RTi
REAL TIME
INSTRUMENTS

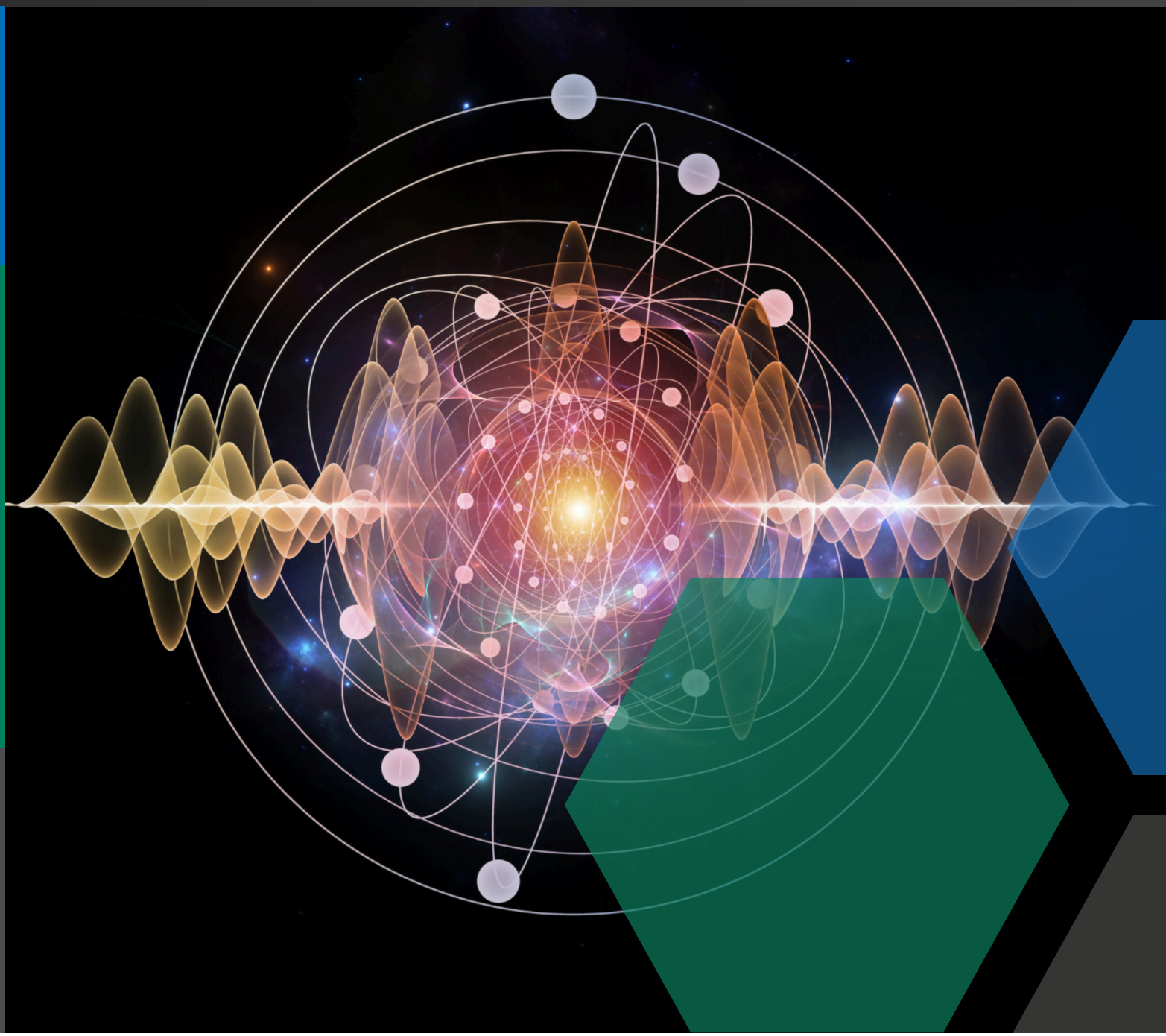
MINEXPO INTERNATIONAL®

2024 | SEPTEMBER 24-26, 2024
LAS VEGAS, NEVADA, USA

EXHIBITOR

RTi

REAL TIME
INSTRUMENTS



Elemental Analysis

24/7 Remote Support

Measure All Material

Real Analysis. **Real** Data. **Real** Time.

EMPOWERING INFORMED DECISIONS THAT SHAPE TOMORROW

DATA BASED DECISION MAKING
IN BULK MATERIAL ANALYSIS

At RTI, we've been delivering intelligent sensors to the mining, resource and energy sectors for over two decades.

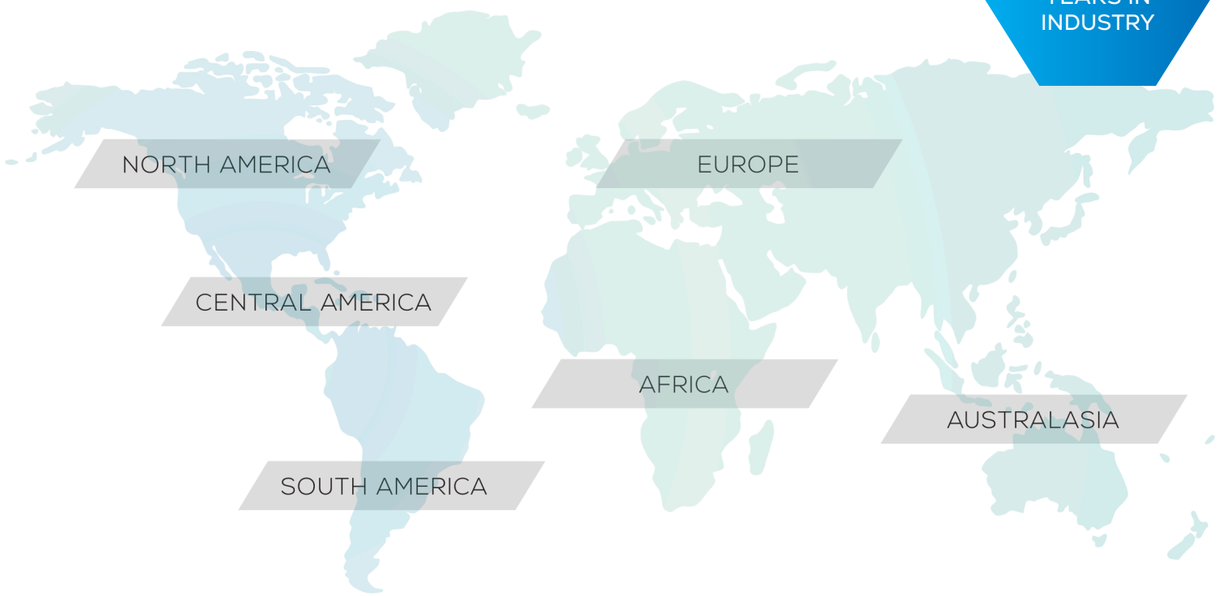
Our world-first sensor technology is purpose-built for mining. Today, we continue to operate at the forefront of mining in over 60 countries worldwide. We help our clients optimise their material value chain with custom scanning solutions, service and support for their material processing operations.

RTI's range of safe, smart and sustainable sensors precisely measure bulk material grade in real time to improve extraction processes, enhance recovery rates and reduce environmental impact.

60+
COUNTRIES

1200+
SENSORS DEPLOYED

20
YEARS IN INDUSTRY



RTI OFFICES

HQ – Mackay, Queensland
Regional office – Perth, WA
Regional office – Santiago, Chile

Our global network of trusted partners around the world deliver unmatched service and support, from on-site technical services to remote diagnostics and calibration

MAKING MINING SAFER,
MORE PRODUCTIVE AND SUSTAINABLE

INCREASE PROFITABILITY
By optimising material recovery, minimising waste and streamlining operations, gain substantial cost savings through reduced ore penalties and processing costs.

MAXIMISE PLANT AND OPERATIONAL EFFICIENCY
Precise elemental, moisture and ash analysis improves processing efficiency, optimises throughput and beneficiation, streamlines transport and handling and supports operators to make better decisions in real time.

IMPROVE QUALITY CONTROL
Consistently meet required specifications at every stage of material processing, from ROM monitoring and ore sorting to stockyard management, slurry analysis and load-out.

REACH SUSTAINABILITY TARGETS
Maximise material value chain and reach net-zero targets by lowering emissions, reducing waste and taking control of pollutants.

MAKE REAL-TIME DECISIONS
Respond immediately to changes in material characteristics and make real-time decisions to reach and exceed production targets.

BOOST SAFETY
Improve occupational and environmental safety by eliminating the need for radiation exclusion zones and enabling remote shut-off capabilities.

OPTIMISE PROCESSES, AT EVERY STAGE

LOAD-OUT

Reduce ore penalties by monitoring ore quality at train loadouts.

ROGUE ELEMENT DETECTION

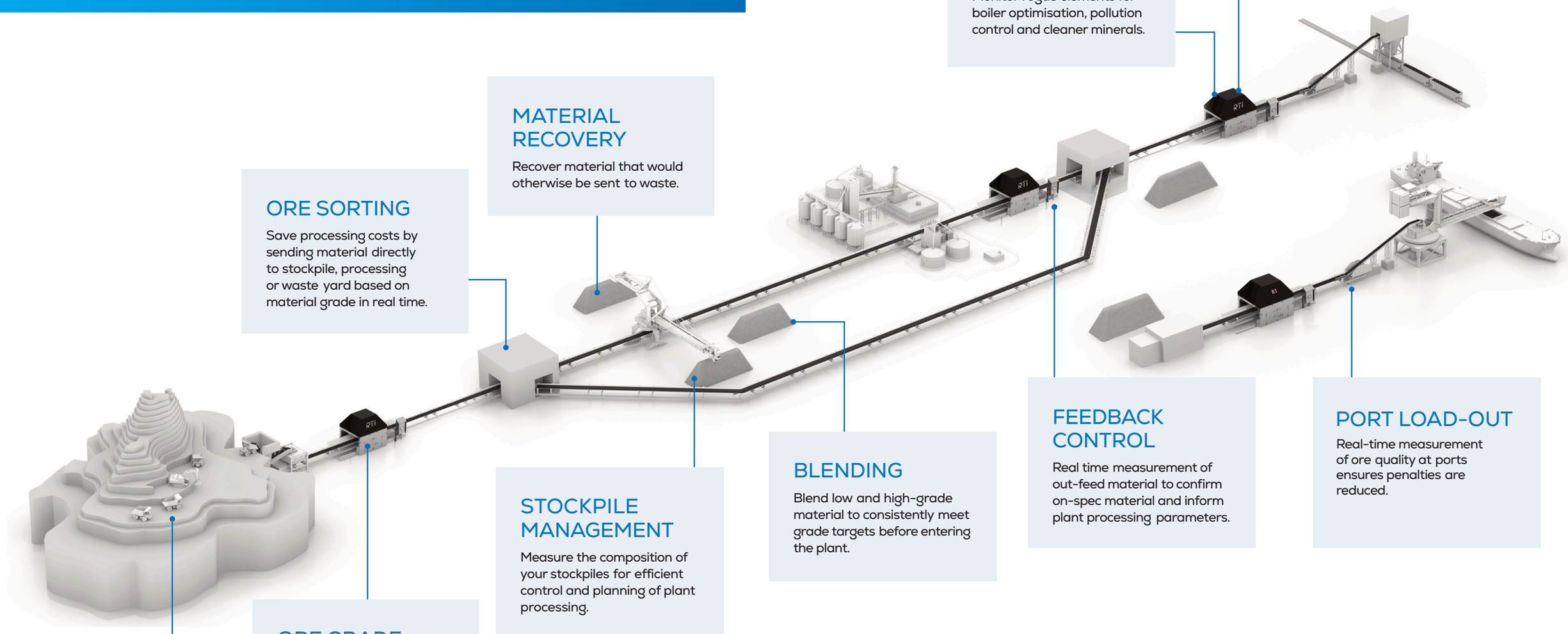
Monitor rogue elements for boiler optimisation, pollution control and cleaner minerals.

MATERIAL RECOVERY

Recover material that would otherwise be sent to waste.

ORE SORTING

Save processing costs by sending material directly to stockpile, processing or waste yard based on material grade in real time.



FEEDBACK CONTROL

Real time measurement of out-feed material to confirm on-spec material and inform plant processing parameters.

PORT LOAD-OUT

Real-time measurement of ore quality at ports ensures penalties are reduced.

BLENDING

Blend low and high-grade material to consistently meet grade targets before entering the plant.

STOCKPILE MANAGEMENT

Measure the composition of your stockpiles for efficient control and planning of plant processing.

ORE GRADE CONTROL

Ensure quality of raw materials meet the specification required at the ROM before processing.

MATERIAL PROVENANCE

Trace the origins of your material to improve sustainability, reduce environmental impact and ensure compliance with regulations.

This model is based on a surface coal mine operation. RTI supports mines of all commodities.

MADE FOR MINING AND MORE

- Coal
- Copper
- Nickel
- Iron Ore
- Gold
- Lithium

TAILORED SOLUTIONS

Every RTI solution starts with a holistic assessment of your material processing Operations.

We know that every site is different and pride ourselves on our ability to deliver the right solution for your needs, fully integrated with your onsite control systems.

ASSESS

Our experienced team assesses your operators to find the right solution for your operational challenge or concerns.

DESIGN

We customise our products to your specific analysis requirements and parameters.

