

ENERGY PROJECT CASE STUDY

INDUSTRIAL REFRIGERATION SYSTEM

Financials

- ◆ **Pre-Project Annual Energy Costs: \$947,000**
- ◆ **Annual Energy Savings: \$253,000**
- ◆ **Total Turnkey Installed Cost: \$466,000**
- ◆ **Simple Capital Payback: 1.8 years**
- ◆ **Project IRR: 54%**

Description of Facility

- ◆ High Volume Ice Cream & Frozen Novelty Plant
- ◆ Approximately 5,000 hp of on-line compressors
- ◆ Multiple blast freezer operations
- ◆ Sweet water and pasteurizing systems
- ◆ Ammonia system divided amongst two separate engine rooms



System Description

- ◆ Ammonia refrigeration system running 4 distinct suction levels; - 65 °F, - 50 °F, -30°F, and + 5°F.
- ◆ System has 30 reciprocating and rotary screw compressors varying in size from 50 to 500 horsepower and 8 evaporative condensers.

System Opportunities/Issues

- ◆ Compressor and condenser sequencing preformed manually in old engine room.
- ◆ Condensing head pressures maintained at 150 psig minimum to avoid compressor trip outs.
- ◆ Problematic and inefficient blast freezer operations.
- ◆ Excessive flood back of liquid refrigerant

Project Description

- ◆ Install a master sequencing control system to enable optimal control of compressors and condenser staging and to allow tighter control over suction pressures.
- ◆ Retrofit several existing condensers with variable speed drives.
- ◆ Convert existing blast freezer fans to variable speed driven control with premium efficiency motors enabling increased production and reduced heat load within the blast freezer.

Project Benefits

- ◆ \$88,000 in annual energy saving by implementing low cost modifications to allow head pressures to safely operate below 120 #.
- ◆ Rerouted suction line to second intercooler where excessive liquid can be used effectively thereby eliminating a continuous false load on the system and savings approximately \$96,500 per year.
- ◆ Developed comprehensive Measurement and Verification (M&V) plan to document savings.
- ◆ Energy savings from implementing developed measures at over 25% with the added benefit of enhancements to plant productivity.

