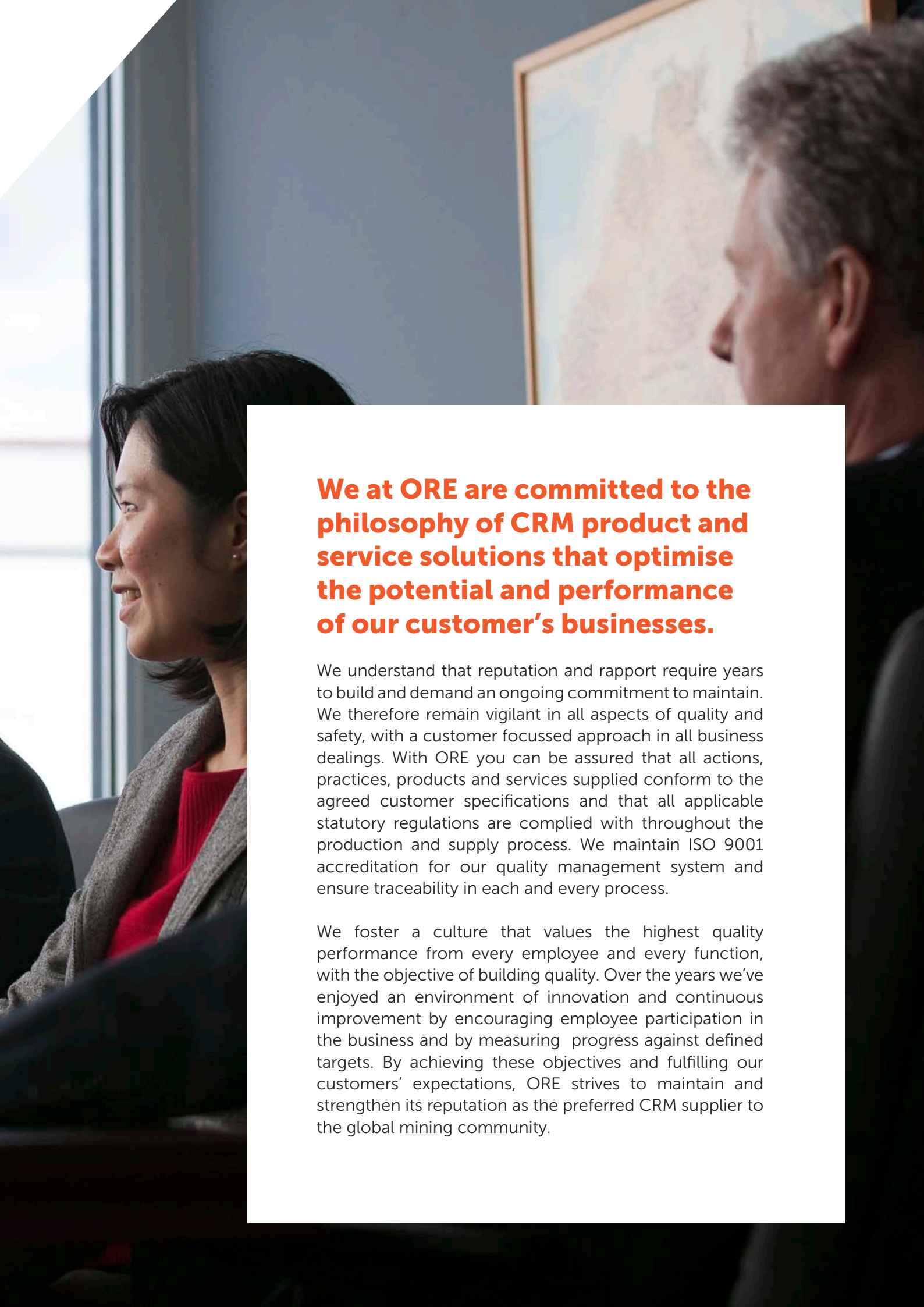
Every CRM is supported by a comprehensive Certificate of Analysis where data integrity is underpinned by a state of the art, CRM-specific LIMS. Our LIMS has been developed in-house and undergoes continual refinement to better suit customer requirements. Our certificates are supported by DataPacks in which all round robin raw results and summary statistics are tabulated in a user-friendly Excel format. This level of documentation provides unrivalled transparency in OREAS products.

