

Case Study 1



Location: SEZ, Dahej, Gujarat

Customer Category: Specialty Chemical Manufacturer & Exporter

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B8, Kaveri Society,
Arunachal Road,
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Problem Statement

Customer was facing frequent pump suction strainer choking in +5° C Chiller plant and had to clean it twice a shift.

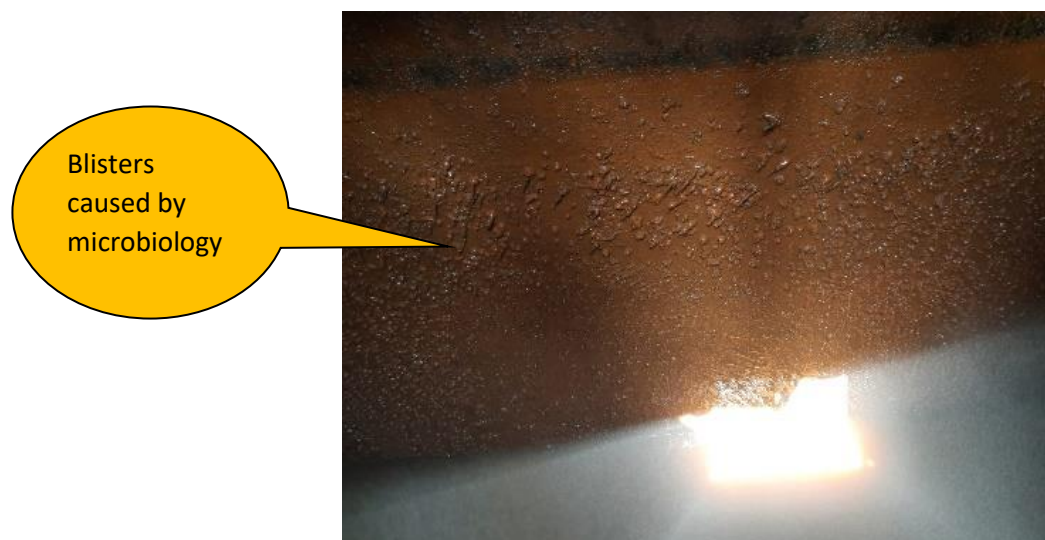
Problem Mitigation Strategy

- Focus on root cause by water sample collection, discussing existing water treatment program & operational practices.
- Sample of chilled water supply, return and make up were collected.
- Customer also share that they were dosing caustic to increase pH along with water treatment chemicals.
- The system details shared were as under:

Description	+ 5 Chiller
Design Circulation Rate in m3/hr.	30
Delta T in o C	1.8
Tank Volume in m3	8
Water Flow m3/hr.	24

Findings & Observation

- Based on the details provided & observed, COP calculated was to be 2.94
- Strainer was full of iron chips.
- Chilled water tank was corroded due to MIC. Blisters were observed.



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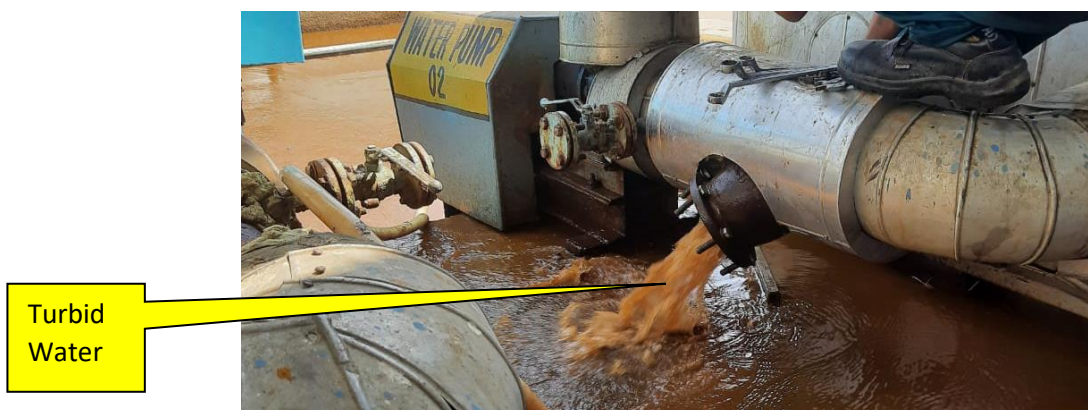
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- Corrosion was also due to caustic attack also as caustic was being used to elevate pH in circulating water.
- Water parameters were as follow:

Parameter	Unit of Measurement	Results	
		Make Up	+5 Chiller
pH		7.8	9.1
TDS	ppm	173	1023
TH	ppm	51	189
T Alk	ppm	43	203
Cl ⁻	ppm	22	193
Turbidity	NTU	2.73	53
TVC	Org/ml	NA	10 ²
SRB	Org/ml	NA	10 ²

NA* Not Analyzed



Summary of Problem

It was summarized that strainer was being choke because of iron chip and there was severe corrosion because of poor water treatment quality and ineffective water treatment program.

