

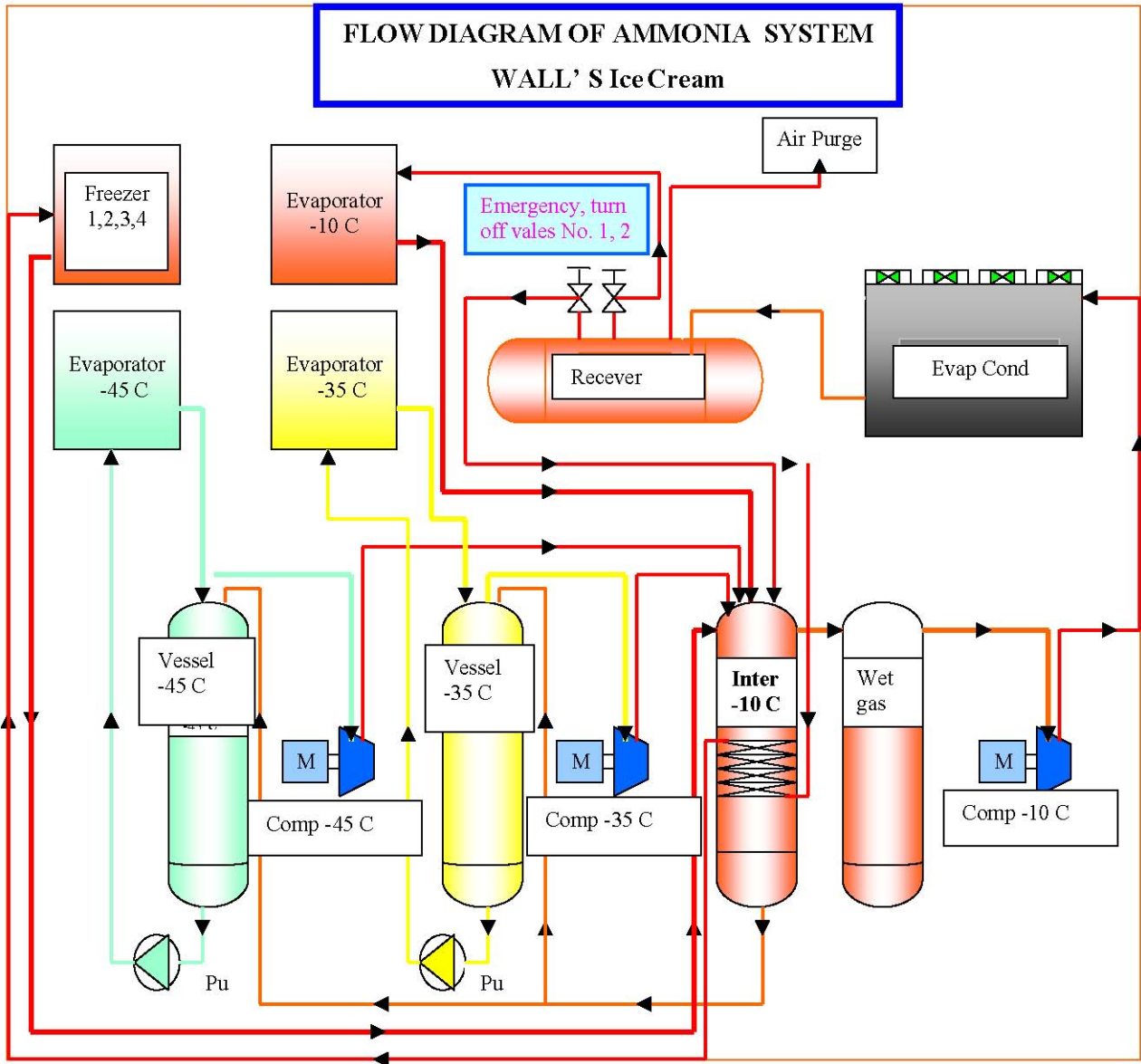
# **Energy Saving of Wall's Ice Cream Factory**

