



Chemicals

Client

Mitsubishi Polysilicon

Location

Theodore, AL, USA

Mitsubishi Polycrystalline Silicon Plant

Project Highlights

Examples of the value added by Lockwood Greene include the following:



- Fast-track project execution, utilizing more than 30 construction packages, achieved final design and construction completion of this project in only 18 months.
- Utilization of Lockwood Greene's unique ProActive Value Engineered Solutions (PAVES) program identified over \$5,000,000 in cost savings during an intensive one-month effort and throughout the life of the project.
- Tax-abated procurement reduced project costs by nearly \$1,000,000.
- Proactive cost control allowed completion of the project significantly under budget.
- Effective use of construction contractor financial incentives achieved on-time project completion.
- Effective management of a large multilingual, multi-cultural owner/engineer team achieved project quality, schedule, and cost objectives.

Project Description

To replicate their Yokkaichi, Japan Polycrystalline Silicon plant, Mitsubishi selected a greenfield site near Mobile, Alabama that could exchange raw material and recycle streams with an adjacent chemical plant. To successfully bring this 1,000-ton-per-year plant on-line in the shortest possible time, CH2M HILL Lockwood Greene was selected to provide conceptual design, Phase I and II environmental site assessment, technology transfer from a basic engineering package prepared in Japan, environmental permitting, process safety management, final process design, final facility design, procurement of equipment, instruments, and lump sum construction contracts, DCS software development, and full office and on-site construction management services. Lockwood Greene's multi-office project execution utilized the technical resources of their Atlanta Office and the local presence of their Mobile Office. The plant produces ultra pure (99.99999999%) polycrystalline silicon for subsequent use in computer chip manufacturing.

Features

The process includes HCl compression, fluidized bed chlorination, multi-stage cryogenic condensation, vapor purification by absorption and stripping, multiple distillation steps, hydrogen gas purification, and electrolytic vapor phase chemical deposition. Subsequent solid phase product processing, including grinding, and high purity water washing, drying, and packaging are carried out in a clean room facility.



Process equipment, instruments, and piping required extreme cleaning measures, including solvent and acid cleaning prior to erection. Process materials include metallic silicon, chlorine, hydrogen chloride, hydrogen, trichlorosilane, silicon tetrachloride, nitric acid and hydrofluoric acid. Materials of construction include ceramic-lined steel, dual-laminated PVC/FRP, ultra pure PVC piping, and jacketed piping.