INTEGRATE

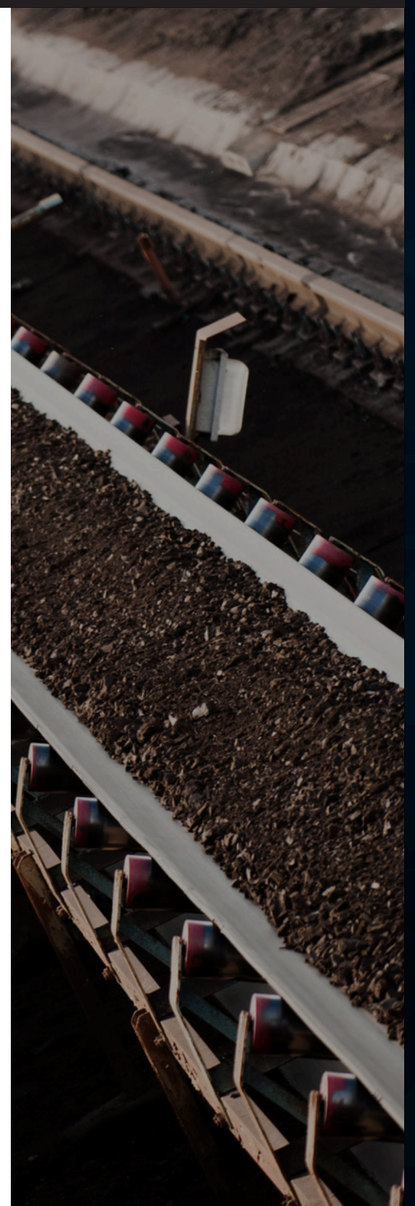
Our engineers work with you to seamlessly integrate your sensor with onsite control systems.

COMMISSION

Our qualified field service engineers provide technical assistance during installation, commissioning and calibration.

SUPPORT

24/7 remote or on-site service and support keeps your equipment operating in peak condition at all times.



SIX REASONS TO PARTNER WITH RTI

1
GLOBAL REACH

We are proud to serve a diverse range of industries globally, bringing our premium products and exceptional service to your operations.

2
PROVEN PERFORMANCE

Our solutions consistently deliver remarkable results, boosting operational efficiency, quality control and profitability for our clients.

3
TAILORED SOLUTIONS

We pride ourselves on our personalised and collaborative approach, helping to deliver customised solutions to meet your individual needs and challenges.

4
PIONEERING INNOVATION

Innovation is at the core of everything we do. We push the boundaries to deliver ground-breaking solutions to drive profitability, efficiency and sustainability.

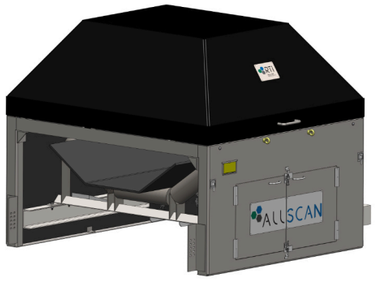
5
BEST IN CLASS TECHNOLOGY

Our world-leading suite of intelligent sensors are built for mining and provide real-time data, enabling informed decisions quickly and accurately.

6
UNRIVALLED MINING EXPERTISE

Born from mining, we harness world-class skills, knowledge and technical expertise across our team to deliver safe, sustainable and effective solutions.

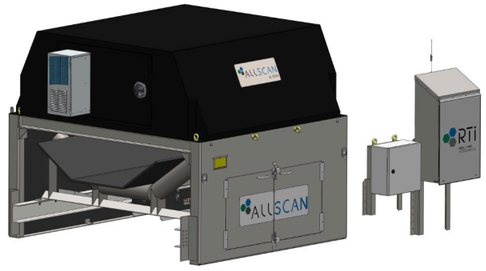
SAFER, SMARTER
TECHNOLOGY



ALLSCAN

The AllScan PGNAA cross belt elemental sensors continuously measures the concentration of individual chemical elements in mineral ores, ore mixes, sinter raw mix and concentrates in real-time.

- World-best analyser innovation
- Fast, intuitive calibration and installation
- Unrivalled accuracy and reliability
- Lowest cost of operation in the market
- Military spec hardware
- No belt weigher required



ALLSCAN NGEN

The AllScan n-Gen cross belt element sensors revolutionises PGNAA elemental analysis with its neutron generation technology, advanced spectra modelling and robust statistical analysis capabilities.

- Advanced long life neutron generator
- Fast, intuitive calibration and installation
- Unrivalled accuracy and reliability
- 10+ year lifespan
- Lowest cost of operation in the market
- Military spec hardware
- No belt weigher required

ALLSCAN SLURRY

The AllScan Slurry harnesses PGNAA elemental analysis technology to continously measure the concentration of individual chemical elements of interest in mineral slurries and concentrates.

- Fast, intuitive calibration and installation
- Superior analytical performance
- Military spec hardware
- Low maintenance

ASHSCAN

The AshScan provides the fastest and most accurate on-belt ash, moisture and calorific value analysis for bulk coal streams.

- Instantaneous, continuous ash measurement
- Automatic bed depth correction
- Intuitive interface
- Military spec hardware
- Seamless plant integration

GAMMASCAN

The GammaScan combines cutting-edge innovation and smart sensor technology to offer the worlds most advanced coal ash and moisture analyser available today.

- Real-time on-belt ash and moisture measurement
- Suitable for all coal types
- No radioactive sources used
- Military spec hardware
- Seamless plant integration

MOISTSCAN

MoistScan deploys the world's most advanced microwave measurement technology to analyse and measure moisture content of bulk materials in real-time at any point in your process.

- Sophisticated microwave technology
- Fast, intuitive calibration
- Hassle-free installation
- Military spec hardware
- Low maintence

TRUSTED
INDUSTRY PARTNER

COAL MINING

METALLURGICAL MINING

POWER GENERATION

GREEN TECHNOLOGIES AND BIOFUELS

FOOD PROCESSING

LIQUID STORAGE

SHIPPING

STEEL PRODUCTION

CEMENT

SUPPORTING
GLOBAL INDUSTRY LEADERS

BHP

MINERAL RESOURCES

RioTinto

WHITEHAVEN

AGNICO EAGLE

VALE

AngloAmerican

GLENCORE

FREEPORT McMoRan COPPER & GOLD

CODELCO

LOCATIONS

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Analysis Solutions

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MoistScan

Advanced Moisture Analysis

Moisture Analysis

24/7 Remote Support

Maximise Yield

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MICROWAVE TECHNOLOGY

Utilising sophisicated microwave technology, combined with powerful hardware and software, the MoistScan reports total moisture in real-time as the product is being conveyed.

Extensive application knowledge means the MoistScan sweeps a microwave frequency band that is highly responsive to moisture variation.

MoistScan is minimally affected by:

- Varying bed depth.
- Vertical or horizontal segregation.
- Varying particle size distribution.
- Temperature fluctuations.

WHY REAL TIME INSTRUMENTS?

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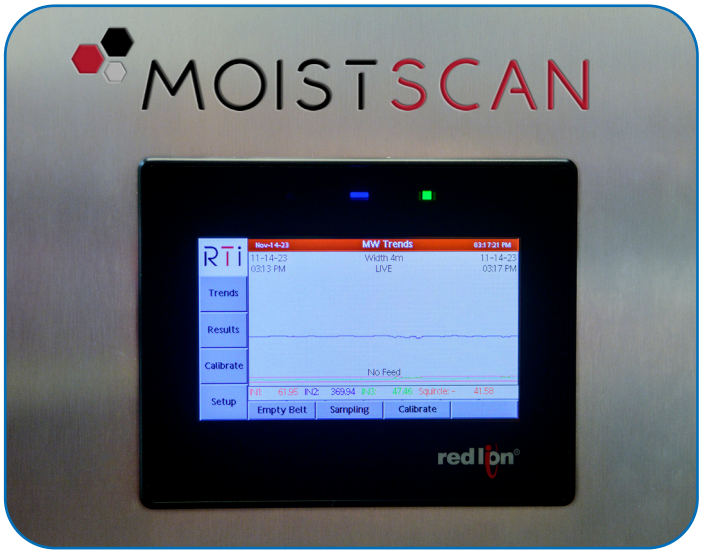

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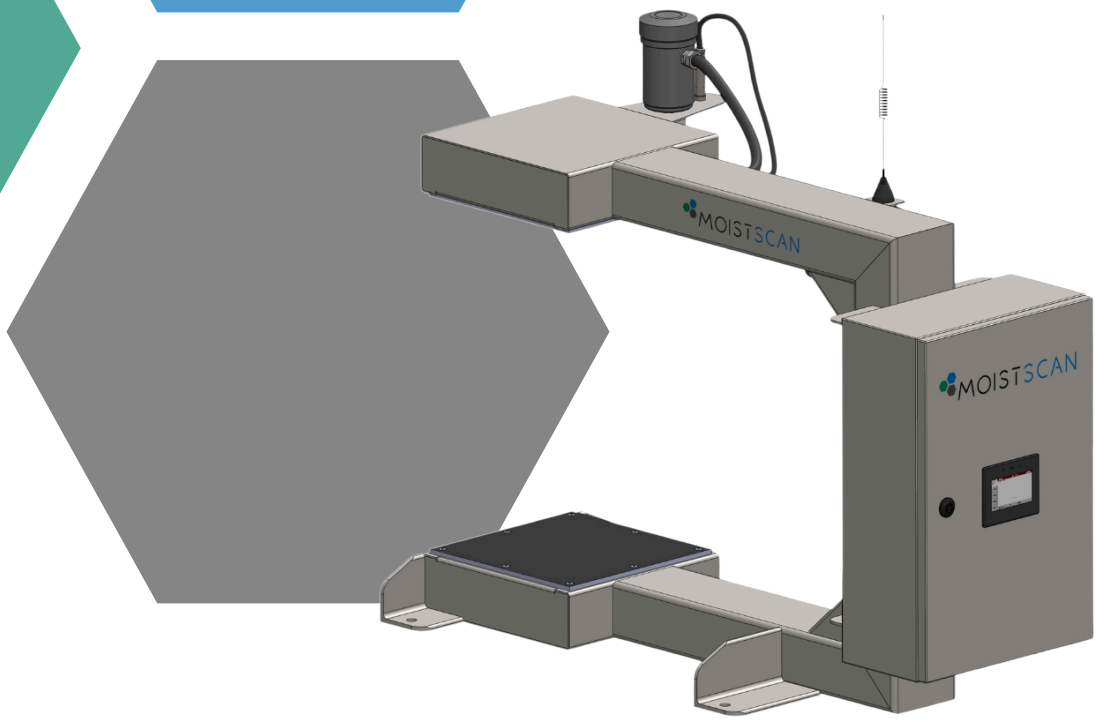
MOISTSCAN



MoistScan

Specifications

Measurement Technique	Variable Frequence Microwave Transmission (VFMT).
Parameter Measured	Total Moisture.
Measurement Range & Frequency	0-95% (application dependant), 50MHz frequency.
Wavelength	0.5MHz - 3.0MHz (application dependant, application optimised).
Instrument Precision	Typically 0.3% at 1 Standard deviation (application dependant).
Installation Options	Conveyor belt, pipe, vertical disk filter, horizontal belt filter, chute, bin, hopper, weigh-feeder, screw feeder, auger.
Environmental Conditions	Sensitive parts are sealed from the environment. The analyser is designed to operate in all outdoor weather conditions from -10 to +50 degrees Celsius in high or low humidity or precipitation.

Unrivalled Accuracy and Reliability

The MoistScan tackles even the most difficult of applications. Our patented MoistScan dual measurement multi-frequency microwave generator measures attenuation and phase shift of the microwave signal, isolates noise and cancels it out, resulting in a measurement that correlates with moisture at an R^2 typically of 0.85 or greater.

Hassle-Free Installation

MoistScan is delivered fully assembled. No modifications are required to existing structures to enable installation.

Proven Performer On All Aplications

Our record speaks for itself. MoistScan® is the most utilised online microwave moisture analyser in the world today.

Chemicals

- Fertilisers
- Pharmaceuticals

Mineral Processing

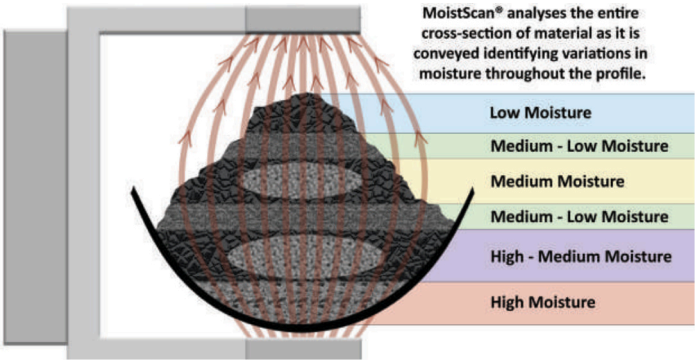
- Sinters
- Pellets
- Hydrates
- Concentrates

Mining

- Iron Ore
- Bauxite
- Nickel ore
- Gold ore
- Copper ore
- Diamond Ore
- Rare Earth
- Manganese
- Phosphates
- Coal

Building Products

- Sawn timber
- Fibreboard
- MDF
- Cement
- Clay
- Aggregate
- Sand
- Plasterboard



Green Technologies, Power Generation And Biofuels

- Bagasse
- Woodchip
- Sawdust
- Wood flake
- Hog fuel

Food

- Cheese
- Butter
- Snack foods
- Flour
- Starch
- Petfood
- Cereal
- Pasta
- Sugar Cane

Key measurements

- Instantaneous moisture
- Time-averaged moisture
- Tonnes-weighted moisture
- Dry tonnage

RTi REAL TIME INSTRUMENTS

LOCATIONS

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REAL TIME
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AllScan

On-line Elemental Analysis

Elemental Analysis

24/7 Remote Support

Measure All Material

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EMPOWERING INFORMED DECISIONS THAT SHAPE TOMORROW

MEASUREMENT IN MINING

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PGNAA TECHNOLOGY

Material composition is usually determined by laboratory sampling. This process is slow and expensive, failing to provide information in real-time. RTI focuses on measuring materials in real-time while they are still being processed.

