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- Boiler type: Water tube packaged boiler 3T/H
- USP type: USP-500 (Acoustic Power 7.5W)
- Installation date: Aug 4, 1997
- Water chemistry tests
  - 1st Test: Aug. 21, 1997
  - 2nd Test: Oct. 23, 1997
- Visual inspection on 83 days after installation: Oct. 27, 1997

**Test Results**

	pH	Cu	Zn	Fe	Salt	SS	SO <sub>4</sub>	Na	K	Ca	Al	SiO <sub>2</sub>	Mg
Pretest	8.5	0.02	0.31	1.33	17.7	113.7	28.8	3.98	1.02	22.44	0.17	-	3.64
1 <sup>st</sup> test	10.5	0.02	3.32	29.0	117.0	673.2	119.4	35.6	15.87	104.7	0.59	-	0.93
2 <sup>nd</sup> test	10.7	0.03	3.42	26.81	184.4	984.0	271.1	98.75	29.66	111.6	0.66	-	7.38

© **Observation**

- pH increased
- All the chemical components analyzed increased in their concentration
- Concentrations of most elements increased far more during the period between initial check up date and the 1st test date than during the period between the 1st test date and the 2nd test date.

© **Evaluation**

- Fe, Ca and Mg, major contributors to the formation of scale inside boiler, obviously increase in the water, indicating that the existing scale was being actively removed by the effect of USP installation.
- Comparatively less increased concentrations of most chemical components between the 1st test date and the 2nd test date implies the precipitation of scale was being suppressed/prohibited.

© **Visual Confirmation**

- Old water pipes were replaced with new pipes in the boiler drum when the USP was installed. The surface of these new pipes was slightly gritty and has no scale.
- On the bottom of the boiler drum the exfoliated mass of scale was being accumulated as a mixture of sludge.
- No scale was observed on the water pipe surface, suggesting that scale formation was being prohibited due to the USP installed.

© **Conclusion**

- Although any chemical treatments for the removal of scale water were not carried out, the chemical analysis of waters in the boiler drum scale strongly indicates that its existing scale is being removed and that the scale formation is also being prohibited and suppressed inside the boiler after the USP was installed.