

## Ausenco: serving the cement industry from early stage to project completion

Ausenco has extensive experience, and has provided services to the cement, concrete and aggregate industries ranging from preliminary studies, detailed design, site resident engineering, construction consultation and programme management of projects ranging in size from small upgrades or modifications to major plant additions, upgrades and optimizations.

A selected list of completed project examples highlighting some of the company's cement handling experience include the following:

### TILBURY CEMENT PLANT EXPANSION

**Client:** Tilbury Cement Limited

**Scope:** Increase production capacity to 1,050,000 tonnes/year

**Services:** Detailed design, construction supervision assistance

Ausenco provided detailed design and assistance in construction supervision for modifications to increase the production capacity of the Tilbury Cement Plant by approximately 20% to over 1,050,000 tonnes/year.

Plant modifications included:

- ❖ removal of the existing planetary cooler and installation of a grate cooler and all ancillary work including conveyors and a new electrical room. Air from the cooler is ducted to a new electrostatic precipitator where it is cleaned before being discharged to the atmosphere.
- ❖ modifications to the pre-heater tower including a new calciner, a new gas burner to the calciner, and a new coal burner to the riser duct.
- ❖ conversion of the direct pulverized coal firing system to indirect firing, including the installation of an inert gas generator, dust collectors, and a new coal silo.

The major emphasis of the project was on design and contracting strategies to allow as much work as possible to be carried out while the plant was in operation. Cooler replacement was completed during tightly scheduled eight week plant shutdown.

### SUGAR CREEK PROJECT

**Client:** Lafarge Corporation

**Scope:** Industrial complex construction

**Services:** Design, site management, quality control, project co-ordination

The project involved construction of a preheater precalciner kiln line, raw grinding, solid fuel firing, along with storage areas and silos, material handling, finish grinding, shipping facilities and an underground mine.

Project features included the latest in dust control technology, centralized closed loop re-circulating water system, central air compressor station, central control room and laboratory.

Ausenco provided design, site management, engineering quality control, coordination and integration between the project team, contractors and the operations team.

The site management functions included engineering and construction quality control, safety OCIP (owner contractor



insurance programme), contract administration, schedule and cost monitoring, and document control.

### PORAYER® MANUFACTURING FACILITY

**Client:** Porayer North America

**Scope:** Design a new manufacturing facility

**Services:** Process assessment, design, construction management



Porayer North America (PNA) selected Ausenco to assess, quantify, engineer and develop the design for a new state-of-the-art North American manufacturing facility.

PNA manufactures and distributes Porayer®, expanded lightweight glass beads (.04 to 8 mm in diameter) using all colours of recycled 'Blue Box' glass as the base material.

Originating in Germany, the existing manufacturing process represented the culmination of 20 years of development in bringing lab results to a full scale mass production facility.

Existing clay expanding equipment and used cement handling equipment were modified, added, and re-modified routinely over this period, resulting in a process that could produce Porayer®, but was inherently convoluted and undocumented.

Ausenco assessed the existing process, designed and constructed the first North American facility on a fast track schedule.

To improve accessibility to equipment, a maximum gravity flow concept was used in the design of the material handling processes. The plant was constructed with a 33m-high roof,



which incorporates multiple standardized working levels.

Modularization of key process functions and phased design, procurement, construction and commissioning program allowed portions of the facility to be constructed before the design completion.

Constructed in a sensitive ground water recharge zone, the plant has zero process water/effluent discharge to the environment.

An intense safety programme incorporated work practices that minimized risk. The facility was constructed on budget with zero loss time accidents.

#### KANOWNA BELL BACKFILL PROJECT

**Client:** North Limited

**Scope:** Design and supervision of metallurgical testwork and preparation of capital and operating costs along with detailed engineering and preparation of all specifications

**Services:** Engineering, procurement and construction management (EPCM)



This project involved an initial study of backfill options, followed by the design and construction management of a surface cement slurry plant and pumped reticulation system, as well as the underground cement slurry/aggregate dosing and mixing system.

Ausenco's scope included the design and supervision of metallurgical testwork; preparation of final process flowsheets, mass balances, design criteria and P&IDs (process and instrumentation diagrams); preparation of capital and operating costs for the entire project to a  $\pm 10\%$  accuracy; detailed engineering and preparation of all specifications; procurement, inspection and expediting for all process equipment; and preparation and administration of all fabrication and site

construction contracts and site construction management, project management and commissioning.

- ❖ fully automated underground truck loading system;
- ❖ high level process control to optimize reagent dosing;
- ❖ one process operator to oversee surface and underground plant operations;
- ❖ surface crushed aggregate distributed via raise to reciprocating feeder.

#### LAFARGE CEMENT MILL No.3

**Client:** Lafarge Canada Inc.

**Scope:** Analyse and design structural steel braced frame building structure

**Services:** Structural 3-D analysis, steel design, concrete design, seismic design, vibration analysis, project management



Ausenco conducted the detailed design and project management for the structural and mechanical components for the Lafarge Cement Mill No. 3 plant in Richmond, B.C.

The 130ft x 65ft x 130ft-high structure is composed of braced frame structural steel with a number of elevated concrete floors.

The highly complex spatial layout of the equipment, ductwork, and conveyors, and the necessity to provide sufficient clearance for future removal of the main mill for maintenance required unique solutions for the structural configuration.

The building was modelled in 3-dimensions using the computer software SAP2000 to optimize and design the structural steel. Vibration analyses were conducted on the structural model to simulate the out-of-balance forces likely to occur during normal operations of the main cement separator cyclone.

The peak velocities and accelerations from this simulated vibration analysis were then compared to acceptable limiting criteria provided by Lafarge. Minor refinements to the structure were made to limit this vibration to an acceptable level. DC