The AllScan harnesses Prompt Gamma Neutron Activation Analysis (PGNAA) to measure the entire flow of material, penetrating bulk materials.

This method of analysis provides a number of benefits:

- Target a wide range of elements.
- Can be used in various setups (on-belt or in-pipe).
- Non-invasive, no contact with material.
- Measure entire cross section of material.

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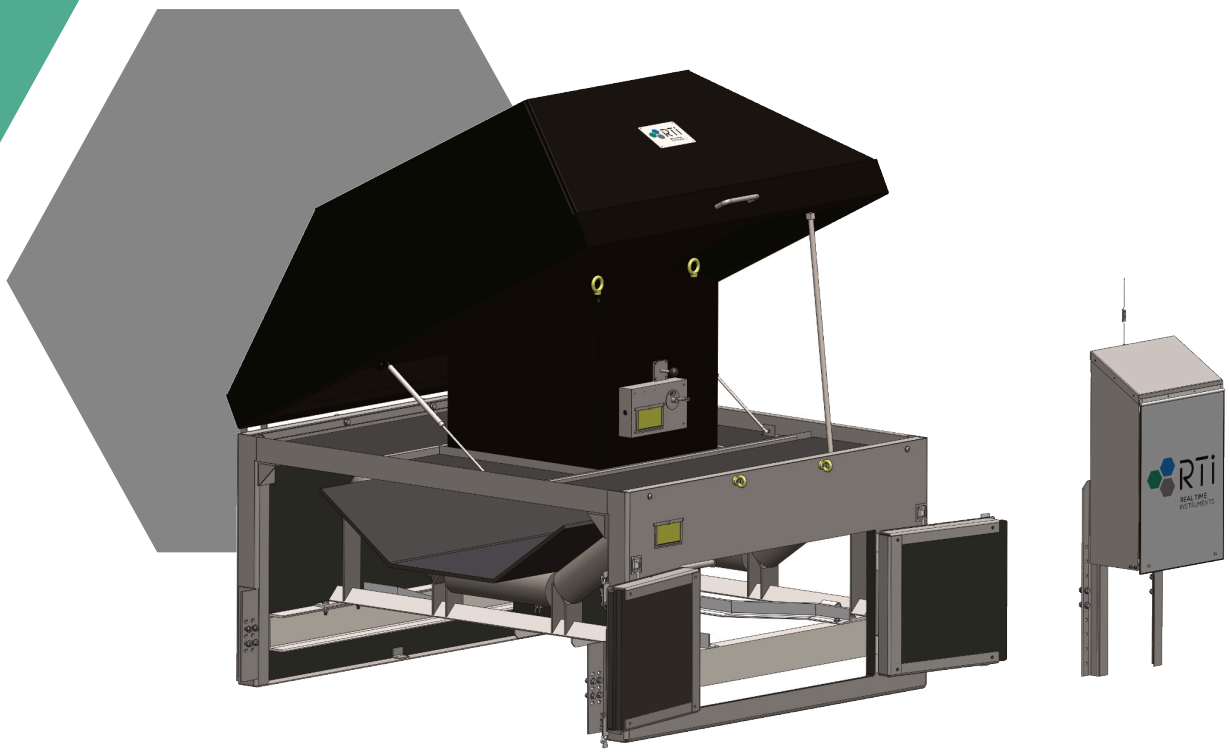
ALLSCAN



Specifications

Measurement Technique	Prompt Gamma Neutron Activation Analysis
Elements Measured	Fe, Al, Si, K, Ti, Ca and others. Total Ash calcuated using elements found in Ash.
Source	20 - 30µg Cf-252 (2.6 years half-life). Source is topped up with 10µg after 2.5 years and again after 5 years. Disposal occurs at 7.5 years.
Radiation Exposure	Typically below 5µSv/hour outside and around the exterior of the analyser. Average 1.3µSv/hour on or near the catwalk beside the analyser.
Belt Widths	750 - 2400mm (30 - 96 inch).
Environmental Conditions	Sensitive parts are sealed from the environment. The analyser is designed to operate in all outdoor weather conditions from -10 to +50 degrees Celsius in high or low humidity or precipitation.

Unrivalled Accuracy and Responsiveness

The AllScan n-Gen and AllScan incorporate two sophisicated algorithms - DuraG and DuraSum.

- DuraG - Overcome the usual adverse affects of chlorine on analytical performance.
- DuraSum - Eliminate the need for time-based averaging of data in order to obtain stable results.

Measuring Moisture

RTI analysers incorporate state of the art technology deriving moisture from elemental composition eliminating the need for a second analyser dedicated to moisture measurement.

Improving Safety

Smaller sources reduce dose rates and permit operators to safely stand next to or near the analyser, and work safely near the entrance or exit of the conveyor with minimal exposure.

I/O And Diagnostics

A browser based touch panel interface in the control cabinent allows for immediate access to all data and functions including trending displays.

A 4G interface is included so that data is uploaded automatically to a secure site, providing alternative ways to view and retreive data that is completely independent of site communication infrastructure.

Real Analysis. **Real** Data. **Real** Time.
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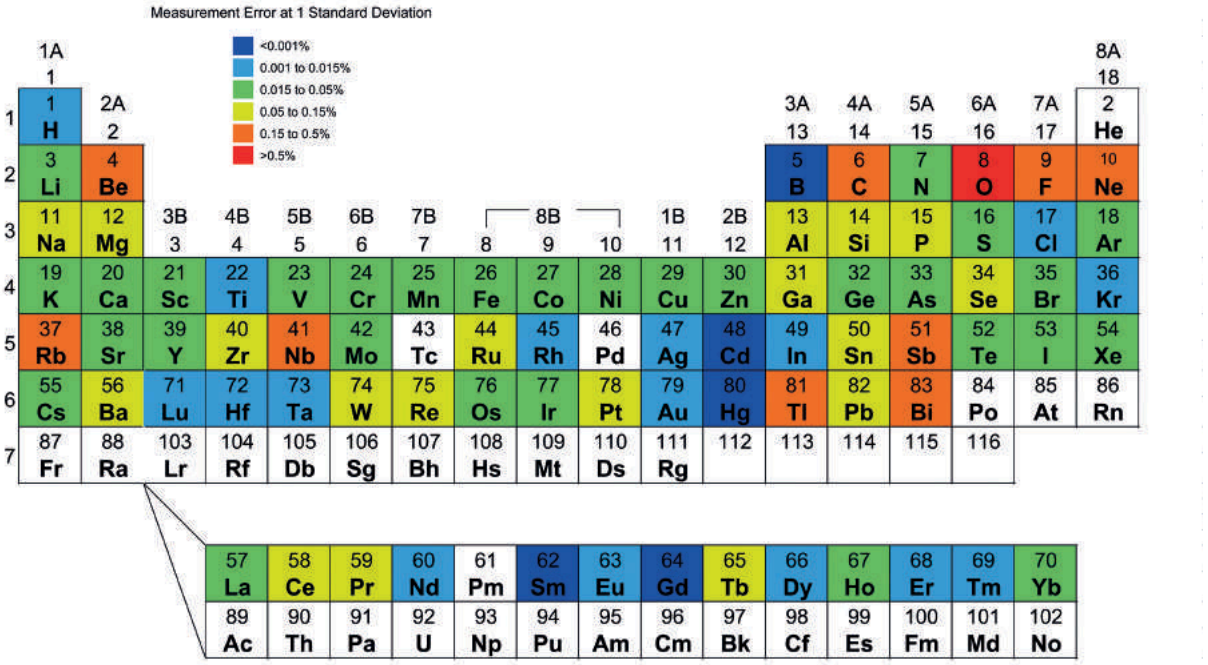
Simplifying Installation

Our elemental analysers are designed to mount on the support rails of a conveyor system, and the small size and weight of analyser greatly simplifies installation.

24/7 Remote Support

Our remote support team is available 24/7 and our analyers harness guided workflows for fast problem solving onsite for issues without RTI assistance.



Cross Belt Measurement

PGNAA analysis allows for measuring the entire profile of the material.

REAL TIME INSTRUMENTS

LOCATIONS

North America | South America | Oceania

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REAL TIME
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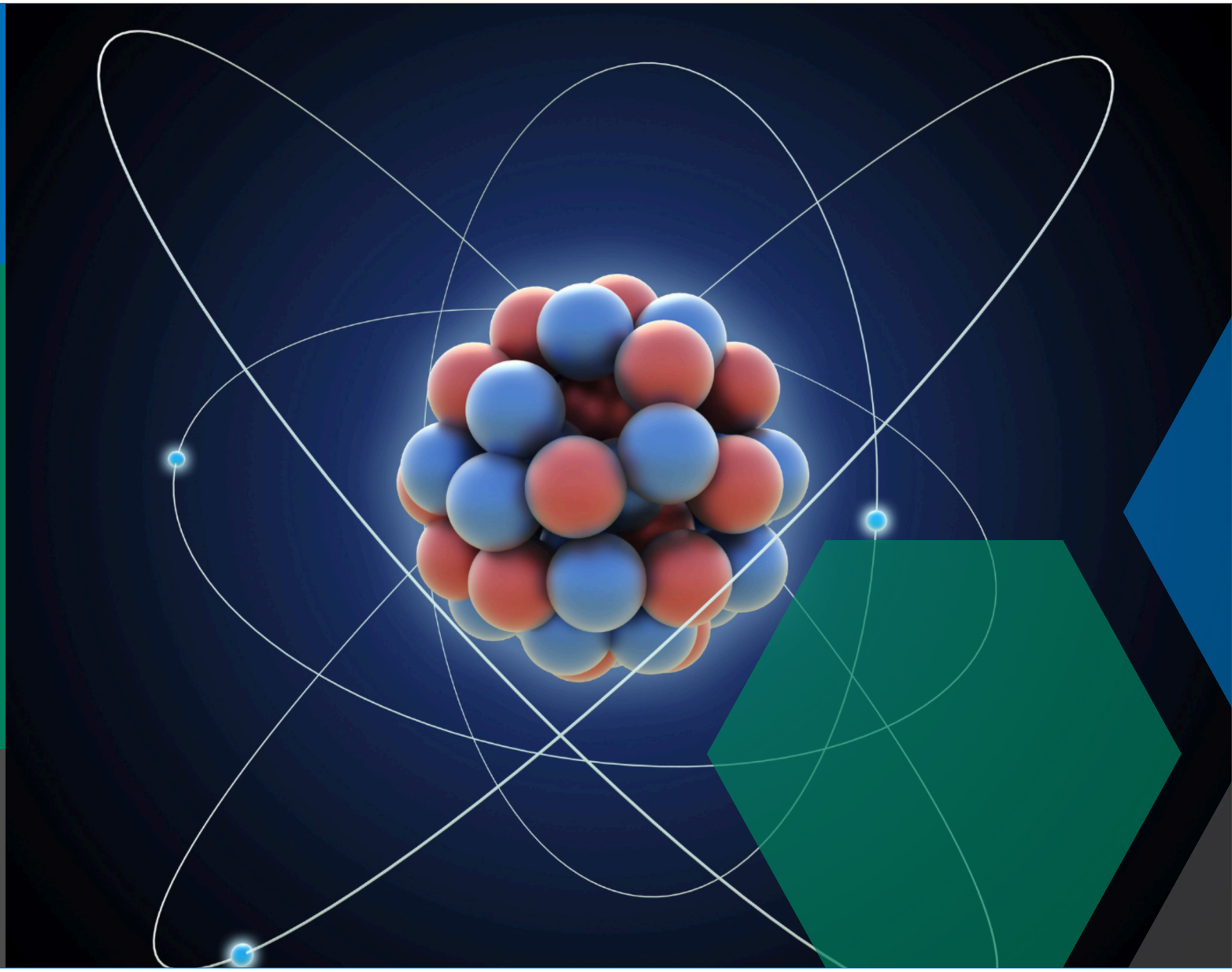
AllScan nGen

Advanced Neutron Generation Technology



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This method of analysis provides a number of benefits:

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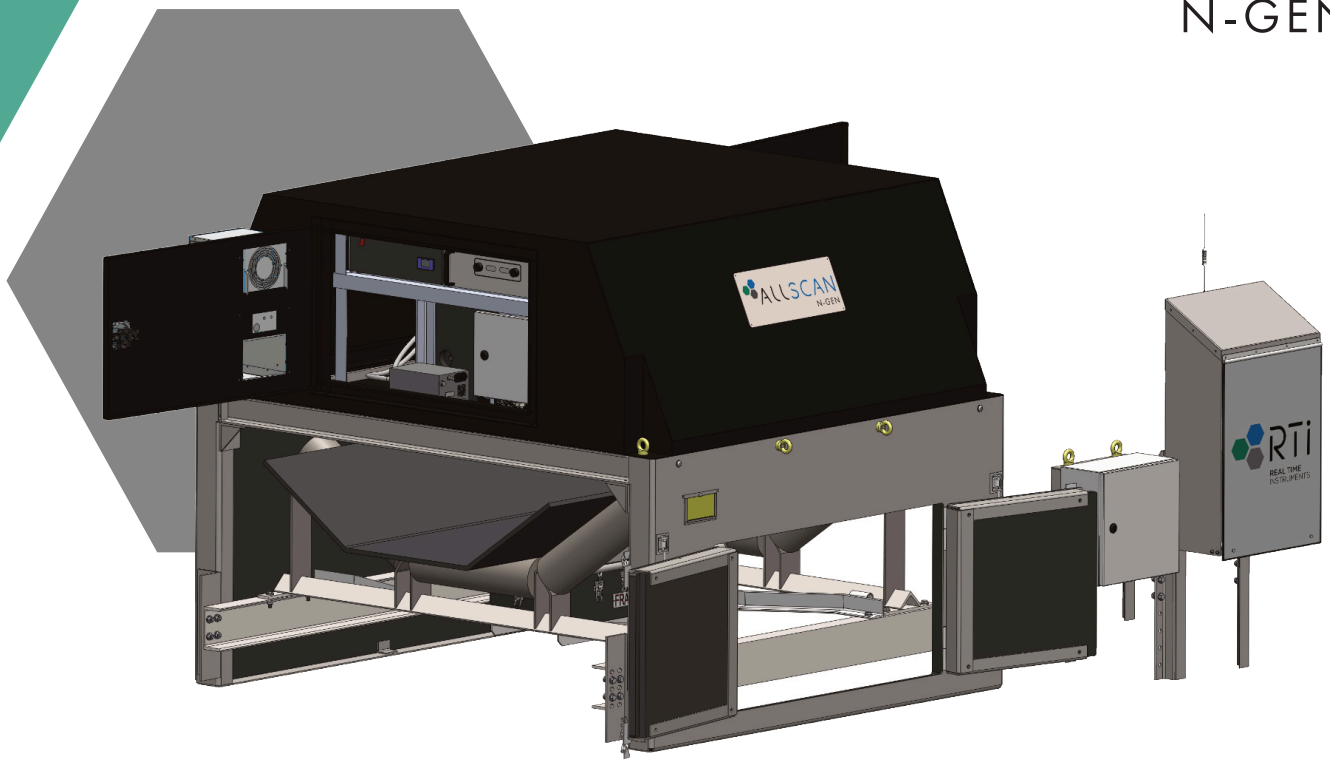

Specifications

Measurement Technique	Prompt Gamma Neutron Activation Analysis
Elements Measured	Fe, Al, Si, K, Ti, Ca and others. Total Ash calcuated using elements found in Ash.
Source	Deuterium-deuterium fusion-based neutron generator (20 - 40µg equivalent) producing low energy 2.45MeV neutrons. Deuterium fuel gas refilled on a 2.5 - 3 year basis.
Radiation Exposure	Typically below 5µSv/Hour outside and around the exterior of the analyser. Average 1.3µSv/hour on or near the catwalk beside the analyser.
Belt Widths	750 - 2400mm (30 - 96 inch).
Environmental Conditions	Sensitive parts are sealed from the environment. The analyser is designed to operate in all outdoor weather conditions from -10 to +50 degrees Celsius in high or low humidity or precipitation.

Unrivalled Accuracy and Responsiveness

At the heart of the AllScan n-Gen elemental analyser is fusion based Neutron Generation technology. By incorporating this technology, the AllScan n-Gen is the safest neutron source available for PGNAA analysers. Other neutron sources utilise a radioactive isotope.

The AllScan n-Gen and AllScan incorporate two sophisicated algorithms - DuraG and DuraSum.

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Measuring Moisture

RTI analysers incorporate state of the art technology deriving moisture from elemental composition eliminating the need for a second analyser dedicated to moisture measurement.

Improving Safety

The neutron generator can be easily switched off, stopping production of radioactive neutrons.

I/O And Diagnostics

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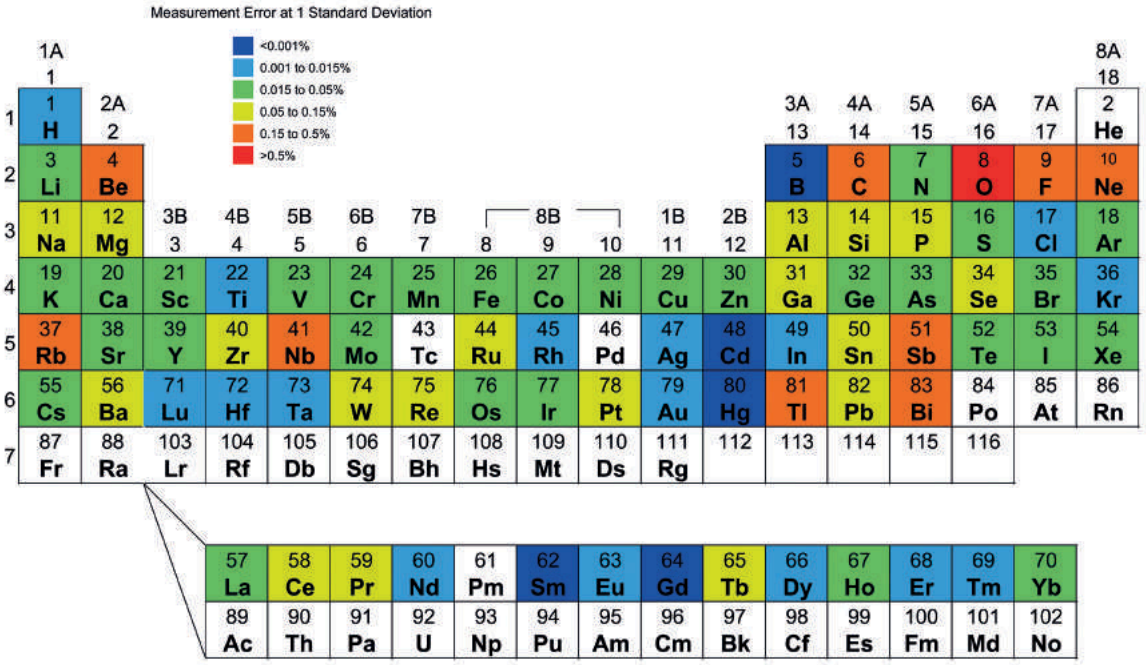

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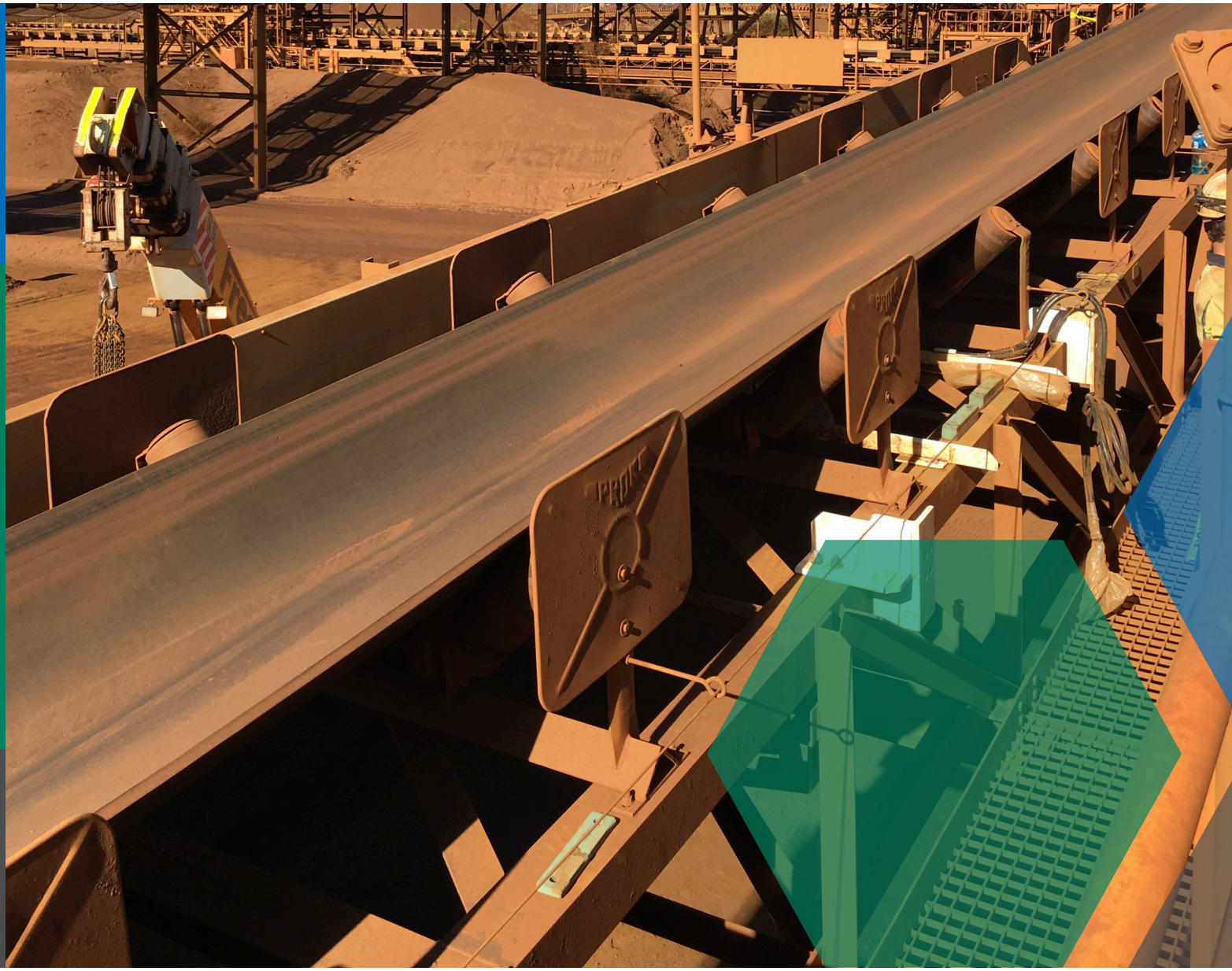
GammaScan

Coal Calorific Value Analyser



Ash Analysis

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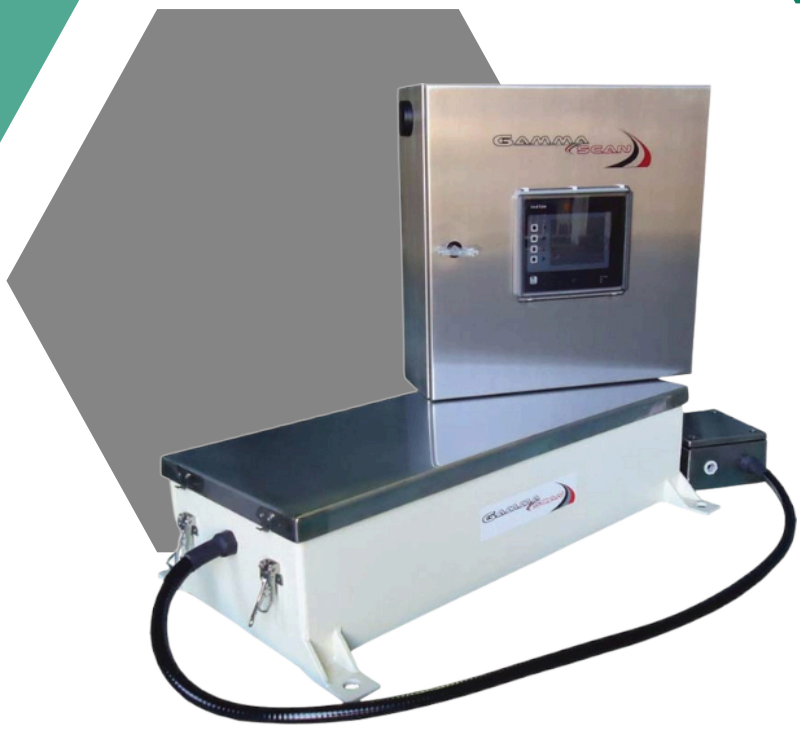


Specifications

Principle of Operation	Natural Gamma - microwave transmission
Ash Range	0 - 100%.
Moisture Range	0-65%
Radioactive Sources	None.
Measurement Time	Continous instantaneous readout of rolling average over "x" seconds, where "x" is typically 10, but adjustable up/down for higher precision or faster response.
Conveyor Width	From 1200mm upwards, no maximum limit. (Belts less than 1200mm accomodated depending on application
Bed Depth Range	Minimum belt loading to achieve acceptable results is 110kg/meter.
Performance	Ash: ± 1.0% (1SD) Moisture Range: ± 1.0% (1SD) Calorific Value: ± 1.5% (1SD)

Features and Benefits

GammaScanDuo™ provides instantaneous, continuous, on-belt ash, moisture and CV data for real-time control.

