Welcome to Scantech, Australia
Core Business

Providing technical and commercial solutions for process optimization through real time analysis of bulk materials.
Over 1,000 Analysers Sold Worldwide
# Product Range

<table>
<thead>
<tr>
<th>Category</th>
<th>Products</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CEMENT</strong></td>
<td>GEOSCAN-C</td>
<td>Full elemental analysis for stockpile and raw mix control</td>
</tr>
<tr>
<td></td>
<td>TBM 210/230</td>
<td>Through Belt Moisture monitoring</td>
</tr>
<tr>
<td><strong>MINERALS &amp; STEEL</strong></td>
<td>GEOSCAN-M</td>
<td>Full elemental analysis for grade control</td>
</tr>
<tr>
<td></td>
<td>TBM 210/230</td>
<td>Through Belt Moisture monitoring</td>
</tr>
<tr>
<td></td>
<td>CM100</td>
<td>Coke Moisture analysis for conductive materials</td>
</tr>
<tr>
<td></td>
<td>IRONSCAN</td>
<td>Elemental analysis for grade control</td>
</tr>
<tr>
<td><strong>COAL &amp; POWER</strong></td>
<td>COALSCAN 9500X</td>
<td>Full elemental analysis for quality control</td>
</tr>
<tr>
<td></td>
<td>COALSCAN 1500/2100/2800</td>
<td>Ash and/or moisture measurement in coal</td>
</tr>
<tr>
<td></td>
<td>TBM 210/230</td>
<td>Through Belt Moisture monitoring</td>
</tr>
<tr>
<td></td>
<td>CIFA 350</td>
<td>Carbon In Fly Ash monitoring for power stations</td>
</tr>
</tbody>
</table>
# Product Technologies

<table>
<thead>
<tr>
<th>Product</th>
<th>Measurement Technique</th>
</tr>
</thead>
<tbody>
<tr>
<td>COALSCAN 1500, IRONSCAN 1500</td>
<td>Natural Gamma Ray Detection</td>
</tr>
<tr>
<td>COALSCAN 2100/2800</td>
<td>Dual Energy Gamma Ray Transmission</td>
</tr>
<tr>
<td>GEOSCAN, COALSCAN 9500X</td>
<td>Prompt Gamma Neutron Activation Analysis (PGNAA)</td>
</tr>
<tr>
<td>TBM 210/230</td>
<td>Microwave Transmission</td>
</tr>
<tr>
<td>CM 100</td>
<td>Fast Neutron and Gamma Transmission</td>
</tr>
<tr>
<td>CIFA 350</td>
<td>Microwave Resonance</td>
</tr>
</tbody>
</table>
# A Global Presence

## Americas
- United States
- Canada
- Costa Rica
- Dominican Republic
- Chile
- Mexico
- Argentina
- Uruguay
- Colombia
- Peru
- Brazil
- Venezuela

## Europe
- Ireland
- Spain
- France
- Slovakia
- Czech Republic
- Serbia
- Bulgaria
- Hungary
- Romania
- Russia
- Turkey
- Poland
- Lithuania
- Azerbaijan
- Germany
- United Kingdom

## Africa
- South Africa
- Senegal
- Egypt
- Sudan
- Tunisia
- Ethiopia
- Libya

## Middle-East
- Iran
- Iraq
- Saudi Arabia
- Jordan
- Yemen

## Asia & Oceania
- Australia
- China
- Thailand
- Vietnam
- South Korea
- Philippines
- Taiwan
- Malaysia
- New Zealand
- Indonesia
- Kazakhstan
- India
- Bhutan
- Japan
- Laos
Elemental Analysis using Prompt Gamma Neutron Activation Analysis (PGNAA)
PGNAA - How it works

- A Californium 252 source emits neutrons
- Neutrons are absorbed by elements in the conveyed bulk material
- Each element emits a unique gamma ray spectrum
• Entire gamma ray spectrum is analysed to determine bulk material composition