The rigorous homogeneity test work documented in our Certificates of Analysis demonstrates that sampling errors are negligible, even in gold CRMs. For over 20 years we have been quantifying the sampling error at the 0.5 to 1.5g level in every gold CRM we produce using high precision neutron activation analysis and the reduced analytical subsample method. By validating homogeneity at this level, we can be confident that for a typical 30 to 50g fire assay charge all errors originate in the analytical process with no contribution from the CRM. Thus errors seen in a client's QC data can be confidently ascribed to laboratory measurement error, not sampling error of the CRM.

We can confidently claim to have the most homogeneous gold CRMs commercially available.

BUSINESS
PHILOSOPHY





We at ORE are committed to the philosophy of CRM product and service solutions that optimise the potential and performance of our customer's businesses.

We understand that reputation and rapport require years to build and demand an ongoing commitment to maintain. We therefore remain vigilant in all aspects of quality and safety, with a customer focussed approach in all business dealings. With ORE you can be assured that all actions, practices, products and services supplied conform to the agreed customer specifications and that all applicable statutory regulations are complied with throughout the production and supply process. We maintain ISO 9001 accreditation for our quality management system and ensure traceability in each and every process.

We foster a culture that values the highest quality performance from every employee and every function, with the objective of building quality. Over the years we've enjoyed an environment of innovation and continuous improvement by encouraging employee participation in the business and by measuring progress against defined targets. By achieving these objectives and fulfilling our customers' expectations, ORE strives to maintain and strengthen its reputation as the preferred CRM supplier to the global mining community.

WHAT OTHERS SAY

"BHP Newman Analytical Hub (NAH) have been using ORE custom made standards for both internal and external examination of NAH Lab process for ~5 years now. We are happy with your product as results have shown that your product is stable and reliable and can be used as a sufficient reference material for the purpose of monitoring NAH day to day process. We have also sent this material for testing at numerous external labs and their results also concur."

Andrew Johnson – Chemist, Newman Analytical Hub, BHP Billiton Iron Ore

"When Tasman began REE exploration in 2009, we quickly learnt that assay methods at the major labs were not as well established as those that we had applied in the past for base and precious metals. As an appropriate range standard wasn't available for the heavy REE's, we decided to produce our own standard with ORE Research & Exploration. With the advice of ORE's, we prepared two samples giving CRM's in a "head grade" and "cut-off grade" range, which have covered all of our analytical needs since. Working with ORE was very simple and provided the product we required with quick turnaround."

Mark Saxon – President, Tasman Metals

"As a worldwide dealer we really appreciate OREAS. OREAS' extremely fair prices, kind staff, quick shipping and excellent certificates have satisfied our wide range of private and public customers. We are now ordering quite regularly because of their ever-expanding offering and happy customers returning for more."

Beau Brammer – President, Brammer Standard

"We have been using ORE's off the shelf standards and matrix matched standard preparation service for 15 years. We submitted 80kg of pulp residues from a supergene gold prospect to be prepared as a standard. The grades of the individual pulp samples ranged from 0.01 to 20.5 g/t Au. Being from the supergene zone, where nuggets up to 5mm in diameter were known to occur in a soft clay matrix, coarse gold problems were considered a certainty rather than a probability. On completion of preparation the standard was tested for homogeneity by instrumental neutron activation analysis. Fifteen 0.5g subsamples considered representative of the entire batch were submitted for gold analysis and returned an impressive coefficient of variation of 1.63%. We were subsequently able to use this standard knowing that at a 30g fire assay charge weight we could confidently discount standard inhomogeneity as a source of error in our QA/QC program."

David Lawie PhD – Managing Director, REFLEX Geochemistry

"Having been a client of OREAS for many years, I can attest to the quality of their CRM's, as well as the prudent QAQC counsel their management provides. For geologists, engineers and metallurgists in the market for both accuracy and precision in batch control, across a wide range of elements, I'd strongly recommend OREAS' product-line."

