Optimize Your Process

Instrument Solutions for the Coal Mining Industry

Part of Thermo Fisher Scientific

Thermo SCIENTIFIC

The Power to Help You Profit

Optimizing Performance with Online Elemental Analysis

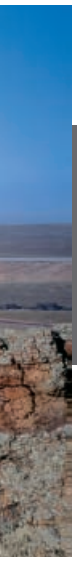
Every year 1.1 billion tons of coal are burned in the U.S., with 90% of that being used for electricity generation. The interconnected series of steps which takes the coal from the mine to the boiler to deliver reliable electricity to industry and households is aided considerably by Thermo Scientific products. These steps include measuring tonnages, determining coal quality, ensuring personnel safety, and meeting emission regulations, and Thermo Scientific products are involved in many of these steps. In fact most of the coal that gets mined and burned in the U.S. is "touched" somewhere along the way by a Thermo Scientific product, whether it's a belt scale, an online analyzer, a sampling system, level sensors, density gauges, or conveyors protected by our belt switches.

Bonus: There are a variety of Thermo Scientific products that fit your application throughout your coal operations. We offer effective solutions to meet your needs.

Quality Control

All prep plants strive to produce clean coal of consistent quality. One prep plant in the Illinois Basin combined sophisticated instrumentation with mechanical simplicity to reach this goal. They installed a Thermo Scientific coal analyzer on the output stream and a simple mechanical diverter on the raw coal stream entering the plant.

Bonus: By monitoring the ash levels in the product and adjusting the percent of raw coal bypassing the plant, they were able to achieve unprecedented consistency in their product, ensuring all shipments met contract specifications.



Control Product Quality. Improve Profitability.

Control your processes and product quality with analytical and measurement instruments

Knowledge is power. Enhance your operation's profitability when your operators know the coal's quality as it comes from the mine or through the preparation plant. Control coal blends to meet quality specifications and ship a more consistent, quality product.

We offer a variety of Thermo Scientific products that provide you with the information you need to better sort and blend coal. Achieve precise and accurate information through the use of Thermo Scientific coal analyzers, weighbelt feeders, electronic belt scales and sample systems. Additional products can help improve material handling such as belt instruments, tramp metal detectors, chute plug and position switches.

Our full line of instruments means one vendor can supply and service your heavy media and underflow density gauges; measure flow, bin, sump and silo level indication (point and continuous); provide belt feeders, thickener interface gauges, chute plug switches; and control real-time data display/acquisition needs.

We're here to serve you

Ensure optimal performance with a product support agreement. Our service experts help you select, engineer, install and commission your Thermo Scientific equipment, making them safer, more productive and profitable for you. We're located around the globe to provide premium support and quick response time.

Integrating Thermo Scientific Products into the Coal Process

From the mine to loadout—we've got you covered. We produce several products to assist you in achieving your process objectives. Take a look at how our online analyzers, sampling systems, coal blending software, belt scales, tramp metal detectors, weighbelt feeders, level sensors and other products fit into your process.