• Dry Basis Oxide results are reported
# Elements Measured

## Periodic Table Of The Elements

<table>
<thead>
<tr>
<th>Elements Measured</th>
<th>PGNAA Repeatability</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Periodic Table</th>
<th>Color</th>
<th>( Z )</th>
<th>Symbol</th>
<th>( \text{Atomic Mass} )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydrogen (H)</td>
<td>Orange</td>
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<td>3</td>
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<td>Sodium (Na)</td>
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<td>11</td>
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<td>Magnesium (Mg)</td>
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<td>12</td>
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<tr>
<td>Aluminum (Al)</td>
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<td>13</td>
<td>Al</td>
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<td>Silicon (Si)</td>
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<td>Si</td>
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<td>Phosphorus (P)</td>
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<td>Krypton (Kr)</td>
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<td>Barium (Ba)</td>
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<td>Reaktan (Re)</td>
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<td>Osmium (Os)</td>
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<td>Iridium (Ir)</td>
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<td>Platinum (Pt)</td>
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<td>Gold (Au)</td>
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<td>Mercury (Hg)</td>
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<td>Thulium (Tm)</td>
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<td>Ytterbium (Yb)</td>
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<td>Yb</td>
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<td>Lutetium (Lu)</td>
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<td>Thorium (Th)</td>
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<td>Protactinium (Pa)</td>
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<td>Uranium (U)</td>
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<td>Neptunium (Np)</td>
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<td>Np</td>
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<td>Plutonium (Pu)</td>
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<td>Pu</td>
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<td>Americium (Am)</td>
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<td>Am</td>
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<td>Curium (Cm)</td>
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<td>Berkelium (Bk)</td>
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<td>Bk</td>
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<tr>
<td>Californium (Cf)</td>
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<td>Cf</td>
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<tr>
<td>Einsteinium (Es)</td>
<td>Yellow</td>
<td>99</td>
<td>Es</td>
<td>252.08</td>
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<tr>
<td>Fermium (Fm)</td>
<td>Yellow</td>
<td>100</td>
<td>Fm</td>
<td>257.07</td>
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<tr>
<td>Mendelevium (Md)</td>
<td>Yellow</td>
<td>101</td>
<td>Md</td>
<td>258.08</td>
</tr>
<tr>
<td>Nobelium (No)</td>
<td>Yellow</td>
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<td>No</td>
<td>259.07</td>
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<tr>
<td>Lawrencium (Lr)</td>
<td>Yellow</td>
<td>103</td>
<td>Lr</td>
<td>262.14</td>
</tr>
</tbody>
</table>

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**ScanTech**

**Online solution specialists**

**Commercial in Confidence**
PGNAA Features

- Suitable for on belt analysis of a wide range of materials such as coal, iron ore, limestone, raw mix, metal concentrates, iron sinter materials.
- Provides accurate elemental analyses such as Si, Al, Fe, Ca, Mg, Na, Ti, K, Cl, S, Mn, Ni, P, Cu.
- Can be combined with a microwave moisture measurement.
- Provides accurate on line analysis of coal for ash, moisture, specific energy, sulphur and oxides in ash.
Introducing GEOSCAN

- Real-Time On-Belt Analysis
- Monitors the full stream to avoid sampling errors and expenses
- 3 frame sizes available to suit belt width and material depth
- Small footprint and very light
- Easy to install
- No contact with the belt
- High performance multi-detector system with digital electronics
GEOSCAN – No belt contact

Accommodates a range of belt widths & trough angles
No tunnel or idler modification required
No wear parts (sacrificial tunnel slider panels)
Belt clips & staples can not damage the Geoscan
GEOSCAN – Options

Automatic Source Drive

TBM Moisture Monitor

Commercial in Confidence
GEOSCANN – TBM
GEOSCAN – Control Cabinet

Main ELCB

Input / Output Controller

Analyser PC

Uninterruptible Power Supply

Source access

Plant Input Wiring

Ethernet / Fibre hub
GEOSCAN – Simple Installation

Fits between adjacent idlers!
Steel enclosure filled with fire-resistant Cast Neutron Shielding

Polyethylene tunnel extensions reduce the radiation to safe levels

Optional automatic source drive kit

Beam On / Off door lights clearly indicate source location

Radiation Safety training provided during commissioning and on request
GEOSCAN (Stockpile control)