Course of Action

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Precleaning and passivation was carried out which was followed by regular water treatment program.

- **Flushing:**

To remove debris like silt, sand, welding slags, oil/grease, and other contaminants normally present in new pipeline systems. Open flushing is carried out for pipelines and header.

- **B. Pre-cleaning:**

The objective of chemical cleaning of Mild Steel pipelines & associated system is to remove loose rust, mill scale etc. normally present in internal surface of new pipelines. The pre-cleaning process is very important because these contaminants also prevent formation of uniform Passivation film.

- **Passivation:**

Effective passivation is imperative for optimum corrosion inhibition. Regular chemical treatment will function well only in systems where the initial passivation is correctly done.

Conclusion

Satisfactory P & P was carried out, which can be concluded from following observations:

- pH level of above 9, which is required for chiller water system.
- No microbiology was observed after P & P activity. TVS & SRB level were less than 10 org/ml.



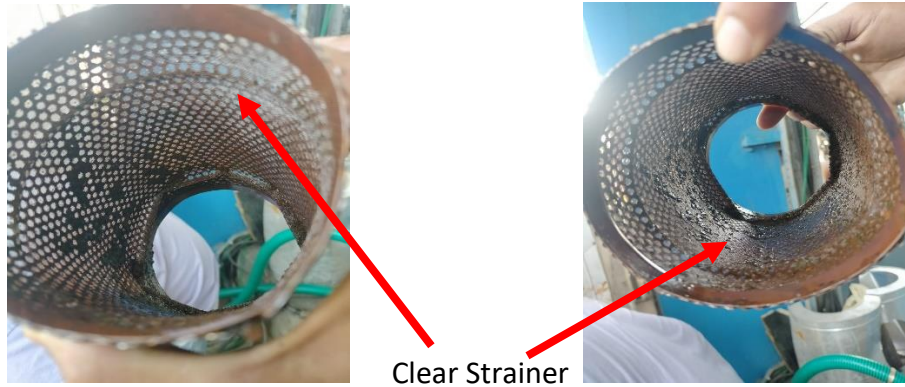
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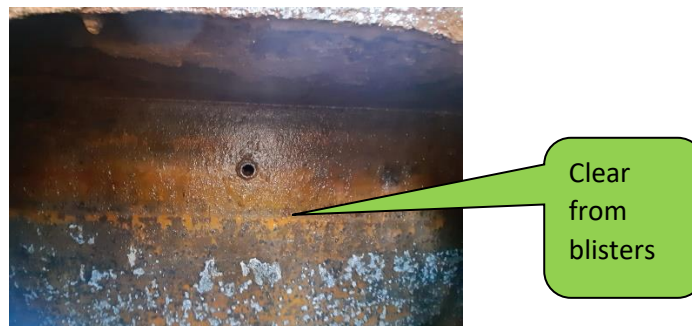
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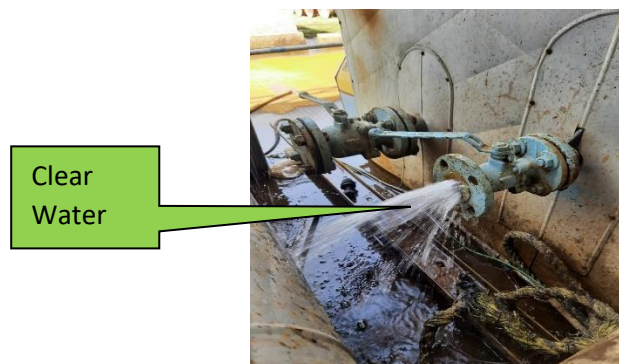
- Pump strainers were clean; minor particles were observed. Prior to P & P activity, strainers had to be cleaned every day at least once. Refer to the picture.



- Tank walls were clean from blisters caused by microbiology. Refer to the picture.



- Water was clear with turbidity less than 20 NTU. Refer to the picture.



Recommendations

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- Regular chiller and cooling water treatment shall be carried out which take care of all water born issues of corrosion, scale, deposit, and microbiology. In absence of effective regular treatment, corrosion is likely to reoccur.
- Filter shall be installed to minimize the fouling in the system caused by inlet water from plant.
- Treatment program shall be regularly monitored and adhered to.
- Imparting the training is also highly recommended.

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