## **Energy Saving Policies of Unilever Company**

**Unilever realized the value and importance of using energy efficient practices as energy is the main factor of the rising production costs. The following practices we implemented:**

- Define goals and plans according to energy saving policies.**
- Control and Manage energy consumption to reach the optimum capacity by tracking and evaluating usage regularly.**
- Design and develop machines and equipment to maximize performance and energy efficiency.**
- Encourage and support water conservation and recycling.**
- Encourage and support the training of employees about ways to conserve energy.**
- Encourage and support employees to participate in energy saving practices.**
- Strictly enforce all relevant energy saving laws.**

The cooling system of Wall's Ice Cream uses Ammonia as a cooling substance with a screw-type compressor. Their main problem is the formation of scale in the tubes of the evaporative condenser, causing an excess of heat and a decrease in heat transfer ability. When the scale continues to form over time, the pressure of the ammonia at the discharge tube is quite high. This leads to an increase in energy consumption. The company solved the problem by scraping the scale from the condenser tubes, followed by chemical usage. This method took a long time, it was complicated, and involved high costs. This process had to be done every 18 to 24 months.



### Evaporative condenser cleaning- typical method



Install scaffolding on both sides



Scale on the condenser tube



Knocking scale off the system



1,700 to 2,000 lbs. of scale removed

## Problem solving was divided into 2 parts

### 1. Control pressure in Ammonia system

Controlling the pressure of the ammonia system is to preserve the condition of the evaporative condenser so that the heat transfer is optimal. By adding the biochemical “**Micro-Nice® D-5**” into the evaporative condenser, the scale was removed from the evaporative condenser and the condenser tubes. With a clean evaporative condenser, the heat transfer will be much more efficient. D-5 simultaneously prevents new scale from forming, so the system will maintain its efficiency.