Real-time updates of average stockpile chemistry allows:

- Reduced deviations within stockpile
- Optimised use of raw materials
- Extended mine life
- Reduced process costs and energy consumption
GEOSCAN (Blending or additive control)

Real-time analysis of combined chemistry allows:

- Control of blended quality (reduced variability)
- Reduced process costs and energy consumption
- Minimised use of expensive corrective materials,
- Improved feed homogeneity
- Improved process efficiency, higher recoveries
GEOSCAN-C - Static Calibration

- Typically 3-5 static samples are used
- Samples span expected chemistry range
- Static samples analysed at various loads for belt load compensation
- Samples are analysed in factory and again on site during commissioning

Bagged samples
GEOSCANN – Dynamic Calibration

- For most applications, samples are collected during normal operation at higher frequency over short time interval
- Plant laboratory performs XRF/typical analysis
- Geoscan results are adjusted to best match XRF analysis
- Typically performed approx. every 6 months
Joint Assessment Process

STAGE I – data assessment

- Data review of detailed analyses to establish that Targets and Guarantees are achievable

STAGE II - testwork on ore samples

- Send samples to Adelaide
- or elemental analysis, dual lab analyses for comparison with GEOSCAN data
- Performance Guarantee presented – compare with Targets
Factory Test Program

- Scantech offers to perform tests on your ore using a full sized analyser at its Adelaide Factory.
- Test program needs 10 samples, each representing the load of one metre of belt length.
- Your only cost would be shipping the samples to us, after taking a sample of each and analysing it.
- Scantech would cover all other costs, including the technical report.
Performances

Can be used for on-line analysis of:

- Nickel, copper, zinc, lead, manganese, ores and concentrates
- Iron and other ferrous ores
- Phosphates, mineral sands, bauxite
- Coal and Cement
- applications where elemental content or ratios are important for process control on a conveyor stream
<table>
<thead>
<tr>
<th>WHY SHOULD YOU CHOOSE A GEOSCAN</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SMALL FOOTPRINT</strong></td>
</tr>
<tr>
<td><strong>VERY LIGHT</strong></td>
</tr>
<tr>
<td>• Compact main frame – Only 1m along the belt.</td>
</tr>
<tr>
<td>• 2,500 Kg plus 1,200 Kg shielding panels for Geoscan-M</td>
</tr>
<tr>
<td>• 3,400 Kg plus 1,300 Kg shielding panels for Geoscan-M -L</td>
</tr>
<tr>
<td>• 4,000 Kg plus 1,500 Kg shielding panels for Geoscan-M -XL</td>
</tr>
<tr>
<td><strong>NO CONTACT WITH THE BELT</strong></td>
</tr>
<tr>
<td>• 30mm distance between tunnel and underneath of the belt.</td>
</tr>
<tr>
<td>• No need for sliders. No wear parts.</td>
</tr>
<tr>
<td>• No need to customize the tunnel to the belt size;</td>
</tr>
<tr>
<td>• Geoscan-M 600mm to 1400mm belt, bed depth to 280mm</td>
</tr>
<tr>
<td>• Geoscan-M -L 600mm to 2200mm belt, bed to 380mm</td>
</tr>
<tr>
<td>• Geoscan-M -XL belt to 2400mm, bed to 530mm.</td>
</tr>
<tr>
<td><strong>MULTI-DETECTORS</strong></td>
</tr>
<tr>
<td><strong>CONFIGURATION</strong></td>
</tr>
<tr>
<td>• The Geoscan can keep on running with one detector out of order</td>
</tr>
<tr>
<td>• No need for keeping detectors as spare parts, no failures yet</td>
</tr>
<tr>
<td>• No need to recalibrate when replaced</td>
</tr>
<tr>
<td><strong>DIGITAL MULTI CHANNEL</strong></td>
</tr>
<tr>
<td><strong>ANALYSER DMCA</strong></td>
</tr>
<tr>
<td>• Better linearity</td>
</tr>
<tr>
<td>• Better spectral resolution</td>
</tr>
<tr>
<td>• Simplified electronics</td>
</tr>
<tr>
<td><strong>HIGH PERFORMANCE</strong></td>
</tr>
<tr>
<td><strong>DETECTORS</strong></td>
</tr>
<tr>
<td>• BGO Type – Higher crystal density</td>
</tr>
<tr>
<td>• Better signal to noise ratio and linearity</td>
</tr>
<tr>
<td><strong>WORLD LEADING</strong></td>
</tr>
<tr>
<td><strong>CUSTOMISED SUPPORT</strong></td>
</tr>
<tr>
<td>• First year technical support included ensures optimal performance</td>
</tr>
<tr>
<td>• 24 month standard warranty</td>
</tr>
<tr>
<td>• Customised Product Support Agreements</td>
</tr>
<tr>
<td>• Emergency Spares only</td>
</tr>
</tbody>
</table>
Through Belt Moisture