- Rapid return on investment through reduced laboratory analysis, and optimisation of plant operation in real time
- No lead over-shield required!
- Suited for all coal types
- No maximum bed depth
- Rugged - designed for harsh environments - mine, washplant, powerplant
- Non-contact technique - no wear components
- Low ongoing maintenance
- SAFE: no radioactive sources used; uses the natural radioactivity of the coal
- 3G interface for comprehensive remote diagnostics by RTI engineers, independent of client IT infrastructure

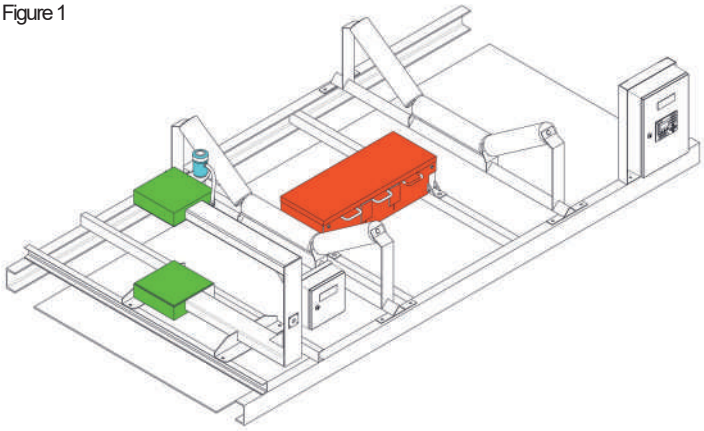
Working Principle

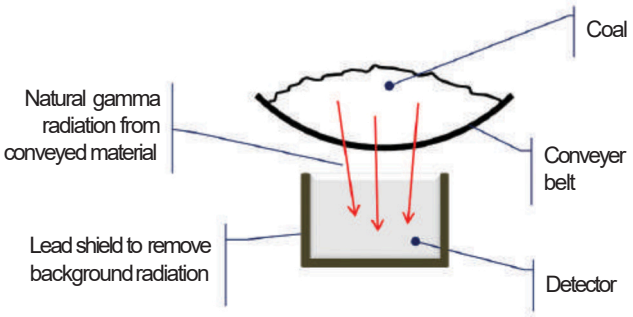
TheGammaScanDuo™ analyser is an on-line "natural gamma and low level microwave" CV (calorific value) measurementsystemwhich is easily installed on conveyor belts. Thesystemdoes not contain any nucleonic sources and therefore does not require a radiation licence for its use.

TheGammaScanDuo™ measures moisture and the low levels of naturally occurring gamma radiation in the coal being transported on a conveyor. Thisradiation mainly arises from elements like U, K, and Thwhich are naturally present in coal. Theamount of these elements present has been shown to correlate well with the amount of the main ash forming elements (Si, Fe, Al, Ca) and so the gamma count rate correlates to ash content.

By combining the ash measurementwith moisture, tonnage and the DAFV(dry ash free value) of the coal CV can accurately be determined.

Figure 1





Measurementsof ash, moisture and tonnage combine to derive coal CV

- a large gamma ray detector measuresthe amount of ash.
- a microwave signal measuresthe amount of moisture.
- an ultrasonic level sensorcalculatestonnage. Alternatively an input froma weightometer can be used.

GammaScanDuo™ provides accurate real-time information for continuous quality monitoring and allows control-room operators to optimise the plants process.

RTi REAL TIME INSTRUMENTS

LOCATIONS

North America | South America | Oceania

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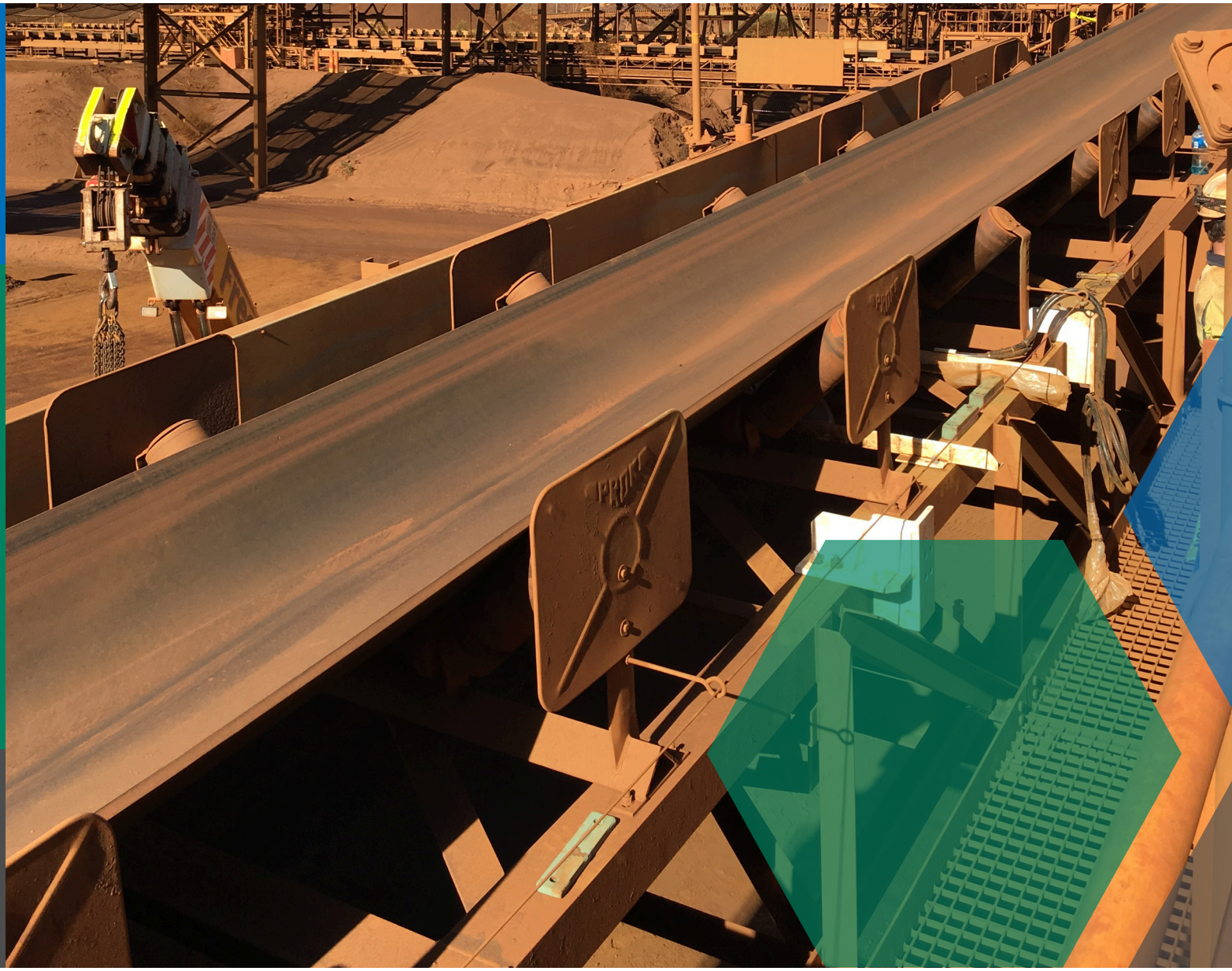
REAL TIME
INSTRUMENTS

AshScan

Advanced Coal Ash Analyser



Ash Analysis

24/7 Remote Support

Maximise Yield

Real Analysis. **Real** Data. **Real** Time.

EMPOWERING INFORMED DECISIONS THAT SHAPE TOMORROW

MEASUREMENT IN MINING

Understanding the material's composition is vital at every stage, allowing operators to maximise product value, maximise efficiency and minimise risk. With value dependent on material content, small changes can drastically alter the end value of the material. Without measurement, operators are incapable of determining material value and run the risk of drastically reducing revenue.

PGNAA TECHNOLOGY

Material composition is usually determined by laboratory sampling. This process is slow and expensive, failing to provide information in real-time. RTI focuses on measuring materials in real-time while they are still being processed.

The AllScan harnesses Prompt Gamma Neutron Activation Analysis (PGNAA) to measure the entire flow of material, penetrating bulk materials.

This method of analysis provides a number of benefits:

- Target a wide range of elements.
- Can be used in various setups (on-belt or in-pipe).
- Non-invasive, no contact with material.
- Measure entire cross section of material.

WHY REAL TIME INSTRUMENTS?

RTI solutions are built by miners, for miners, with over 20 years of experience.

With a global customer base, 24/7 remote servicing and a customer focused approach, RTI has established itself as a leading provider of real-time analysis solutions across a range of commodities.

Our solutions are tailored to the customer, with expertise in bulk ore sorting, ore management, grade control, feedback systems and process optimisation.

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ASHSCAN DUO

Specifications

Principle of Operation	"Dual Energy Transmission". Also referred to as "Low Energy Transmission" microwave attenuation and phase shift.
Ash Range	0 - 100%.
Source	Cs-137 and Am-241.
Measurement Time	Continous instantaneous readout of rolling average over "x" seconds, where "x" is typically 10, but adjustable up/down for higher precision or faster response.
Conveyor Width	Up to 1400mm as standard (larger belts accomodated depending on application).
Bed Depth Range	Best suited to 50 - 350mm (application dependant).
Expected Precision	Ash in typical raw coal: ± 0.9% (1SD) Ash in typical washed coal: ± 0.6% (1SD) Ash in pulverised coal (single seam): ± 0.3% (1SD) **Moisture in all coal types typically 0.3% at 1SD.**

Features and Benefits

AshScanDuo® provides instantaneous, continuous measurementof ash, moisture and energy for real-time control of plant operations.

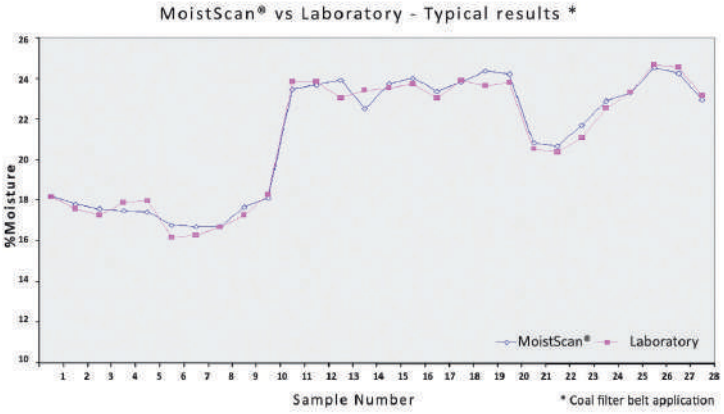
- Rapid return on investmentthrough reduced laboratory analysis, and optimisation of plant operation in real time
- SAFE:Sourcecan be switched ON/OFF, and source holder removed, all from the walkway while the belt is running. Belt shut down not required
- Suited for most coal types
- Multiple stored calibrations for multi-seam operations
- Fast response
- Automatic bed depth correction
- 4G interface for comprehensiveremotediagnostics by RTIengineers, independent of client IT infrastructure. RTIengineers can remotely calibrate the AshScanDuo® for you
- Rugged and reliable for harsh mining conditions, with low ongoing maintenance
- All standard communicationsprotocols supported. Seamless,hassle-free plant integration

Rapid Return on Investment

Reduced labratory analysis and optimisation of plant operation in real time greatly reduces time for return on investment.

Cutting Edge Technology

The AshScan and AshScanDUO bring together world-best innovaiton and the smartest technology to deliver the most advanced coal ash analyser, and combined coal ash and moisture analysers in the world today.

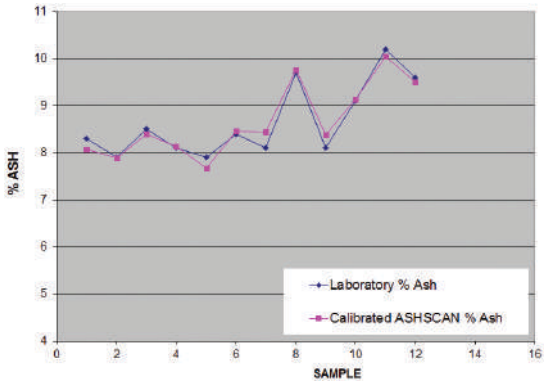


Working Principle

AshScanDuo® utilises two radioactive sources and a microwave signal.

1. The absorption of Am-241 low energy gamma rays.
2. The absorption of Cs-137 high energy gamma rays.
3. The absorption of the microwave signal occurs due to the presence of moisture in the coal.

The above three parameters form the basis of a regression equation that generates instantaneous values for ash, moisture and energy (calorific value).



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EMPOWERING INFORMED DECISIONS THAT SHAPE TOMORROW

Case Studies

Case Study, Chile

Real Time Analysis Enhancing Leach Processes for Copper Extraction

COMMODITY
Copper ore

APPLICATION
Feedback Control

PRODUCT
AllScan

"When optimising heap leach processes for copper extraction diligent monitoring and management is crucial."

THE CASE

The copper porphyry deposit is located in Chile, south-east of Antofagasta, and is one of the biggest mines in the world. The mine site faced significant challenges in determining the grade of material being reclaimed from the heap leach process.

The harsh environment made mechanical sampling difficult and slow, delaying the feedback needed to improve the leach process. Timely and accurate data were essential to optimise the leach operations and enhance copper recovery.

When optimising heap leach processes for copper extraction diligent monitoring and management is crucial. This case study explores how a copper mine can improve its leach operations by employing the AllScan system for real-time analysis of reclaimed material.

THE SOLUTION

Real Time Instruments installed the AllScan system on the outfeed of the leach pile process to provide real-time analysis of the reclaimed material. This system allowed operators to continously monitor the copper content and other key parameters as the material was processed, enabling precise control and timely adjustments to the leach operations.

By integrating the Allscan system, the mine could make immediate adjustments based on real-time data, ensuring that the leach process was optimised for maximum efficiency and copper recovery.

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THE RESULT

The implementation of the AllScan system resulted in several significant benefits from real-time analysis, optimised leach operations, and improved efficiency.

Real-Time Analysis:

- Operators could determine the grade of the reclaimed material instantly, providing immediate feedback to improve the leach process.

