ELGRESSY
ENGINEERING SERVICES LTD.

EEC SYSTEM PILOT REPORT

Electro Coagulation for Silica Removal

Nestle, Bangkok

14th of June 2015

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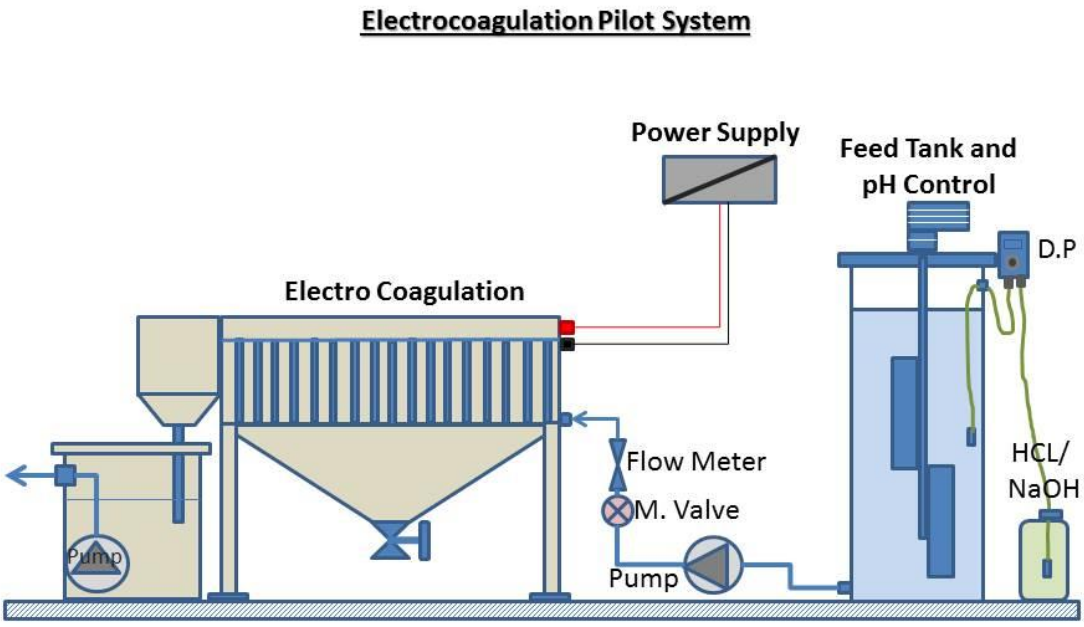
1. The samples from Nestle factory in Bangkok, Thailand, arrived to our factory on the 11th of June 2015, after it was released by the environmental ministry.

Fig 1. The EEC pilot system sketch.



2. We received 3 samples of 15 liters each;
   a. A sample from the raw water tank
   b. A sample from the brine pond
   c. A sample from the reject evaporator

   Note: only on the raw water sample it was written that the sample was in fact of the raw water. The 2 other samples had no indication to where the water came from.
   Therefore, we determined that the raw water sample will be sample "A" (as it was indicated on the tank), the light yellow sample is "B" and the darker sample is "C".

Fig 2. The water samples – BEFORE the pilot test

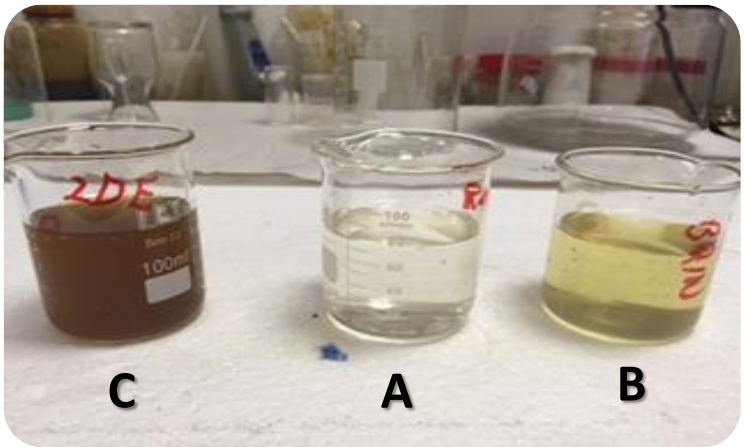


Fig 3. The water analysis before the EEC pilot operation.