Thermo Scientific Products in the Coal Process

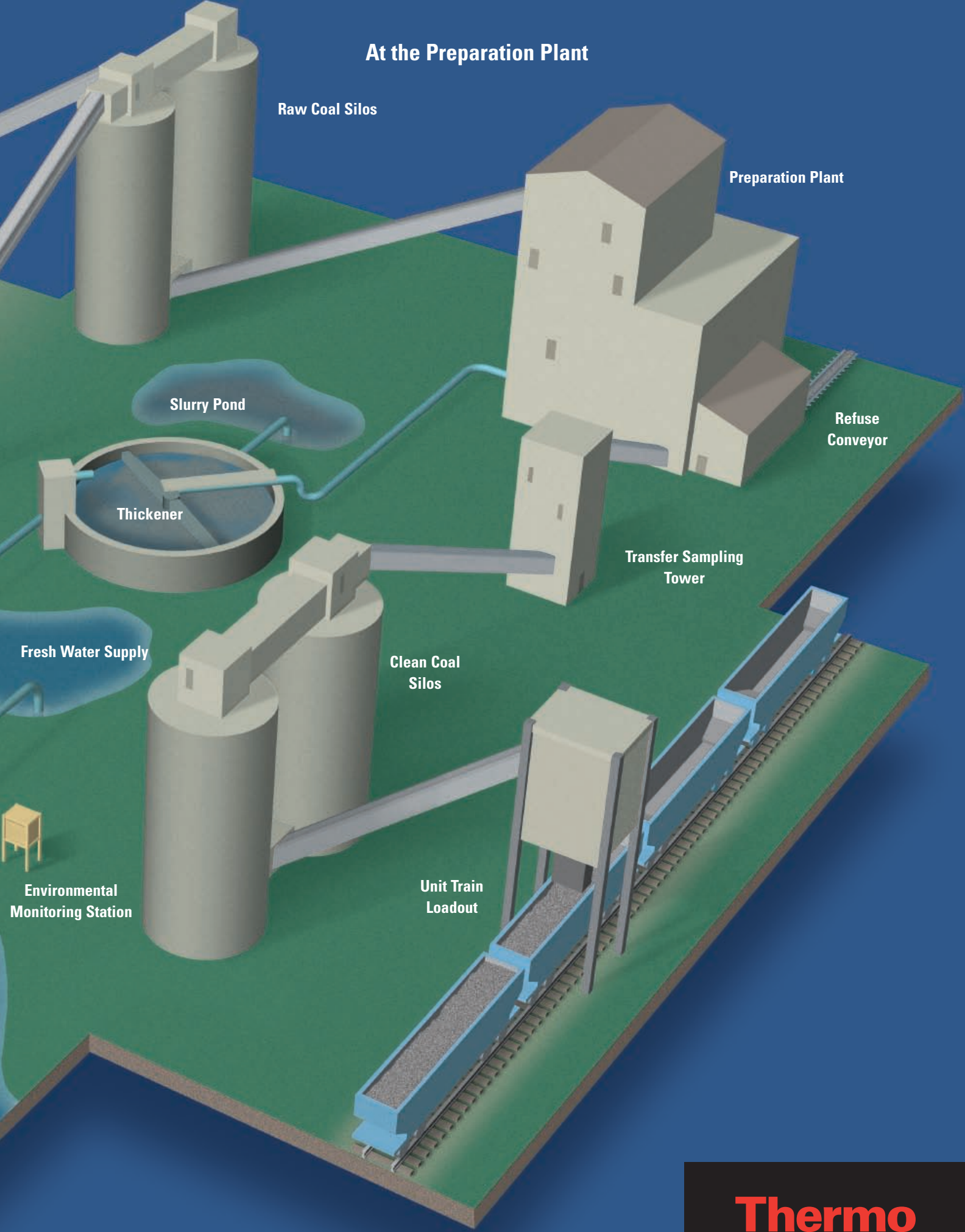
At the Mine

- Belt Line Switches
  - Misalignment switches
  - Pull cord switches
  - Belt motion detectors and speed indicators
  - Position switches
- Plug Chute Switches
  - Tilt switches
  - Capacitance level controls
  - Rotary level controls
  - Flow detectors
- Belt Scales
  - Monitoring production output with belt scales
- Metal Detectors
  - Tramp metal detection
- Sampling Systems
  - Collect representative samples
  - Provide a representative sample directly from material on conveyor belt
- Online Elemental Analyzers
  - Blending, sorting
- Power Quality Monitoring Instruments
  - Detecting and monitoring radiation exposure
- Laboratory Information System
  - Environmental monitoring for ground, air and water control
  - Grade of ashes, grade of carbon, sulfur and moisture
  - Other lab tests: pH, temperature, oxides, clay, limestone, conductivity etc.
- Continuous Level Sensors for Piles, Bins or Silos
  - Sonic/Ultrasonic
  - Capacitance level controls
  - Nuclear switches
  - Continuous level sensors: radar
  - Continuous level sensors: nuclear
  - Strain gauge
  - Plumb bob
  - Flow monitors
- Ventilation Fan Instrumentation
  - Flow monitors
  - Pressure monitors
  - Electronic chart recorders
- Coal Bed Methane Well and Collection System Instrumentation
  - Flow of methane gas and water

