



December 8, 2007

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Subject: IRP 2008-2009 Action Plan

Short Term

- Continuous replacement of inefficient electrical equipment
- Continuous replacement of low-efficiency lighting throughout the plant
- Upgrade and modify existing processes for better efficiency
- Improve process cycles through "Theory of Constraints Procedures"

2007-2008 Status Report

- The titanium sponge production facility (Vacuum Distillation Process) had been expanded 43% and has been up and running since April 2007. The expansion included high efficiency motors and silicon controlled rectifiers (SCR) units to control the reduction and distillation furnace electrical heaters. The energy savings from the installation of the SCR units on a total of 13 furnaces and related equipment such as vessel lids and joint-pipes is calculated to total 645,600 KWH annually. From the start of the new equipment, efforts have been successful to adjust the operation of the new equipment as well as the older equipment.
- The second-generation chlorinator is budgeted for 2009 and all process engineering has been completed. Formal engineering on the chlorinator is slated for 2008-2009. This second generation chlorinator will improve and simplify the Purification process and reduce the amount of effluent that is currently discharged to the Water Conservation Facility thereby reducing the amount of energy used to pump, filter, and purify the feed materials.
- The ammonia system for chillers used in the Purification Process heat exchangers was replaced in 2006. An additional compressor with an

energy efficient motor has been purchased and installed. This amounts to a total of 940,000 KWH for both vintage systems.

- The “Theory of constraint Procedure” is in place and reviewed in the Management’s daily morning meeting. The purpose of this procedure is to recommend, study, design, and implement process cycle time reduction. The procedure ultimately eliminates the need to increase capacity by new systems and additional energy use requirements.

2008-2009 Action Plan

- A titanium-melting furnace has been installed in the Quality Control Laboratory. The basic design of the melting furnace shall reduce the pounds per KWH requirement for each ingot melted. The furnaces are operational and performing energy-efficient controls.
- The Titanium Tetrachloride Plant has received a completely new motor control center including a weatherproof enclosure with positive pressure capability to prevent the contamination of the sensitive electrical controls from fugitive chemicals in the process area. All replaced equipment such as electrical motors, transformers, motor control centers and PLC’s are high-energy efficient design.
- Three 350-Hp electrical motor driven air compressors have replaced three old compressors. The electrical motors and computer-monitored controls are high energy-efficient devices. Because of modulation control of the compressors, the units are not running full power during an on-off operation. The compressors are on a demand only control cycle which saves KWH consumption.
- Improvements to the chlorinators in the Titanium Tetrachloride Plant will feature PLC controls for solids, gas, and liquid flows. This will save in equipment operation cost and energy consumption.
- Overhead bridge cranes in Melting and Magnesium Recovery have been replaced with high energy-efficient cranes. Two additional cranes are planned for replacement during 2009 in Magnesium Recovery.
- Both aging overhead cranes in the Vacuum Distillation Plant have had the trolleys replaced with heavier design units the feature high-energy efficient motors.

- The motor control centers in Melting #113 has been completely replaced and relocated. This motor control center was located in the processing area and was exposed to dust and debris. The relocation away from the process area has been completed and all controls are new and energy-efficient.

2008-2013 (Five Year Plan)

- Continue the infrared monitoring program to eliminate high resistance points in transmission cables and electrical equipment.
- Installation of a Magnesium Recovery electrical bus by-pass switch to allow the isolation of any one electrolysis cell to be isolated from the electrical bus grid without tapping down the rectifiers. Isolation of one cell will improve the power factor of the building and reduce electrical consumption. This project is currently engineered and planned for construction during 2009.
- Replacement of Double Melt Furnace bus bar with water-cooled cables to improve the efficiency of the process and reduce the resistance losses caused from inadequate bolted bus joints.
- Replace the existing cooling system in Melting. The new cooling tower shall be equipped with energy efficient pump and fan motors to reduce the energy consumed for each gallon of water pumped and cooled.
- Modernization of the Chlorination Department with the installation of Quencher devices on all chlorinators to reduce the output of solids from the process. This is energy-efficient because of the addition of computer controlled equipment and energy-efficient motors.
- The installation of a new titanium blend and sort facility to improve the efficiency of quality control and provide energy saving inspection and material handling equipment.
- Retrofitting of the sponge crushing and sizing plant by adding an additional guillotine shear and screens. The additional equipment will permit extended maintenance and retrofitting of the existing aging equipment, which will insure the installation of energy-efficient improvements.

Sincerely:

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