Test		A	B	C
Conductivity	**µS/cm**	1,268	11,080	(above 20 mS)
pH		8.20	7.32	8.43
TDS	**ppm**	634	557	-
Silica	**ppm**	11.80	27.50	-
Appearance		**Clear yellow**	**Light yellow**	**Dark brown**

- Note: since the water of sample C were so polluted and arrive to our laboratory after ~2 weeks it was already contaminated and not stable enough to measure the silica level in the sample.

3. On the 14th of June 2015, we executed the EEC pilot while working with different levels of pH in order to find the most effective pH level in which the silica is at its maximal removal.
   - We then found that while using a pH level of ~10, the silica was at its maximal removal.

4. The tests were made with a one through flow of 5 liter/hr.

5. The tests also included various variations of electrodes – aluminum, aluminum/aluminum, aluminum/iron, iron, iron/iron.
   - The best results were received while using aluminum electrodes and while using reverse polarity.
   - We also executed tests with different voltages and current levels.

Fig 4. The Silica results after the EEC system operation

Test		A	B	C
Silica	**ppm**	0	0	9.80
Appearance		**Clear**	**Clear**	**Clear yellow**

As you can see in the table in Fig 4, **the EEC system is capable of removing almost all the silica from the water.**

Fig 5. Example of the water samples – BEFORE & AFTER the EEC treatment

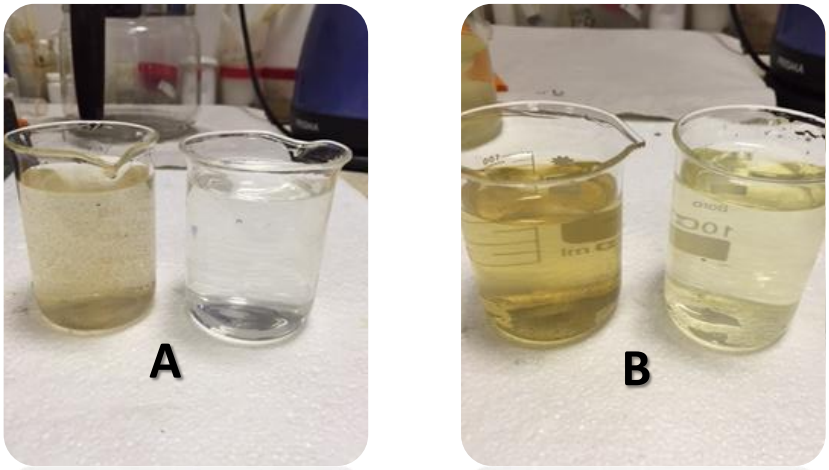
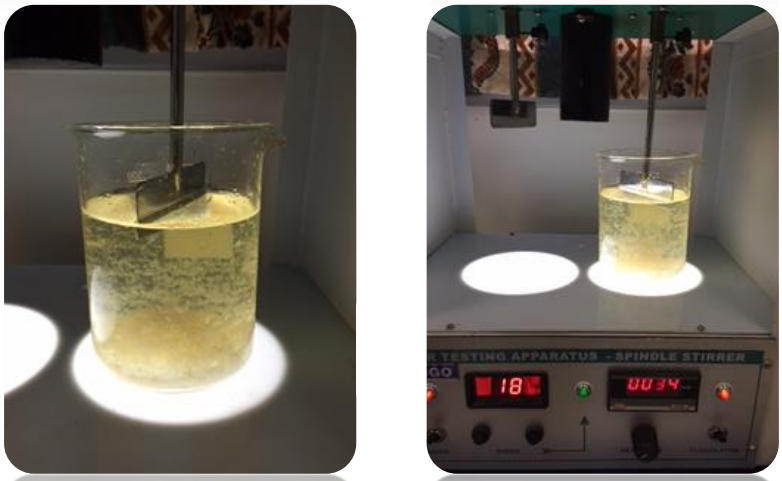