Geoff Booth PhD – Director-Mining, PT (Sole) Company Ltd

"Operation of modern independent geochemical laboratory is impossible without use of reliable, stable and homogeneous certified reference materials. ORE standards perfectly meet these requirements and are made with great attention to details: standards subject to oxidation are packed in small units in protective atmosphere, certificates frequently provide data for total and partially recoverable concentrations e.g. by fusion and aqua regia leach. This is why we have been using ORE standards day after day since early 2000s. We also take part in round robins organised by ORE and this provides another level of independent quality assurance. Keep up your good work and looking forward to new quality standards!"

Andrey Tairov – Technical Manager, ALS Ireland (formerly OMAC Laboratories)

Being both participants in the certification round robin program and purchasers of standards, we find that some of the most suitable standards for complex mineralogies across the diverse range of local, national and international clients submitting samples can be sourced from Ore Research. Craig and the team have extensive experience in the industry and understanding in the generation, validation and reporting of data taking the client needs into account.

Andrew Gasiorowski – Laboratory Manager – Adelaide, Intertek Minerals

"I've worked with ORE twice in developing new assay standards for our projects. The team there was easy to work with as we navigated our way through the technicalities of analytical methods. They were very efficient and thorough with their prepping of the samples and the processing of the data afterwards. The whole process only took a few months and we were able to put the new reference material into our system right away. We were very happy with the service."

Lori Martin P.Geo MBA – formerly Geology Lead at Fraser Morgan, Glencore

"We are both a participant in the Ore Research reference material certification process as well as a purchaser of these materials for use in many of our Mineral testing labs across the globe. Ore Research offers an extensive supply of reference materials that are mineral appropriate, range suitable and methodology specific that add value to routine quality control regimes for data acceptance and method validation studies."

Valerie Kuch – Quality Systems Manager, SGS Canada, NAM Geochemistry

"I have recommended Ore Research to clients for over ten years. For projects that are destined for Feasibility Studies it is vital that a QA/QC protocol be instituted that will withstand the scrutiny of technical auditors and reviewers acting on behalf of financial institutions or potential joint venture partners. The documentation and quality of the customised standards from actual materials produced by Ore Research have consistently provided a rigorous basis for the assessment of the assay results that potentially underpin substantial investments. The extremely low coefficients of variation achieved even on gold, mean that there is little scope for disputes between laboratories and clients regarding discrepancies between Recommended Values and those returned by the laboratory."

Phillip Hellman – Director, Hellman & Schofield

"We think OREAS is an innovative supplier who not only develops products for sale but is focused on improving its own processes and competitiveness in the market. We are very pleased to be working and cooperating with OREAS."

Melba Huerta Sepulveda – Quality Control Manager – Chile, Bureau Veritas

OUR CLIENTS

Our clients include all major international mining houses and the major commercial laboratory groups.

The foundation of our success is built on a strong record of industry-leading innovation, a high level of repeat business from our many loyal clients and word-of-mining community. In addition to our 1300 customers purchasing our ready to order OREAS range, our custom CRM clients include:

Abosso Gold Fields - Damang, Ghana
Akara - Chatree, Thailand
ALS Vancouver - Generic Base Metal CRMs
ALS Vancouver - Generic Gold CRM
Anglo American - Boyongan, Philippines
Anglo Base Metals - Black Mountain, South Africa
Anglo Base Metals - Gamsberg, South Africa
Anglo Base Metals - Jacare, Brazil
Anglo Base Metals - Lisheen, Ireland
Anglo Base Metals - Minera Loma De Niqel, Venezuela
Anglo Brazil - Barro Alto, Brazil
Anglo Brazil - Codemin, Brazil
Anglo Chile - Collahuasi, Chile
Anglo Chile - El Soldado, Chile
Anglo Chile - Los Bronces, Chile
Anglo Chile - Mantos Blancos, Chile
Anglo Chile - Mantoverde, Chile
Anglo Plats - Merensky Reef & UG2 , South Africa
Avannaa - Karrat, Greenland

Barrick - Jabal Sayid, Saudi Arabia
Barrick - North Mara, Tanzania
Barrick – Porgera, PNG
Barrick/Xstrata JV - Kabanga, Tanzania
BHPB - Escondida, Chile
BHPB - Olympic Dam, Australia
BHPB - Pujada Nickel Project, Philippines
BHPB - Ravensthorpe, Australia
BHPBIO - Brockman, Australia
BHPBIO - Marra Mamba, Australia
BHPBIO - Pilbara CID, Australia
BHPBIO - Various West African Projects
Bisha Mining – Bisha mine, Eritrea