At the Preparation Plant

- Weigh Feeders
  - Weigh feeders control and measure flow rates
- Belt Scales
  - Monitoring production output with belt scales
- Impact Scales
  - Measure the mass flow rate and total mass of free-flowing particulate materials
- Online Elemental Analyzers
  - Ash quality control
- Belt Line Switches
  - Misalignment switch signals belt displacement
  - Pull cord switch alerts equipment circuits of a stop condition
  - Belt motion detectors and speed indicators
- Laboratory Information System
  - Environmental monitoring for ground, air and water control
  - Grade of ashes, grade of carbon, sulfur and moisture
  - Other lab tests: pH, temperature, oxides, clay, limestone, conductivity etc.
- Plug chute switches
  - Tilt switches
  - Capacitance level controls
  - Rotary level controls
  - Flow detectors
  - Position switches
- Continuous Level Sensors for Sumps, Piles, Bins or Silos
  - Sonic/Ultrasonic
  - Capacitance level controls
  - Nuclear switches
  - Radar Level Sensors
  - Continuous level sensors: radar
  - Continuous level sensors: nuclear
  - Strain gauge
  - Plumb bob
  - Archiving
  - Alarming
  - Historical graphing
  - Exporting data to spreadsheet applications
  - Report generation
  - OPC communications capabilities
  - Network ready
  - Nuclear density gauges
- Flowmeters
  - Portable, clamp-on ultrasonic flowmeters
- Site Particulate Monitors
  - Monitoring workers using nuclear density gauges
  - Smoke and gas detectors at the transfer lines connected to ViewPoint
  - Dust collectors at the belts connected to ViewPoint
  - Monitoring dust from the tailing or sludge pit with ViewPoint and ADR1200
- Sampling Systems
  - Collect representative samples
  - Provide a representative sample directly from material on conveyor belt
- Tramp Metal Detectors
  - Tramp metal detection and removal
- Blending Software
  - Blend coals from multiple sources to achieve a quality target
- Silo Tracking Software
  - Analysis on the inventory contained in downstream silos


At the Mine
Coal Shovel
Truck Dump
Breaker
Drag Line
Surface Mine
Slope Head House
Coal Bed Methane
Drainage Well
Mine Fan
Access
Shaft
Coal Bed Methane
Drainage Well
Slope Belt
Water Pump
Intake
Underground Mine
Natural Water Supply



Thermo SCIENTIFIC

Keeping You in the Black

Online Coal Analysis

Control coal quality coming from your mine and improve your preparation plant's efficiency. Thermo Scientific coal analyzers provide accurate elemental analysis of coal measuring sulfur, ash, moisture, calorific value and ash oxides online. They allow operators to control out-of-seam dilution and maintain a consistent product. Minute-by-minute coal quality information enables plant operators to maximize the recovery of combustibles while maintaining product quality within specification.

Complement the analyzers with software that sorts and blends coal and tracks the average coal quality of each downstream silo and bunker. The Thermo Scientific coal blending optimization system software blends up to six coal sources to meet quality specifications at the lowest cost. This software system allows you to minimize the use of higher cost or scarce coal resources and reduce the variability of the quality in your blends. Our silo tracking software runs on the Operator Console (OpCon) and gives the operator an analysis of the composition of coal conveyed to downstream silos or stockpiles. Achieve your desired target and enjoy the benefits of real-time awareness of trends and continuous monitoring with our software programs.

Eliminate the use of fiber optic cable and copper wire with the Thermo Scientific wireless system. It connects online analyzers to the OpCon as well as to mobile terminals wirelessly.