(TBM 210 & TBM 230) Analysers
Microwave transmission

- Scantech’s Through Belt Moisture (TBM) analysers use the Microwave Transmission technique to measure the moisture content of bulk materials on moving conveyor belts.

- Scantech’s TBM210 and TBM230 use high and low frequency microwaves, respectively, to suit requirements.

- Microwaves interact with free (surface) water molecules, causing them to oscillate.

- Water molecules which oscillate will be detected, so ice and inherent (chemically bound) moisture are not detected; Microwave Transmission is not suitable for electrically-conductive materials.

- Changing moisture levels influence the microwave beam’s attenuation and delay (phase shift), which are both measured by the TBM.
Scantech’s TBM developments

First Generation

• 1992 – Scantech licensed microwave technology from CSIRO (“DC” technology using microwave diodes, subject to drift and limited dynamic range)

Second Generation

• 1995 – Scantech-designed microwave mixer technology to overcome stability problems with microwave diodes and to increase dynamic range

Third Generation

• 2005 – TBM210 developed with fully-digital frequency synthesis and signal analysis in a compact board to provide excellent stability (removing the need for temperature control and regular recalibration) and further increase dynamic range

• 2008 – TBM230 low frequency version developed to complement the TBM210

• 2011 – TBM210/230 became PC-based to offer greater ease of use and plant interfacing options
TBM Series

TBM230
- For deeper / more attenuating materials
  For example, >300mm Iron Ore

TBM210
- For shallower / less attenuating materials
- Higher sensitivity to Moisture
TBM230 Adjustable Frame

Minimum 450mm

Maximum 900mm
TBM Electronics Cabinet - NEW

- **Plant Interface modules:**
  - Digital Inputs (Belt Run)
  - Digital Outputs (Critical Alarm)
  - Analogue Inputs (TPH / Depth)
  - Analogue Outputs (%Moisture)
  - Modbus protocol over RS422, Ethernet, Optical Fibre

- **Industrial PC**
  - Reliable
  - Flexible configuration
  - Remote Access

- **Wiring terminals**
TBM230 Shipment

TBM230 shipping crate bound for Alcoa in Brazil
Options selected: Door LCD display for %Moisture
Material Level Sensor
TBM230 Installation
TBM Installation & Commissioning

• Mechanical and electrical installation typically less than 1 day

• Scantech Service Engineer attends site for typically 3 days:

  **Day 1**  Inspect installation work, check plant wiring connections

  **Day 2**  Static calibration using prepared crushed, oven-dried sample
             (Stopped empty belt for 5 hours)

  **Day 3**  Collection of dynamic or stop belt samples, client training
             (Normal plant production; belt stopped for 30 minutes per sample
              if no sampler)
TBM – Typical Installation
TBM – Typical Performance

Static Calibration on limestone / raw mix

Estimated Moisture %

Std Err = 0.44%
R = 0.99

TBM Moisture %

DMLieferant 
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+7 (499) 990-05-50; +7 (800) 775-29-59 
info@dmliefer.ru 
www.dmliefer.ru
Thank You

Any Questions?
DO YOU NEED MORE INFORMATION?

- Brochures
- Specifications
- Drawings
- Manuals
- Site data sheets
- Installation guides
- Graphs of results
- Application advice
- Hardcopy
- Electronic
- CD-ROM
- Training

www.scantech.com.au