Optimised Leach Operations:

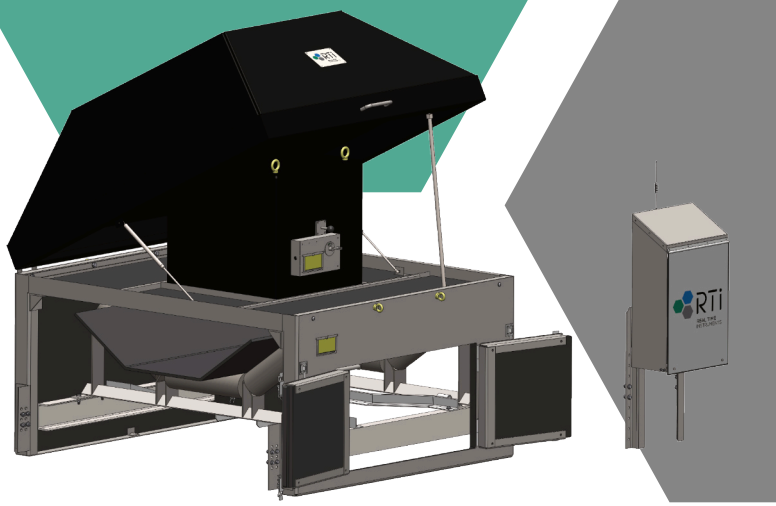
- The real-time data allowed for better management of the leach process, ensuring more efficient copper extraction.

Improved Efficiency:

- The ability to make immediate adjustments based on real-time data enhanced the overall efficiency of the leach operations.

Specifications

Measurement Technique	Prompt Gamma Neutron Activation Analysis
Elements Measured	Fe, Al, Si, K, Tl, Ca and others.
Source	20 - 30µg Cf-252 (2.6 years half-life). Source is topped up with 10µg after 2.5 years and again after 5 years. Disposal occurs at 7.5 years.
Radiation Exposure	Typically below 5µSv/hour outside and around the exterior of the analyser. Average 1.3µSv/hour on or near the catwalk beside the analyser.
Belt Widths	750 - 2400mm (30 - 96 inch).
Environmental Conditions	Sensitive parts are sealed from the environment. The analyser is designed to operate in all outdoor weather conditions from -10 to +50 degrees Celsius in high or low humidity or precipitation.



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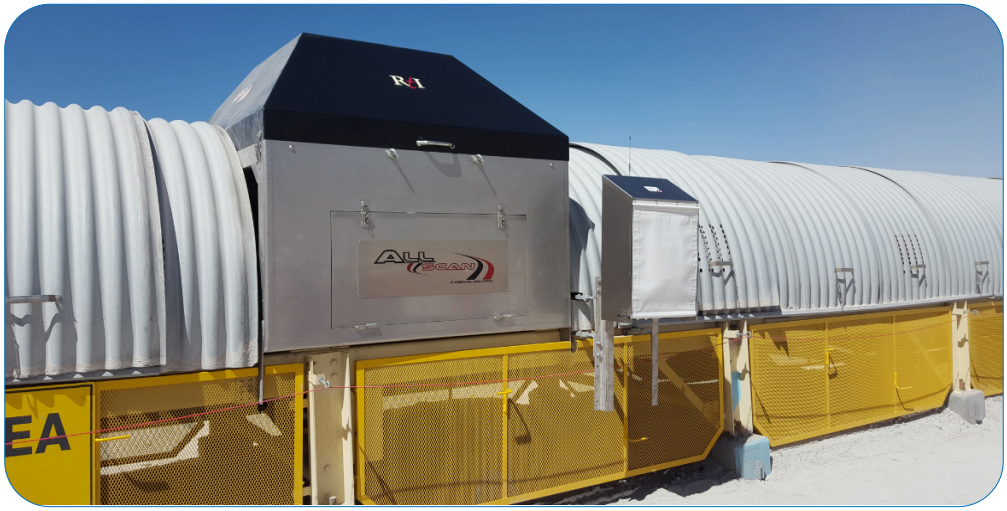
Case Study, Chile

Real Time Analysis Ensuring Accurate Management Of Material Stockpiles



Optimising processing regimes in mining operations hinges on effective stockpile management. This case study explores how a Chilean copper mine enhanced its stockpile builds by utilising a real time scanner, the AllScan system, to determine material composition in real-time.

THE CASE

The copper mine encountered the challenge of accurately determining the composition of run-of-mine (ROM) material prior to stockpiling. Accurately understanding the ROM composition was essential for managing stockpile builds and ensuring the material's suitability for various processing regimes.

THE SOLUTION

Real Time Instruments installed the AllScan system on the overland conveyor belt to provide real-time analysis of the material composition. This system enabled operators to continuously monitor copper content and other key parameters as the material was transported, allowing for precise control over stockpile builds.

By integrating the AllScan system, the mine could make immediate adjustments to stockpile destinations based on real-time data. This ensured that each stockpile met the specific requirements for downstream processing.

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COMMODITY
Copper ore

APPLICATION
Stockpile Management

PRODUCT
AllScan (Cf252)

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THE RESULT

The implementation of the AllScan system resulted in several significant benefits from real-time analysis, optimised leach operations, and improved efficiency.

Real-Time Analysis:

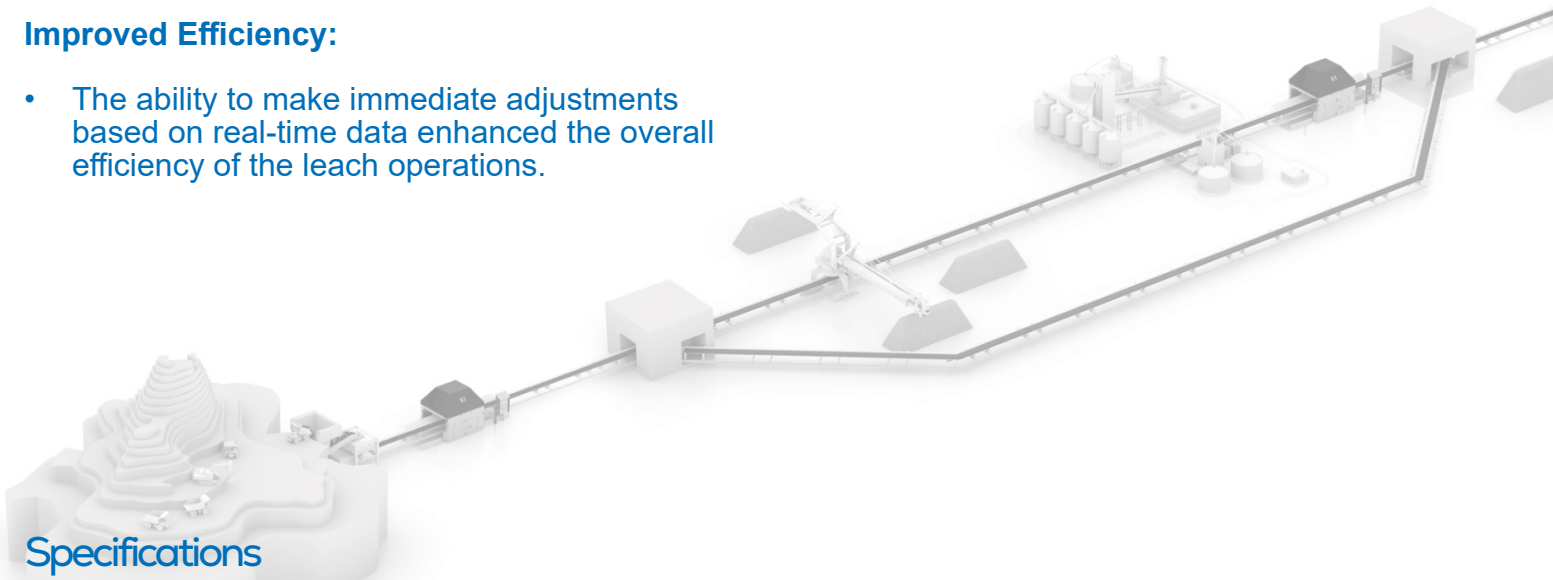
- Operators could determine the grade of the reclaimed material instantly, providing immediate feedback to improve the leach process.

Optimised Leach Operations:

- The real-time data allowed for better management of the leach process, ensuring more efficient copper extraction.

Improved Efficiency:

- The ability to make immediate adjustments based on real-time data enhanced the overall efficiency of the leach operations.



Specifications

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Elements Measured	Fe, Al, Si, K, Tl, Ca and others.
Source	20 - 30µg Cf-252 (2.6 years half-life). Source is topped up with 10µg after 2.5 years and again after 5 years. Disposal occurs at 7.5 years.
Radiation Exposure	Typically below 5µSv/hour outside and around the exterior of the analyser. Average 1.3µSv/hour on or near the catwalk beside the analyser.
Belt Widths	750 - 2400mm (30 - 96 inch).
Environmental Conditions	Sensitive parts are sealed from the environment. The analyser is designed to operate in all outdoor weather conditions from -10 to +50 degrees Celsius in high or low humidity or precipitation.

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Case Study, Australia

Optimising Iron Ore Feedback Control With Elemental Analysis

“Optimising processing operations at iron ore mine sites depends on robust feedback control.”

THE CASE

The iron ore mine encountered significant challenges in effectively managing the composition and quality of the processed material. Traditional sampling methods were cumbersome and slow, causing delays in obtaining analytical results.

These delays impeded timely adjustments, ultimately leading to suboptimal processing outcomes and heightened operational costs. As a result, there was a pressing need for a more efficient and real-time solution to monitor and control material quality throughout the processing operations.

Optimising processing operations at iron ore mine sites depends on robust feedback control. This case study examines how an iron ore mine enhanced its processing efficiency through real-time material analysis with the AllScan system.

THE SOLUTION

Real Time Instruments installed the AllScan system to provide real-time analysis of the material being processed. Positioned strategically within the processing line, the AllScan system continuously monitored the iron content and other key parameters of the material. This real-time data allowed operators to make immediate adjustments, optimizing the processing operations.

By integrating the AllScan system, the mine could ensure that the material fed into the processing plant met the required specifications, improving the efficiency and quality of the final product.

COMMODITY
Iron ore

APPLICATION
Feedback control

PRODUCT
AllScan (Cf252)

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THE RESULT

The implementation of the AllScan system led to significant improvements:

Real-Time Feedback Control:

- Operators could instantly monitor the material quality, providing immediate feedback to the processing plant and allowing for timely adjustments.

Optimised Processing Operations:

- The real-time data enabled better management of the processing line, ensuring that the material met the required specifications and reducing waste.

Improved Efficiency:

- The ability to make real-time adjustments enhanced overall operational efficiency, leading to lower processing costs and higher-quality output.

By utilising the AllScan system for real-time material analysis, RTI enabled the iron ore mine to optimise its processing operations, resulting in improved efficiency and product quality.

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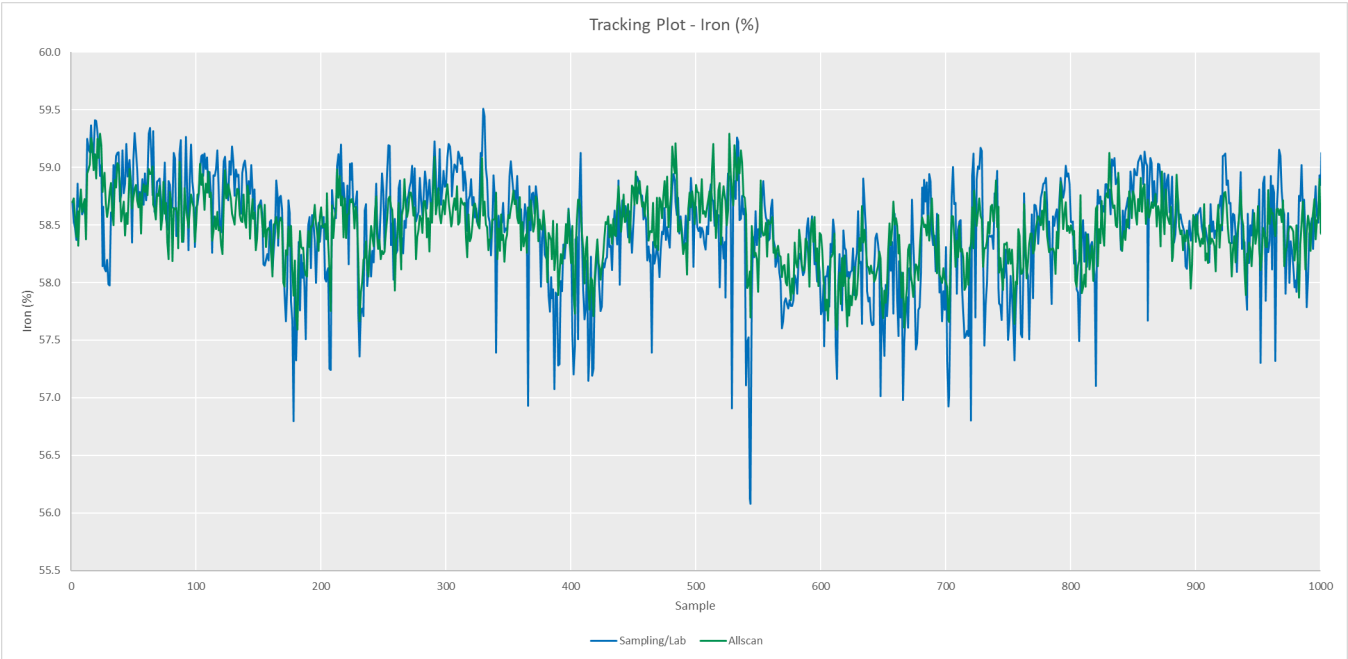

Case Study, Brazil

AllScan Optimises Stockpile Management Control for Brazil Nickel Mine

Efficient stockpile management is essential for optimising downstream processing in mining operations. This case study examines how a nickel mine in Brazil enhanced its stockpile control using the AllScan system to manage multiple stockpiles with varying compositions.