Bulk Weighing and Monitoring

We offer a variety of bulk weighing and monitoring equipment for the coal industry from conveyor protection switches, belt scale systems and metal detectors to continuous level measurement in coal storage.

Enhance your operation's safety and process control with conveyor belt accessories. Employ the conveyor belt technology you need with Thermo Scientific pull cords, speed switches and misalignment switches. Utilize chute plug switches for point level indicators to detect when material reaches or clears a preset location. Choose mechanical chute plug switches that rotate or tilt, capacitance chute plug switches or microwave chute plug switches to monitor chutes and hoppers throughout your operations. Our tripper position switch is often used to indicate position of a tripper on a conveyor with multiple discharge points, but can also be used anywhere an extremely heavy duty limit switch is required. This switch provides the user with position or alarm signals.

Monitor production output and inventory or regulate product loadout with our belt scale systems. Prevent damaged equipment downstream on conveyor belts and detect tramp metal such as bucket teeth, manganese steel mantles, bore crowns, bar scrap chains, tools and more.

Measure mass flow rate of conveyed materials through the mine or pit operations all the way to loadout. Our impact weighers provide continuous mass flow measurement in mechanical conveying systems, particularly in vertical flow streams, without interrupting the flow of material. Thermo Scientific weighbelt feeders reduce material waste and maintain blend consistency.

Belt Scale

Sample Stream Elemental Analyzer

Point Level Measurement System

Primary Sweep-Type Sampler

THERMO SCIENTIFIC PRODUCTS

(continued)

Sampling Systems

We also offer sampling systems designed to collect representative coal samples for process monitoring or quality control purposes. Falling stream sampling systems use falling stream sample cutters and crushers to divide and reduce a process stream to an ASTM sample. Sweep arm samplers extract an ASTM sample directly off the conveyor belt.

Level, Density and Flow Measurement

Our continuous level monitoring systems measure the continuous level of solids and liquids in sumps, bins and silos. Solid flow sensors rely on microwave technology which senses if solid materials are flowing against the wall of a chute. The point level switches are mounted externally on tanks, bins, hoppers, pipes, chutes, or other vessels to sense the level of liquids, slurries and solids. A relay contact output can control high or low level, or operate alarms to signal level changes. Liquid flowmeters measure the flow in a slurry pipeline using Doppler and transit time technology. Measure slurry and clear water in fpm or gpm to prevent settling and measure the mass flow.

Density systems measure the density in process pipes using gamma attenuation technology. The systems allow you to control heavy media density and the percentage weight of solids in a refuse slurry line. The thickener gauges monitor the slurry density and provide highly repeatable outputs to control the proper slurry density. They handle four major measurements—heavy media washer, heavy media cyclone gravity, refuse thickener underflow and over dense. These applications deal with the concentration of magnetite and water. The Thermo Scientific density systems offer a precise method to control these gravities.

Data Acquisition

We can help you handle your data acquisition needs with the SmartView family of paperless data acquisition systems. Streamline distribution, analysis and management of critical process data with systems featuring touch screen programming, front access electronics and multiple data storage options.

Level Measurement System

Tramp Metal Detector

Density Measurement System

Continuous Level Measurement System

Continuous Gamma Level Measurement System

Full Stream Elemental Analyzer

PRODUCT SUPPORT

Service and Training

Your operations will benefit from a comprehensive service offering including installation and maintenance, calibration, training and repair aimed to reduce down time and keep your process working. We offer multiple levels of product support agreements and repair services to meet the needs of your operation around the globe. We offer field service repair or depot repair on many of our products with options that fit your budget and your deadline.

We offer a comprehensive selection of training options to help you increase productivity by optimizing the use of your products and expanding the skills of your operators. You can receive hands-on instruction in your plant or one-on-one instruction at our training facilities. Courses typically cover basic operation, theory, calibration, and routine user level maintenance, but can include circuit board level troubleshooting and certification, if required.

Our spare parts are designed specifically for your Thermo Scientific system, and we make it easy for you to secure replacements by maintaining offices around the world that respond quickly to your phone or online request.

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