

REDD-Wilkins Salt Group

Performance Improvement Projects

Project: Vacuum Plant De-Bottlenecking, Leslie Salt
Location: Newark, California

This project consisted of the analysis of a vacuum plant at a salt facility located in Newark, California. It was determined that the Swenson Evaporator was limited by a circulation pump. The pump was upsized and overall plant capacity was increased by 70%.

Project: Salt Refinery Optimization, Leslie Salt
Location: Lake Point, Utah

Analysis of a salt refinery located at Lake Point, Utah. On-site observation and engineering review indicated that a static screen and rotary dryer could be easily modified. A distribution system was added prior to the screen and several modifications to the rotary dryer were made which resulted in an increased plant capacity of 100%. Additionally, salt purity was increased significantly via an improved conveying and storage system.

Project: Salt Works Optimization, Panbros Salt
Location: Accra, Ghana

This project consisted of the analysis of solar salt concentrators and crystallizers in Accra, Ghana. Extensive on-site operational review and pond system modeling indicated potential for a 500% increase in salt production. A report was produced which outlined areas of improvement organized by capital cost. Suggested improvements included: pond redesign (with limited construction required), concentrator brine and rainwater management procedural improvements, pump operating suggestions, crystallizer management procedural improvements, and harvesting method changes.

Improvements were never realized due to lack of strong management and capital availability.

Project: Project Scoping Study, Cargill Salt
Location: Bonaire, Caribbean Netherlands

Due to perceived sub-optimal production REDD was hired to perform a high level solar salt production optimization study, which included visiting the site, gathering data, and analyzing various projects. REDD gathered project ideas from the facility personnel, proposed additional projects, and then analyzed and prioritized all projects which represented a 30% production increase at the Bonaire site. We provided a consolidated report of our findings as well as comprehensive recommendations for project execution.

Other Salt Projects

Project: US Gypsum Mill Modernization
Location: Sweetwater, Texas

This project consisted of the complete installation of an additional 50 TPH mill and ancillary equipment at a gypsum plant located in Sweetwater, Texas. The equipment, which weighed in excess of 20,000 pounds, was installed onto the top floor of a 100 foot building. A limited footprint was achieved through use of a vertical structure.

Interface between the new mill and conveyors and the existing mills and conveyors was carefully planned so that



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Installation could be performed during normal plant operations with strict downtime allowances for the rest of the plant.

REDD provided conceptual and detailed design for the project including process flow diagrams, general arrangement drawings, and equipment and material selection. REDD also provided project scheduling, cost estimating, construction management, document control, turnover package preparation, and material receipt inspection services.

Project: US Gypsum Primary Crusher Study & Installation
Location: Plaster City, California

Study of the options for increasing capacity of crushed rock available to the manufacturing plant in addition to the options for interfacing with the existing rail car loading. Several types of crushers and sizing systems were evaluated and considerations were made for limited available footprint. An air quality study for compliance with local and national health codes was also performed. The expansion to the rail car load out portion of the facility was scheduled to allow minimum downtime in operations.

Conceptual and detailed design for a 100 TPH Jaw Crusher and MMD Sizer system, including process flow diagrams, general arrangement drawings, and equipment and material selection. In addition, REDD provided scheduling, cost estimating and construction management services for the project.

Project: Great Salt Lake Minerals Expansion
Location: Ogden, Utah

REDD was hired to assist Great Salt Lake Minerals (GSLM) with a plant expansion to nearly double the throughput of the Sulfates of Potash (SOP) Plant. With REDD's help GSLM produced a Cost Estimate and Project Plan. This Plan focused on keeping the plant running nearly continuously (2 – 1 week long turnarounds for making tie-ins) and maintaining plant operations during construction.

REDD provided design development, process flow diagrams, general arrangement drawings, equipment and material review and recommendations, total project scope, schedule, cost estimate and construction oversight.

Project: El Nasr Salines Site Evaluation
Location: Alexandria, Egypt

Evaluated the Borg El Arab site to determine if improvements were possible to increase the yield of the pond system. Soils and water testing was performed in addition to information gathering from site personnel. Significant fresh water infiltration was discovered which was determined to reduce production capacity by up to 80%. A preliminary review of the salt refinery was also performed. A report was issued describing the challenges at the site and a proposed path forward.

Project: Meda Industrial Group Site Feasibility
Location: Riyadh, Saudi Arabia

Provided site data gathering and engineering in order to evaluate the feasibility of a remote salt works on the Red Sea. Soils samples and topographic data were compiled and a feasibility report was issued.

Production modeling was performed to determine the yield of the proposed facility. REDD then prepared a proposal which included budgetary estimates and a schedule for the completion of the pond and refinery construction.

Project: Preliminary Refinery Design
Location: Ghandidham, India

Detailed instructions to Indian engineers with respect to design and equipment selection for the Refinery built near



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Ghandidham in western India in the mid 1980's. Provided the preliminary design of a one story refinery layout to replace the original refinery which was destroyed by an earthquake in 2001.

Project: Cargill Feasibility Study

Location: Kandla Port, India

Feasibility Study for Cargill Salt to construct a Solar Salt Production Plant near the Kandla Port in India. Project included pond layout, process flow design and production schedule estimates before the project was abandoned.

Project: Produsal Solar Pond Design

Location: Los Olivitos, Venezuela

This project involved the design, solar pond layout, and process flow for Produsal at Los Olivitos near Maricaibo, Venezuela. Also involved consulting services for construction until the plant was sold to Cargill.

Project: Complete Solar Salt Works Design

Location: Port Headland, Australia

Complete Design / Build of a 2MM tonnes/year salt plant and shipping facility. Also included feasibility and post-construction operations.

