

## **DAMAGE OF A BOILER ECONOMIZER TUBE**

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A case of cracking/leaking of a boiler economizer tube in a thermal power plant is described. Despite systematic monitoring of the thermal plant operation there is a risk of the economizer tube failure. Cracking or leaking of the tubes may endanger operation of the steam generator and cause loss of control leading to impairment of other parts of the boiler tubing. A disruption of the plant operation that occurs as a result necessitates repair or replacement of the damaged parts. In addition to repairing the damage it is essential to find out the cause of it. In our case of cracking/ leaking of a boiler economizer tube, pieces of the tube were taken for examination and cut into 10 x 10 mm plates. A number of the plates were examined directly by means of a Philips X - ray diffractometer with  $\text{CoK}_\alpha$  radiation using the counting technique, and by means of a scanning electron microscope in a beam of secondary electrons. The plates that were prepared by grinding with a rough/fine abrasive paper and etched, were analysed by means of a MEF2 Reichert light microscope and a MEBA micrometer using the photographic technique known as the back reflection method. Concentrations of the  $\text{Fe}_3\text{O}_4$ ,  $\alpha\text{Fe}_2\text{O}_3$ , and FeO phases were determined by the method of external standard. The values obtained were treated mathematically.

Results of investigation demonstrated the following phenomena: the presence of products of high temperature corrosion, water, and phase interactions, inhomogeneous distribution of sludge within the magnetite film as well as of the  $\text{Fe}_3\text{O}_4$ ,  $\alpha\text{Fe}_2\text{O}_3$ , and FeO phase concentrations, altered wall thickness, and microstructural changes accompanied by the appearance of intercrystalline corrosion. According to the literature data the reason for this could be found in the unsatisfactory quality of the fuel and water as well as in inadequate process management.