Fig 6. Sample C – during the process of the EEC system

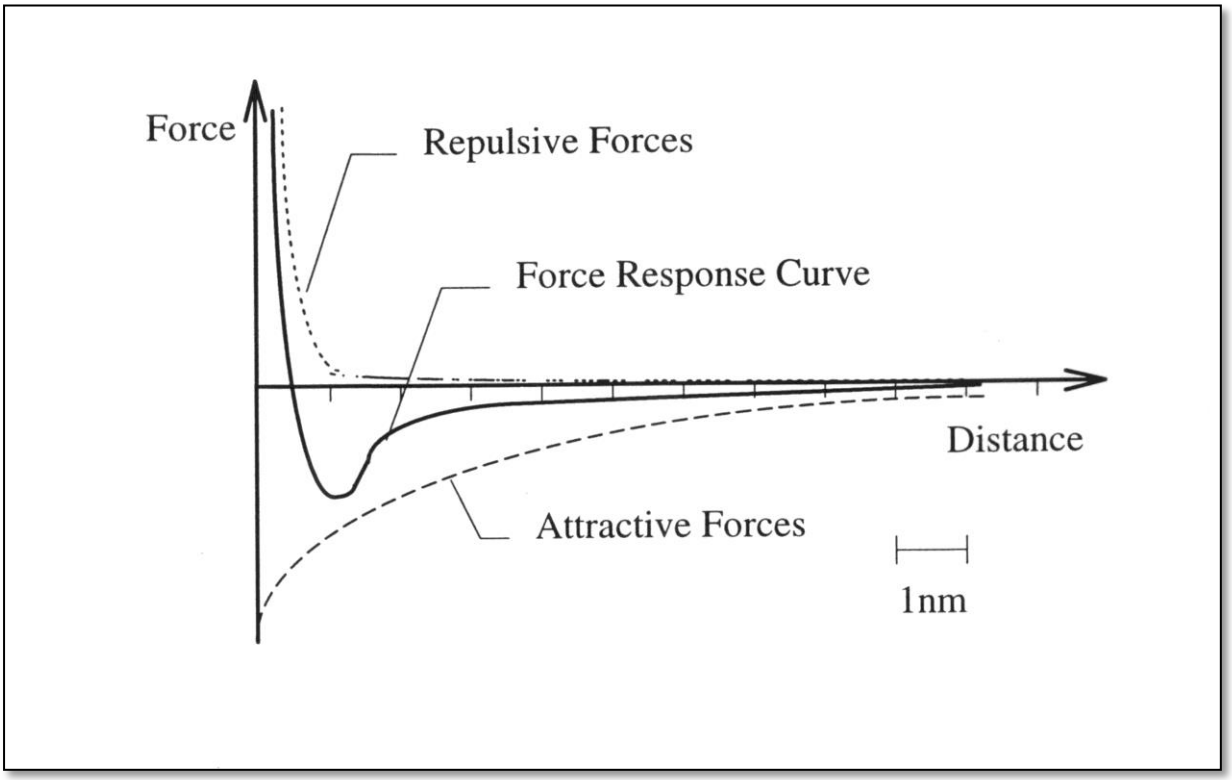
- Note: the high concentration of foam indicates that the sample contains many organic substances.

Fig 7. The sample after the EEC treatment and during the precipitation on the stirrer



6. The distance between the electrodes in the pilot system may not be the distance in the real-size EEC system.
   The distance between the electrodes in the real-size EEC system will take into consideration the van der Waals forces, which is expected to accordingly improve the results.

Fig 8. The Van Der Waals Forces Graph



7. Elgressy will design the full-size EEC system, electrodes, power supplies, parts, cells dimensions, weight, sketches and etc after we will receive the purchase order.

Best Regards,
Elgressy Gaby