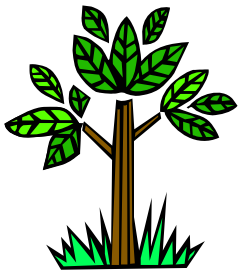
C B H Ltda.

Special Fluid Treatments

TECHNICAL REPORT 04

DESCALING ELECTRONIC EQUIPMENT

ScaleWatcher



TECHNICAL REPORT 04

ELECTRONIC DESCALING EQUIPMENT

Rancagua, April 15th, 2009.

Post-Sales Service, Personal Training

Regarding the installation of a ScaleWatcher electronic descaling device in a leach water aqueduct between Mine and Head Pool SX, we can inform the following:

1. This report covers the visits made on March 23rd, April 2nd and April 8th, 2009.

2. Visit of March 23rd: Measurements were taken of the accretion thicknesses in the points indicated in the previous report. At the discharge opening into the Head Pool, we spotted detached crusts in the discharge area and total cleanliness in the interior of the tube.

   Upon verification of the operation of the SW equipment, we verified that it was still out of service, since it did not have an electrical power cord at the operating location.

   This stoppage of the process shows an increase in accretions on the points indicated below. Point B1 shows a particular sensitivity to the formation and dissolution of large quantities of accretions.

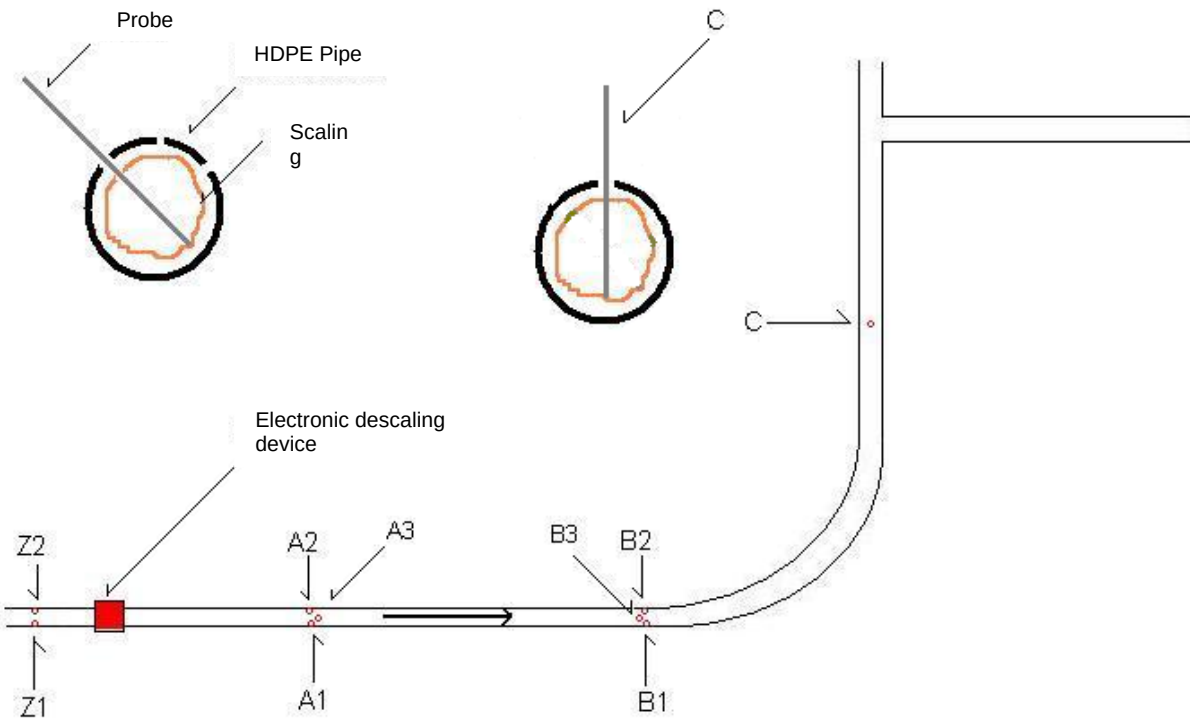
   We were also able to verify the presence of accretions in the probe entry points, indicating clearly the beginning of new accretions in that area of the tube. This condition was not evident while the SW was functioning correctly. This condition signaled that the dry parts of the tube and the water borders present a greater formation of accretions.

3. Visit of April 2nd: In measurements taken, we confirmed that there is little variation, with the exception of Point B1, which presents the beginning of a decrease in accretions due to the fact that electrical power to the SW equipment has been restored.

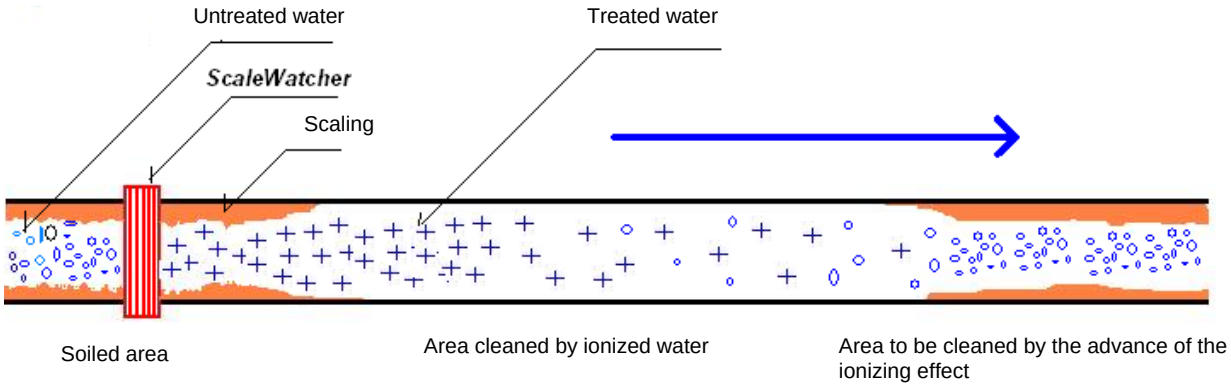
4. Visit of April 8th: During this visit, we verified some variations in Point Z1, which is located upstream with respect to the location of the SW. The variation is manifested as an increase in accretions. However, the most interesting episode is the measurement taken at Point B1, which has decreased ostensibly the

