

Scalewatcher Application #01-GE

Customer: General Electric Canada
Nuclear Fuel Pellet Operations
1025 Lansdowne Ave.
Toronto, Ontario

Application: Cooling Water System for Electrically Heated Furnaces

Prevention of scale build-up in the cooling water holding tank, the steel jacketed Furnace cooling water systems, cooling towers and associated equipment using *Scalewatcher* electronic descaling technology.

Problem Definition:

A major operating problem in the noted application is scale build-up on the walls & piping of the steel jackets of the Furnaces, the stainless steel holding tank, degrading of the cooling towers and associated equipment.

The previous method of controlling this problem was by the use of continuous chemical treatment plus acid treatment every 2 years. This treatment, while reducing scale build-up, unfortunately caused leakage within water jackets, piping, valves, pump seals etc. and degradation of the cooling towers.

The objective of this evaluation is to confirm the effectiveness of the *Scalewatcher* electronic descaling technology in overcoming the problems associated with scale build-up. Also removing the high cost of using chemicals, which additionally cause problems within the system.

DSI Canada additionally assisted GE Canada in its' best practice and six sigma programs, by introducing an environmentally friendly solution to the problem.

Scalewatcher Installation:

The electronic descaling system was installed on the feed pipe to the cooling tower for the recirculating system. The equipment was installed July 19,1999 and tested to ensure that it was operating correctly.

The installation of the descaling system was very straightforward; a coil of # 12 wire was wrapped around the feed pipe, and the two ends of the coil were connected to the *Scalewatcher* unit. No modification to the existing piping was required.

Observations - Site Visits:

July 19, 1999

The equipment was installed and a Gauss meter was used to confirm that the Unit was functioning and sending the oscillating signals into the pipe. A visual inspection of the holding tank and of the flows at the Furnaces was conducted.

Sept 01, 1999

The *Scalewatcher* unit was determined to be operating as per specification. A Gauss meter check was conducted and the oscillating signal was found to be satisfactory. The tank was visually inspected and found to be clean, the furnace discharge flows were found to be normal.

Sept 22, 1999

The *Scalewatcher* unit was determined to be operating as per specification. A Gauss meter check was conducted and the oscillating signal was found to be satisfactory. The tank was visually inspected and found to be clean, the furnace discharge flows were found to be normal. A backpressure test was conducted on the discharge piping, when pressure was released scale in solution was easily released from the water jackets. This indicated that a soft build-up was becoming free from the jackets.

Dec 06, 1999

The *Scalewatcher* unit was determined to be operating as per specification. A Gauss meter check was conducted and the oscillating signal was found to be satisfactory. The tank was visually inspected and found to be clean, the furnace discharge flows were found to be normal. A backpressure test was conducted on the discharge piping, when pressure was released scale in solution was easily released from the water jackets. This indicated that a soft build-up was becoming free from the jackets.

July 17, 2000

The *Scalewatcher* unit was determined to be operating as per specification. A Gauss meter check was conducted and the oscillating signal was found to be satisfactory. The tank was visually inspected and found to be clean, the furnace discharge flows were found to be normal. As GE Canada was in the process of shutting the Furnaces down for their Annual Plant Shutdown, it was recommended that water samples be taken and that the stainless steel holding tank be pumped out. It was noted by GE Canada that there was an amount of scale in the bottom of the tank, indicating that scale had been released from the Furnace water jackets.

Summary:

The system has been operational for a year with no adverse affects to the process. On this application, the *Scalewatcher* electronic de-scaling system has performed to expectation in eliminating new scale deposits and observations indicate that descaling of the equipment of pre-deposited scale is evident.

An observation by of the GE Canada maintenance staff was that when the furnace heating element holders were disconnected from the cooling piping for standard cleaning, no evidence of hard scale deposits was found. This cleaning has typically been an annual requirement due to hard scale build-up restricting flow in the piping system. Another visual inspection noted that the cooling tower had no evidence of scale build up.

It should be noted the pH and hardness of the water was not altered by the process and the system has run free of chemicals previously used to prevent precipitation of unstable mineral ions in the cooling water. Also noted is that an algaecide was used for the cooling tower.

The *Scalewatcher* electronic water treatment device appears in all areas to have allowed the process system to run as specified and has eliminated the need for future shutdowns due to scale buildup in the process.

Water Sample Test in PPM (except pH)

July 25 2000	PH	Alkalinity	Cl's	Total Hardness CaCO ₃	Conductivity Micromhos	Magnesium Hardness	Calcium Hardness	Appearance
CT #1	8.5	182	100	318	856	116	202	Clear, colorless
CT #3	8.6	228	92	344	867	26	318	Clear, colorless

CT#1 is treated using *Scalewatcher* electronic descaling system.

CT#3 is treated using conventional chemicals.

KEL Automated Systems
Jason Todd, P. Eng.