#### Addition of Micro-nice® D-5



Scale falls to the bottom



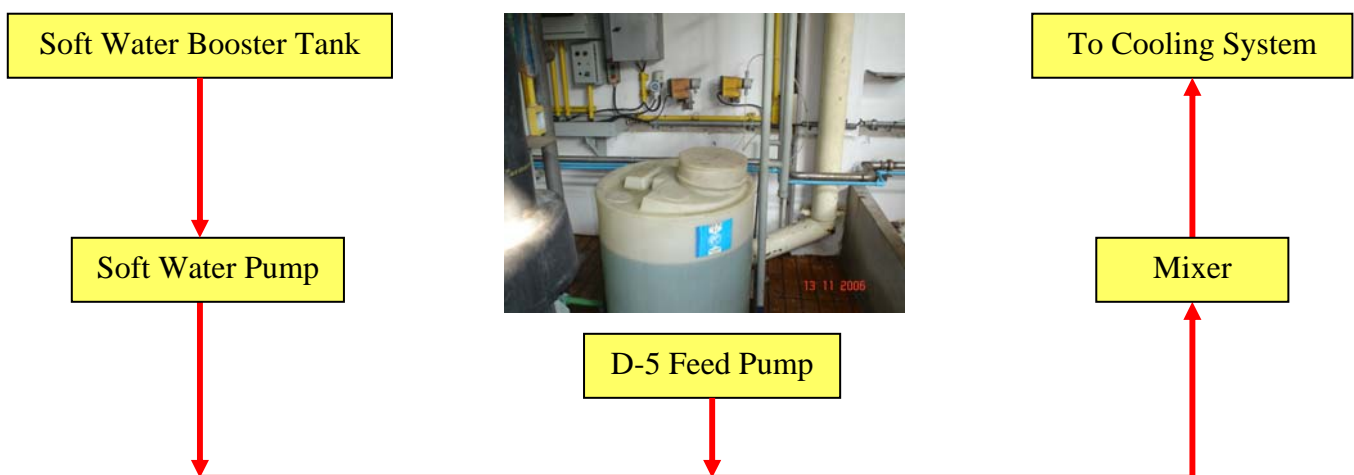
Scale falls off of the condenser tube



Scale collected from the evaporative condenser

After the pressure in the ammonia tube had been lowered, **Micro-Nice® D-5** was added to the Chiller until the pressure in the Freon feeder pump declined to the levels of a new pump. In the past, the company used chemicals to clean the chiller condenser every 6 months. After using **Micro-Nice® D-5** in the evaporative condenser and chiller, the maintenance time was reduced, chemical cost was reduced, and the energy consumption resulting from the scale problem was reduced.

#### Flow Chart of Micro-Nice® D-5 feed



## 2. Control work load system

When the pressure in the cooling system of both the ammonia system and the chiller could be controlled, the second step was to set up the machine controlling system in each compressor to work according to the work load requirement. Each compressor will be managed to work at their maximum capacity for the machine. If the load demand is too much for the one compressor, then the controller will order the next compressor to work. When the load reduces, the controller will stop the latest compressor that worked. Normally, many compressors are running at one time, each working well below their rated capacity. This results in much higher energy consumption.

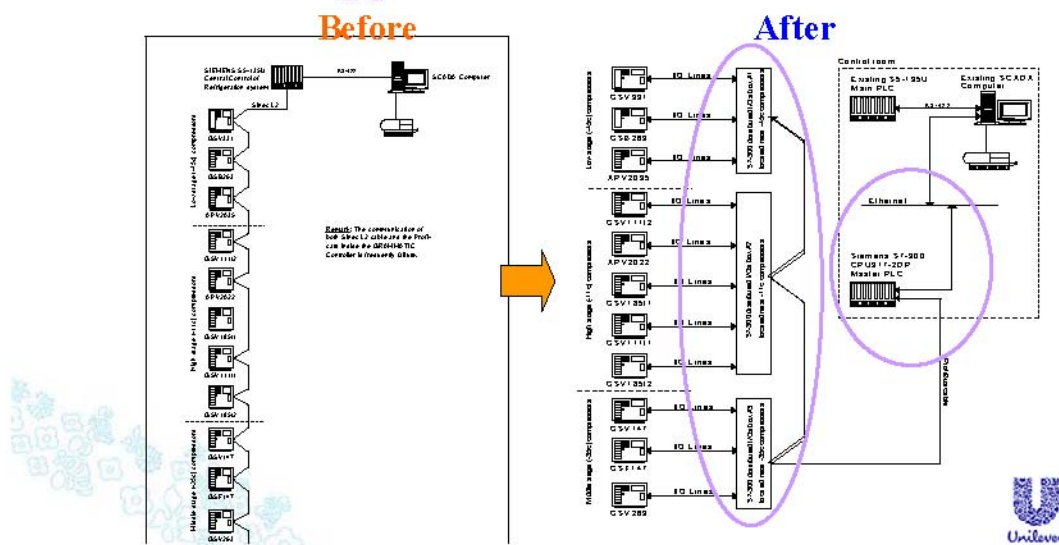
From these 2 implementations, Walls Ice Cream reduced their energy costs by about **\$150,000 US per year (Approximately 5 million Thai Baht)**. Moreover, the company could take advantage of tax reductions for energy savings supported by *The Department of Alternative Energy Development and Efficiency, Ministry of Energy* and *The Board of Investment of Thailand (BOI)* by refunding 30% of the amount that the company can save (not over \$55,000 US, about 2 million Thai Baht). And this project had already passed the **audited** process from *The Department of Alternative Energy Development and Efficiency, Ministry of Energy*.

NH<sub>3</sub> Compressor

Part 2

Install master PLC in order to control all Ammonia feeders in each system to work as a real master/slave

### ▶ Working process



The upcoming project is to study the possibility of recycling the water from the production processes to be used in the cooling system.

Approve By

( Pitchaya Madary )

Engineering Manager Food & Ice-Cream

