

BORON MEASUREMENTS IN COAL FIRED POWER PLANT EFFLUENT

BACKGROUND

The US EPA has begun to regulate the discharge of Boron from Coal Fired Power Plant Effluent. The Power Plant utilizing our analyzers has installed a Boron removal system. To monitor this system four HANDYChem Analyzers were added to the process. These analyzers continuously performed Boron analyses during each step of the Boron removal process.

ANALYZER SETUP

A Pennsylvania Coal Fired Power Plant placed four HANDYChem analyzers on their boron removal system. Each analyzer was under control of the customer's PLC (programmable logic controller). The measurement cycle would begin with the customer's PLC sending a digital signal to the analyzer; thus beginning the measurement cycle. The cycle



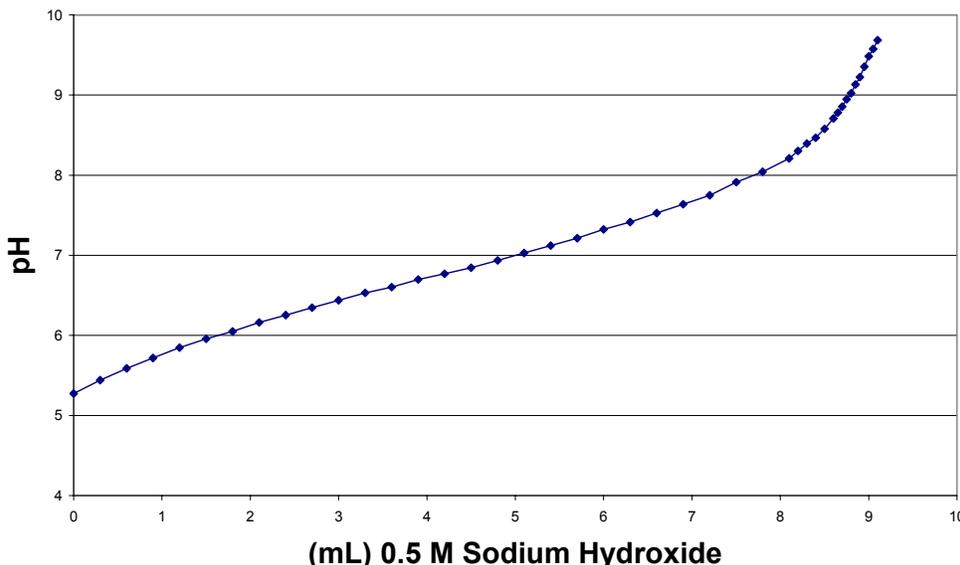
begins with sample collection and sample transfer into the analyzer's measurement cell. The HANDYChem analyzer uses a pH electrode to make the two acid/base titrations required for the boron measurement. The first titration was a pH adjustment. The initial pH of the sample was between pH 8.5 – 7.5. The analyzer uses a dilute Hydrochloric Acid solution to titrate the sample down to a pH of 7.00. The second titration utilized a dilute Sodium Hydroxide solution after the addition of Mannitol solution to the sample. Mannitol reacts with the Boron present in the sample thus making it much easier to titrated

with the dilute Sodium Hydroxide solution. With both titrations complete the analyzer calculates the concentration of Boron in the sample. This data is to the customer's PLC with an analog output (4-20 mA) connection. However, the HANDYChem can also use Modbus RTU as well as Ethernet to transfer data. In the final step in the cycle the measurement cell is washed and prepared for the next sample.

ADVANTAGES

- 1) Lab Accuracy On-line
- 2) Reliable Analyzer On-line
- 3) Rapid Measurements
- 4) Reduced Lab Man-Hours
- 5) Probes Washed Between Tests

Boron Curve (mannitol titration)



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