

## **The Gatekeeper - XRF On Line And Real Time Surveillance Of Aqueous Solutions, Waste Waters**

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### **Purpose:**

The practical implementation of a fast instrument for on line and real time XRF analysis that can be integrated into any factory IT management system and which operates 24/7. The system is particularly feasible for atomic power plants, steel plants, chemical factories and pharmaceutical factories who want to control their emissions.

### **Method:**

The unconventional approach for this real time measurement is strongly influenced by the fact that usually plant management is well-aware of problems that may occur during the production process. Nonetheless, the pivotal question remaining is: When, and to what extent, do such problems take place? An early warning system can not only be time efficient, it can also be significantly cost efficient, while, at the same time, preventing environmental pollution and destruction.

### **Software:**

Gatekeeper software includes settings that allow for user specified criteria: which are the unwanted elements to be detected? The user can put in his choice of 5 - 10 elements as well as the frequency the waters are to be tested in real time. Once these unwanted elements have been identified, the user then also specifies the string of elements that are to be measured during one measuring cycle. Subsequently, the user can also specify at which intervals the measuring cycle should be repeated and how often a flow stream is to be screened for elements in the specified settings. In contrast to making a full water analysis, the intention here is to give a round the clock feedback of any detected unwanted elements within the shortest possible time, the measurement is stopped after about 3 - 6 seconds. If a positive match for the unwanted element(s) repeats a second time, an alarm is triggered. The water can then be rechanneled into a storage tank for further processing and decontamination.

### **Patents:**

European and United States patents have been obtained to protect the special construction of the flowcell: a new x-ray window, a feeder tube to ensure that the sample at the x-ray window is representative, and a solution to facilitate the self-cleaning function of the x-ray window.

USA patent # 9,989,510 B2 (2018) and European patent # 3196637 (2019).