China Molybdenum Co. Ltd – Northparkes, Australia
Compañía Minera Antamina – Antamina, Peru
CSIRO/Standards Australia - Various, Australia
CuDeco - Rocklands, Australia

Fortescue - Cloud Break, Australia

Gindalbie - Karara, Australia
Glencore Zinc – McArthur River, Australia
Gold Fields - Far South East, Philippines
Gold Road Resources – Gruyere, Australia
Goldfields - St Ives, Australia
G-Resources - Martabe, Indonesia

Hudbay Minerals - Flin Flon, Canada

Implats - Merensky & UG2 Reefs, South Africa
Indophil - Tampakan, Philippines
Ivanhoe - Cloncurry, Australia

Koniambo Nickel – Koniambo, New Caledonia
Kumba - Sishen Expansion Project, South Africa
Kumba - Sishen, South Africa
Kumba - Thabazimbi, South Africa
Kumba - Zandrivierspoort, South Africa

Lynas - Mount Weld, Australia

Mantra - Nyota, Tanzania
Marathon - Mount Gee, Australia
Masan Resources - Nui Phao, Vietnam
Minara - Murrin Murrin, Australia
Mincor - Miitel, Australia
Mincor - Wannaway, Australia
MMG - Golden Grove, Australia
MMG LXML - Sepon, Laos
MMG LXML - Sepon, Laos
Morobe Mining JV - Wafi-Golpu, PNG

New Market Gold - Stawell, Australia
Newcrest - Cadia, Australia
Newcrest - Cracow, Australia
Newcrest - Gosowong, Indonesia
Newcrest - Lihir, PNG
Newcrest - Namosi, Fiji
Newcrest - Ridgeway, Australia
Newcrest - Telfer, Australia
Newcrest Morobe JV – Wafi-Golpu Project, PNG
Newmont - Batu Hijau, Indonesia
Newmont - Boddington, Australia
Newmont - Mesel, Indonesia
Nickel West (BHPB) - Leinster, Australia
Nickel West (BHPB) - Mt Keith, Australia
Nickel West (BHPB) - West Musgrave, Australia

OTML - Ok Tedi, PNG
Oz Minerals - Carapateena, Australia
Oz Minerals - Prominent Hill, Australia

Pebble Partnership - Pebble Project, Alaska USA
PepinNini Minerals - Crocker Well Australia
Poseidon Nickel - Black Swan, Australia

Rio Tinto - Oyu Tolgoi, Mongolia
Rio Tinto Iron Ore - Brockman, Australia
Rio Tinto Iron Ore - Marra Mamba, Australia
Rio Tinto Iron Ore - Robe River, Australia
Rio Tinto Iron Ore - Yandicoogina CID, Australia

Saracen - Carosue Dam, Australia
Sons of Gwalia - Yilgarn Star, Australia
St Barbara - Tarmoola, Australia

Vale - Goro, New Caledonia
Vale - Sorowako, Indonesia
Vedanta Zinc- Skorpion, Namibia

Xstrata - Ernest Henry, Australia
Xstrata Copper - Frieda River Project, PNG
Xstrata Copper - Mount Isa, Australia
Xstrata Nickel - Cosmos, Australia
Xstrata Nickel - Sudbury, Canada
Xstrata Zinc - Mount Isa, Australia

GLOBAL SUPPLY CHAIN

Now more than ever, businesses must improve the efficiency of their supply chains in order to meet the ever increasing demands of customers. Over 27 years ORE has developed and refined it's warehousing and dispatch systems to ensure products reach customers safely, on time and cost effectively. Utilising a range of courier and freight services ORE supplies OREAS products to 1300 satisfied customers in over 105 countries with 90% of orders for stocked product being dispatched within 24 hours of order receipt.

ORE has three locations stocking OREAS products strategically positioned in Australia, North America and West Africa. In addition to our main warehouse and manufacturing facility in Australia, we have Analytical Solutions Ltd. servicing the North American region and X&M Suppliers servicing the West African region.

Australia and the rest of world
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Providing unrivalled confidence in your analytical data

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