THE CASE

The nickel mine needed to manage multiple stockpiles, each with different ranges of **Nickel (Ni)** and **SiO2/MgO** ratios, to ensure efficient downstream processing.

However, the existing method of laboratory sampling and analysis was too slow to make timely and meaningful control decisions, often resulting in material being stacked in the wrong location.

THE SOLUTION

Real Time Instruments tested the AllScan system on the full range of material to show how the data could be used to provide real-time control over stockpile destinations. This data flow was shown to enable accurate stockpile modelling and reclamation control by offering immediate data on the composition of the material being stockpiled.

By integrating the AllScan system, operators could continuously monitor and adjust stockpile builds based on real-time data, ensuring that each stockpile met the required specifications for downstream processing.

COMMODITY
Nickel ore

APPLICATION
Stockpile Management

PRODUCT
AllScan (Cf252)

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THE RESULT

The testing of the AllScan system showed significant improvements:

Real-Time Control:

- Operators could make immediate adjustments to stockpile destinations, ensuring that each stockpile met the necessary quality standards.

Enhanced Stockpile Management:

- The real-time data allowed for precise stockpile modelling and reclamation control, optimizing the use of available resources.

Improved Precision:

- The measured precisions provided by the AllScan system were more than adequate for effective stockpile management, resulting in more efficient downstream processing.

By utilising the AllScan system for real-time analysis, RTI enabled the nickel mine to improve its stockpile management, leading to more efficient processing and better resource utilisation.

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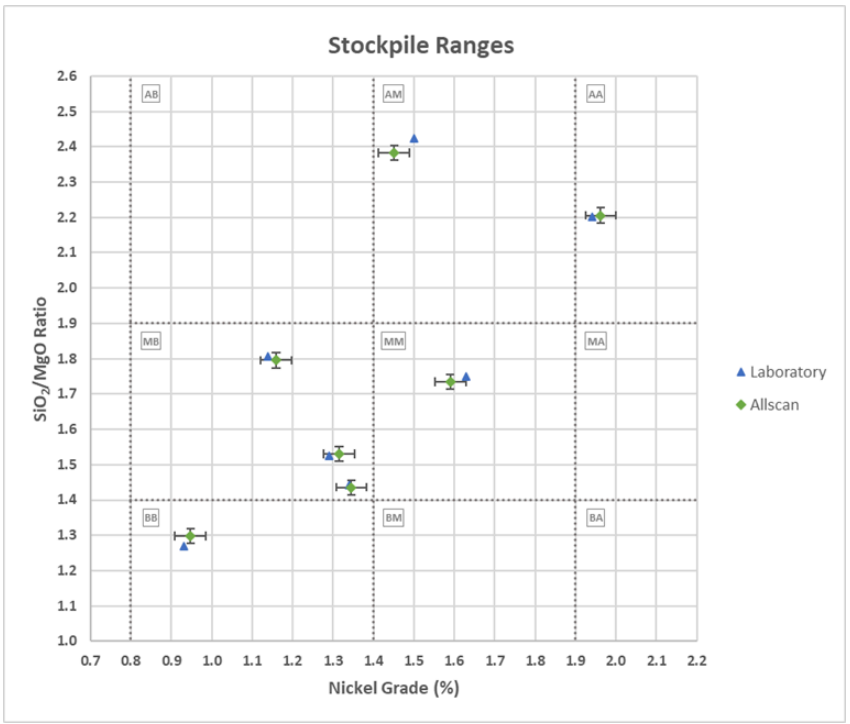

Case Study, Australia

Elemental Analysis Driving Efficient Ore Grade Control in Iron Ore

Optimising processing operations at iron ore mine sites depends on robust feedback control. This case study examines how an iron ore mine enhanced its processing efficiency through real-time material analysis with the AllScan system.

THE CASE

The iron ore mine encountered significant challenges in effectively managing the composition and quality of the processed material. Traditional sampling methods were cumbersome and slow, causing delays in obtaining analytical results.

These delays impeded timely adjustments, ultimately leading to suboptimal processing outcomes and heightened operational costs. As a result, there was a pressing need for a more efficient and real-time solution to monitor and control material quality throughout the processing operations.

THE SOLUTION

Real Time Instruments installed the AllScan system to provide real-time analysis of the material being processed. Positioned strategically within the processing line, the AllScan system continuously monitored the iron content and other key parameters of the material. This real-time data allowed operators to make immediate adjustments, optimizing the processing operations.

By integrating the AllScan system, the mine could ensure that the material fed into the processing plant met the required specifications, improving the efficiency and quality of the final product.

COMMODITY
Iron ore

APPLICATION
Ore Grade control

PRODUCT
AllScan (Cf252)

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THE RESULT

The testing of the AllScan system showed significant improvements:

Real-Time Control:

- Operators could make immediate adjustments to stockpile destinations, ensuring that each stockpile met the necessary quality standards.

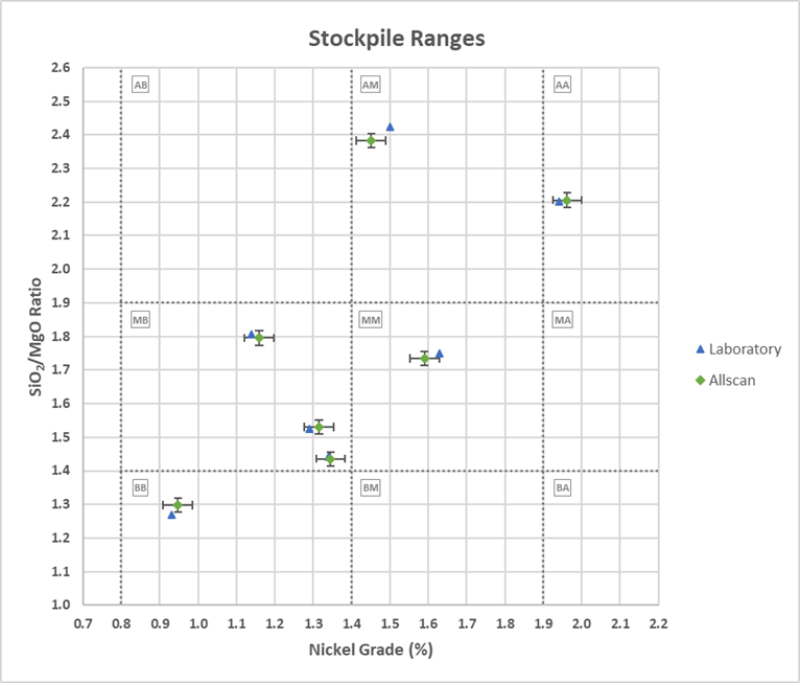
Enhanced Stockpile Management:

- The real-time data allowed for precise stockpile modelling and reclamation control, optimizing the use of available resources.

Improved Precision:

- The measured precisions provided by the AllScan system were more than adequate for effective stockpile management, resulting in more efficient downstream processing.

By utilising the AllScan system for real-time analysis, RTI enabled the nickel mine to improve its stockpile management, leading to more efficient processing and better resource utilisation.



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Case Study, Brazil

South American Mine Optimises Nickel Feedback Control Through AllScan

COMMODITY
Nickel ore

APPLICATION
Feedback control

PRODUCT
AllScan (Cf252)

Optimising ore grade control is vital for enhancing downstream processing and reducing costs in mining operations. This case study examines how a nickel mine in South America used the AllScan system to improve real-time management of their screening plant operations, resulting in better product grade and increased operational efficiency.

THE CASE

The nickel mine encountered significant challenges due to the highly variable composition of their mined material, which included fluctuations in **magnesium (Mg)**, **nickel (Ni)**, and **moisture content**. These variations increased downstream processing costs and complicated the management of the screening plant.

Relying on sample analysis for infeed material had considerable lag, preventing real-time decision-making. This limitation hindered the mine's ability to maximize ore upgrades and effectively control deleterious components.

THE SOLUTION

Real Time Instruments implemented the AllScan system to measure the quality of material fed from the mine in real time, allowing for immediate adjustments to stockpile builds and providing direct feedback to mining operations. This enabled real-time changes to infeed quality. By determining the levels of Ni, Fe, SiO2, MgO, and other elements in the mined ore, the customer gained real-time oversight of the infeed to the ore upgrading process. This data allowed them to make informed decisions about pit operations and screening processes, thus controlling and maximising the grade of stockpiled material.

RTI's approach began with understanding the customer's specific challenges. The AllScan was calibrated to report material parameters most useful for decision-making, such as **SiO2/Mg, Fe/Ni, and Ni/Co ratios.** RTI collaborated with the customer to validate the AllScan's performance, ensuring the data generated reliably informed process control decisions.

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THE RESULT

The tailored integration of the AllScan system yielded significant benefits:

Real-Time Monitoring:

- The customer could directly monitor feed material from mining operations, enabling immediate adjustments.

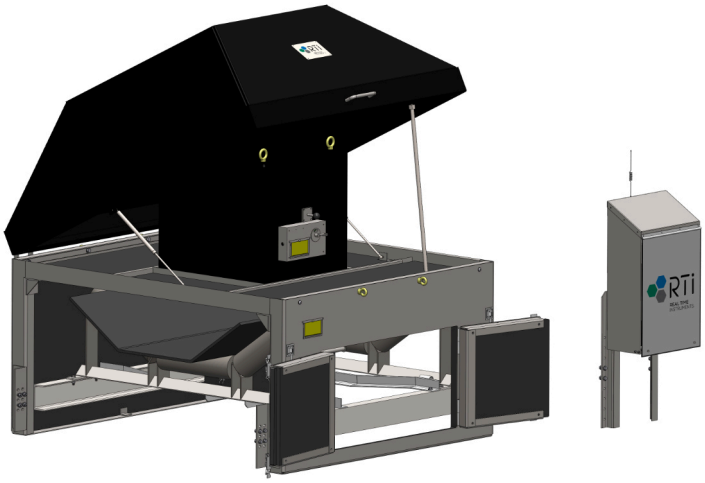
Enhanced Ore Upgrade:

- Real-time control of the ore upgrade process led to a 50% increase in the grade of the product at the furnace infeed.

Reduced Variability:

- The system significantly reduced variations in deleterious components, positively impacting power consumption costs and CO2 emissions.

By providing a customised, integrated solution with the AllScan system, RTI enabled the nickel mine to enhance ore grade control, resulting in improved product quality and more efficient operations.



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Case Study, Australia

AllScan Significantly Improves Iron Ore Stockpile Management

The efficient management of iron ore stockpiles is crucial for maximising yield and meeting content specifications. This case study explores how a comprehensive real-time stockpile management solution significantly improved operational efficiency and profitability for a customer facing challenges in identifying the quality of their iron ore post-processing.

THE CASE

Our customer was dealing with varied grades of iron ore but struggled to identify the quality of the product after it had been processed and stacked. Although a comprehensive stockpile management system was in place, it required manual updates with lab data, which became available 6-8 hours post-stacking. This delay hindered critical decision-making, as operators lacked timely information to optimise the ore blending process.

THE SOLUTION

To address this challenge, it was essential to provide the customer with real-time insight into the Iron (Fe) content of the ore. This would enable them to maximize yield, exploit ore value optimally, and meet stringent content specifications. The first step taken by Real Time Instruments was to thoroughly understand the customer's specific challenges. Based on this understanding, a tailored high-value solution was developed and integrated into the existing stockpile management software. An AllScan was installed on the stockyard conveyor belts to provide immediate real-time results as the ore was stacked. The stockpile management software was then updated to log this real-time data, offering a detailed display of the product's location, quantity, and quality. This integration allowed operators to have precise, up-to-the-minute information about the stockpile, enabling them to reclaim and blend the ore effectively.

COMMODITY
Iron ore

APPLICATION
Stockpile Management

PRODUCT
AllScan (Cf252)

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THE RESULT

The implementation of the AllScan and the integration of real-time data into the stockpile management system yielded significant benefits:

Real-Time Monitoring:

- Operators could monitor the stockpile in real time, ensuring that high-quality iron ore was not inadvertently ‘given away.’