thicknesses of the accretions, ever since electrical power was restored to the SW.

Diagram of the outline of the aqueduct, points of control and location of the electronic descaling equipment



A1, A2, A3, B1, B2, B3, C, Z1 and Z2 are probing points.



The graph shows the progress of the cleaning effect as the ionized water acts on the

accretions.

In the measure in which the tube is cleaned, the action of the ionized water moves forward until it dissolves the accretions located furthest away.

The following chart summarizes the measurements of accretion thicknesses in the different points shown in the previous diagrams.

Date	Sampling point	Z1	Z2	A1	A2	A3	B1	B2	B3	C
Control 01	Probe measurement	36	47	47	38		19	47		46.5
14/Jan/2009	Scale thickness	11.5	0.5	0.5	9.5		28.5	0.5		1
	Difference in period									
Control 02	Probe measurement	34.5	47.5	46	38		31	47.5		
21/Jan/2009	Scale thickness	13	0	1.5	9.5		16.5	0		
	Difference in period	-1.5	0.5	-1	0		12	0.5		
Control 03	Probe measurement	s/l	s/l	47	37.8	46.5	46.1	47.3	47.1	46.8
04/Feb/2009	Scale thickness			0.5	9.7	1	1.4	0.2	0.4	0.7
	Difference in period			1	-0.2	-1	15.1	-0.2	-0.4	-0.7
Control 04	Probe measurement	s/l	s/l	47	37.5	46.7	33.2	47.3	47	46.4
11/Feb/2009	Scale thickness			0.5	10	0.8	14.3	0.2	0.5	1.1
	Difference in period			0	-0.3	0.2	-12.9	0	-0.1	-0.4

Note: Equipment is not connected to the electrical power supply.

Control 05	Probe measurement	46	47	47	37	46.5	38	47	47	47
04/Mar/2009	Scale thickness	1.5	0.5	0.5	10.5	1	9.5	0.5	0.5	0.5
	Difference in period	-3	0	0		-0.5	4.8	-0.3	0	0.6

Note: Equipment is not connected to the electrical power supply.
B1 and A1 are obstructed when the stopper bolt is removed.

Control 06	Probe measurement	46	47	46.5	37.5	46.5	30	47	s/l	s/l
23/Mar/2009	Scale thickness	1.5	0.5	1	10	1	17.5	0.5		
	Difference in period	0	0	-0.5	0.5	0	-8	0		

Note: Equipment is not connected to the electrical power supply.

Control 07	Probe measurement	46	47	46.5	37	46	35	47	s/l	s/l
02/Apr/2009	Scale thickness	1.5	0.5	1	10.5	1.5	12.5	0.5		
	Difference in period	0	0	0	-0.5	-0.5	5	0		

Note: During this period, electrical power supply is connected to the equipment.

Control 08	Probe measurement	41	47	46.5	37.5	s/l	45.7	47	s/l	s/l
08/Apr/2009	Scale thickness	6.5	0.5	1	10		1.8	0.5		
	Difference in period	-5	0	0	0.5		**10.7**	0		

Preliminary interpretation.-

Points A1, A2 and A3: In general, these do not present great variations since they are the closest to the electronic descaling device.

Points B1 and B2: Point B1 presents a significant increase in sedimentation during the period in which the SW equipment had no electrical power supply. Point B2 does not present any modification since it is practically clean. AT present, those two points present little variation in thickness. However, in one of them (B1) there are strong variations with a tendency to increase and decrease (with and without electrical power supply). This is probably due to the accumulation of solid particles in suspension which are displaced easily once the ionic bond is broken with fine particles.

Points A3 and B3, correspond to the measurement at the bottom of the pipe, which presents no variations, since they are almost clean.

In general, due to the short time elapsed since its installation, we have observed important thickness movements, especially at the point with the most accretions (B1), which will be studied with more careful attention.

At Point C we only measure the bottom of the pipe and it presents a clean floor.

What has drawn our attention is the fact that ever since the electrical power supply was suspended, accretions have appeared in the top part of the pipe, because when we retired the stopper bolts we observed minor obstructions in that location, which had not been observed in previous measurements. This indicates that the accretions are deposited in those locations where the wringing is performed in a semi-full pipe, in areas which are only humid due to splash water. The highest effectiveness of the system is observed in those areas susceptible to accretions, being these, areas with curves and changes in slope in semi-full pipes. Since the installation of the SW, there are various points which remain almost entirely clean, in some cases, and totally clean in others.

At the discharge points of the fluid into the Head Pool, we can observe a visible removal of accretions.

Ricardo Barteau A.
General Manager