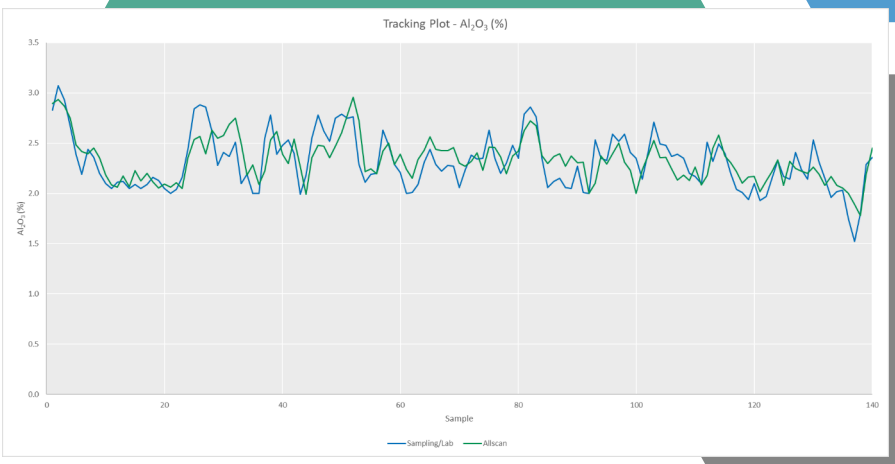
Optimised Blending:

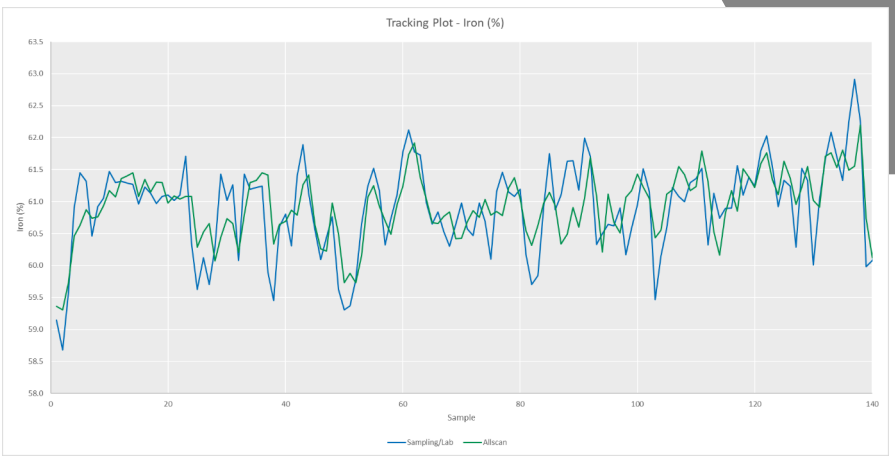
- The ability to blend high-grade ore with regular ore resulted in the production of a superior product in larger quantities.

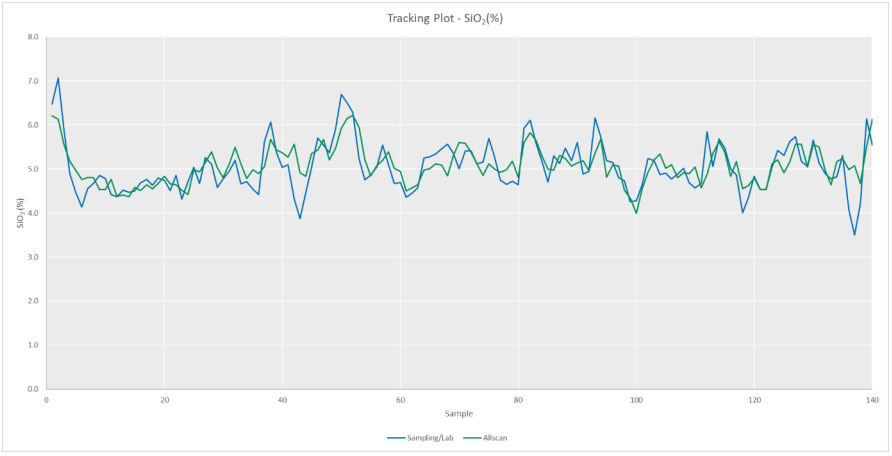
Increased Profitability:

- This optimised blending and improved quality control led to more than a 5% annual profit increase and a substantial improvement in revenue.

By providing a customised, integrated solution, RTI enabled the customer to enhance their stockpile management processes, resulting in improved operational efficiency and financial performance.





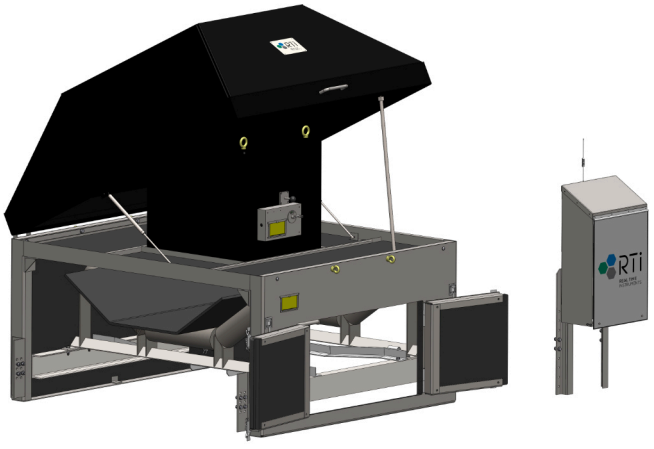


WHY REAL TIME INSTRUMENTS

RTI solutions are built by miners, for miners, with over 20 years of experience.

With a global customer base, 24/7 remote servicing and a customer focused approach, RTI has established itself as a leading provider of real-time analysis solutions.

Our solutions are tailored to the customer, with expertise in bulk ore sorting, ore management, grade control, feedback systems and process optimisation.



Case Study, Africa

Enhancing Copper Ore Grade Through Real Time Analysis

Efficient ore sorting is crucial for maximising yield and minimising waste in mining operations. This case study highlights how an African copper mine can leverage advanced real-time analysis algorithms to improve its ore sorting process. By utilising AllScan technology, the mine effectively manages the challenge of highly variable material.

THE CASE

The client encountered substantial short-term fluctuations in the quality of the mined material, which posed challenges when employing existing analysis methods for ore sorting. To tackle this issue, a solution was required that could deliver rapid analysis while still maintaining precise assessments near the cut-off grade. This would allow them to determine whether specific batches of mined material should be appropriately separated through ore sorting.

THE SOLUTION

Real Time Instruments tested an innovative analysis technique aimed at striking a balance between analysis speed and precision. Our goal was to provide essential information for optimal ore sorting. We installed an AllScan elemental analyser, which continuously monitored the copper content of the mined material in real time, updating every 20 seconds. The data underwent analysis, factoring in the known precision of the measurements. Decisions were then made based on a confidence interval around the cutoff grade. When compared to the traditional analysis method, this novel approach demonstrated a significant enhancement in the quality of ore sorting.

COMMODITY
Copper ore

APPLICATION
Ore Grade control

PRODUCT
AllScan (Cf252)

RTi REAL TIME INSTRUMENTS

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THE RESULT

The implementation of the AllScan and the novel analysis technique led to significant improvements in the sorting outcomes:

Enhanced Recovery:

- The new analysis method outperformed the existing status quo across all grade levels. It led to a better recovery rate, ensuring that valuable materials were efficiently captured during sorting.

Optimised Sorting:

- Thanks to the Allscan and the novel analysis technique, the mine significantly reduced the instances where material was misclassified as either waste or valuable ore.

By seamlessly integrating high-speed and precise analysis, RTI demonstrated that this technology could improve sorting efficiency at the copper mine.

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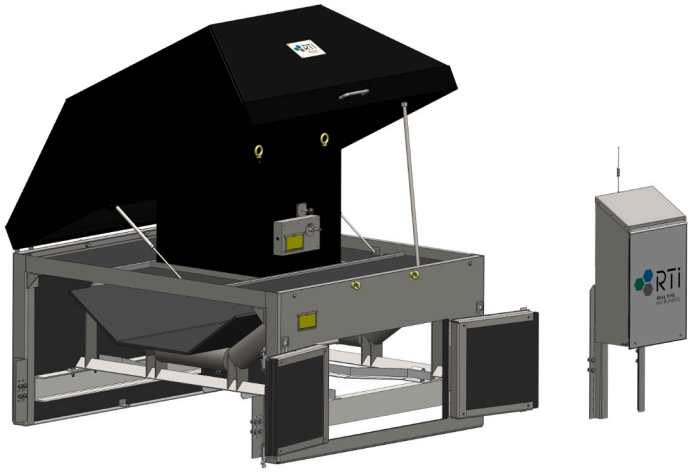

Case Study, Brazil

Tailored Solution Optimising Nickel Ore Grade Control

Efficient ore sorting can be a valuable tool for maximizing yield and minimising waste in mining operations. This case study showcases how a South American nickel mine could utilise advanced real-time analysis algorithms to enhance their ore sorting process, employing the AllScan technology to manage the challenge of highly variable material.

THE CASE

The client faced significant short-term variability in the grade of the mined material, creating difficulty in effectively sorting the ore using the status quo analysis methods. To address this, they required a solution capable of providing high-speed analysis whilst maintaining high precision close to cut off grade to determine if specific periods of mined material should be correctly removed through ore sorting.

THE SOLUTION

Real Time Instruments trialed a novel analysis technique designed to balance the speed of analysis with precision, to provide the necessary information for optimal ore sorting. The data from the installed AllScan elemental sensor was processed to determine real-time analysis of the nickel content of the mined material on a very rapid update rate of 20 seconds. The data was analysed using the known precision of the data and decision made based using a confidence interval around the cutoff grade. This novel approach was tested against the normal analysis method and showed a marked improvement in the quality of the sort that could be achieved.

THE RESULT

The implementation of the AllScan and the novel analysis technique led to significant improvements in the sorting outcomes:

Better Recovery:

- The recovery rate was better for the new analysis method against the status quo for all grade uplifts.

Optimised Sorting:

- Greatly reduced the blocks of material that were incorrectly characterised as waste or ore.

COMMODITY
Nickel ore

APPLICATION
Ore Grade control

PRODUCT
AllScan (Cf252)

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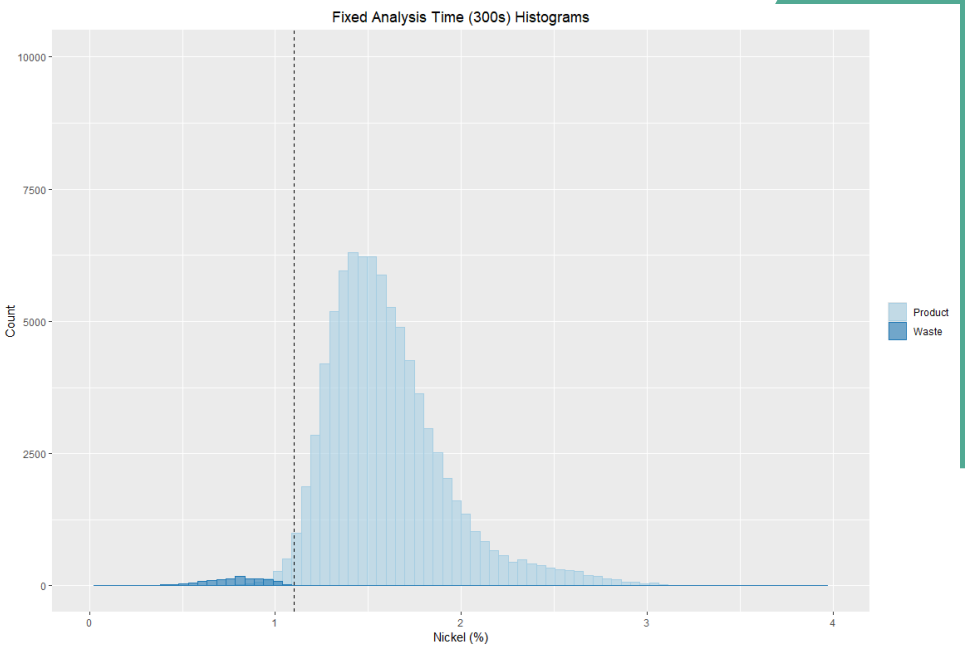
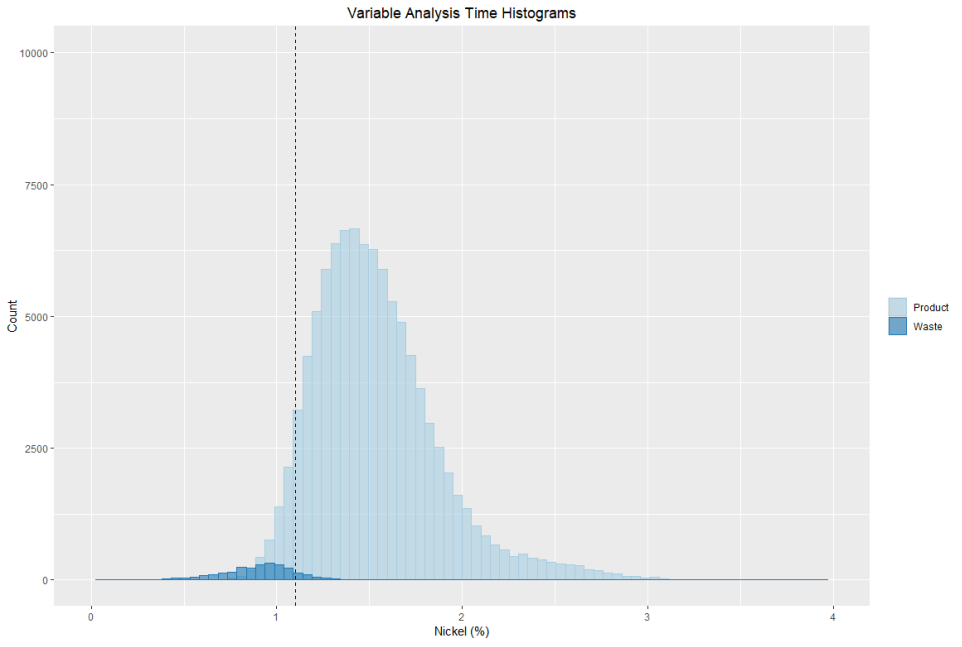


By providing a tailored solution that integrated high-speed, precise analysis, RTI proved that this technology could allow the nickel mine to improve their sorting efficiency, resulting in better utilisation of resources and enhanced operational performance.



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Real Analysis. **Real** Data. **Real** Time.
EMPOWERING INFORMED DECISIONS THAT SHAPE TOMORROW

COMMODITY
Nickel ore

APPLICATION
Ore Grade control

PRODUCT
AllScan (Cf252)

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