



## OVA 5000 Trial Report for Zinc Smelter. (For Zinc Cadmium and Lead Analysis)

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This report is a summary of the first 3 months operation of the OVA 5000 trial at a zinc smelter.

### **Introduction**

In 2006 following discussions with the plant environmental department, it was agreed to trial the OVA 5000 for the analysis of Zn, Cd and Pb in plant effluents initially for 3 months. Samples were sent to the Lab21 laboratory for analysis and method development purposes and were analysed without difficulty, requiring only moderate acidification.

The effluent water is largely seawater and comes together from various plant locations in a large wooden culvert before discharge to sea. The effluent is normally monitored by ICP analysis of 24 hour composite samples.

Following an initial site inspection in early October, it was decided to locate the OVA 5000 in one of the sheds near the intersection of two culverts and monitor both streams simultaneously. Although the OVA 5000 would be located further downstream after a successful trial, no shelter was currently available in that location. It was initially requested that the shed be air conditioned as the temperature range in that region would almost certainly exceed operating temperature specifications for some components of the OVA 5000. Initial indications that air conditioning would be added to the instrument shed were later withdrawn due to surprisingly high cost, but it was decided to press ahead with the trial anyway as Lab21 Environmental would also gain useful information about the OVA 5000 performance in such a hostile environment.

### **Installation to Initial Testing; 23 October to 25 December**

The OVA 5000 was installed in the week of 23<sup>rd</sup> October 2006. Although some technical issues arose, they were not uncommon with an installation for a new application and they were resolved on site. While initial results seemed stable, occasionally results dropped to below expected minimum levels for Zinc, especially on stream 2 and subsequent instrument self tests indicated continuing residual contamination of the instrument.

These symptoms strongly indicated organic contamination originating in stream 2. The source of the contamination wasn't clear at this stage but the evidence for organic

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contamination seemed strong enough to warrant installation of a UV pretreatment module.

The UV digest module was fitted during the week of 11<sup>th</sup> December. This successfully removed problems with organic contamination and the instrument ran successfully without incident before being stopped over the Christmas break. The contamination seems to have been from a small laundry effluent pipe feeding into stream 2 which wasn't noticed on previous visits.

### **Metal Analysis Comparison Results**

The most obvious events showing elevated metal concentrations occurred on stream 2 between January 17<sup>th</sup> and 25<sup>th</sup>. This is clear in both ICP and OVA 5000 results. It is interesting that the more detailed OVA data indicates a number of short events not resolved by the 24 hour average samples measured on the ICP. This increased resolution of timing of the events made identification of the sources much easier by comparing event timelines with scheduled maintenance and other operations carried out on the site. Some events were so high that they affected the full 24 hour composite despite only lasting a few hours. This is highlighted by the difference in results scales between the two instruments for Zn and Cd.

These events are also identified much more quickly with the OVA 5000 than using the composite sampling regime alone. This fast response time for all three metals of concern simultaneously allows identification of the event, while it is still occurring rather than from the next day's lab testing. This enables any remedial action required to be carried out much more easily and efficiently.

In the future it is planned to be connected to a monitoring station giving staff access to 24 hour monitoring data from on or off site.

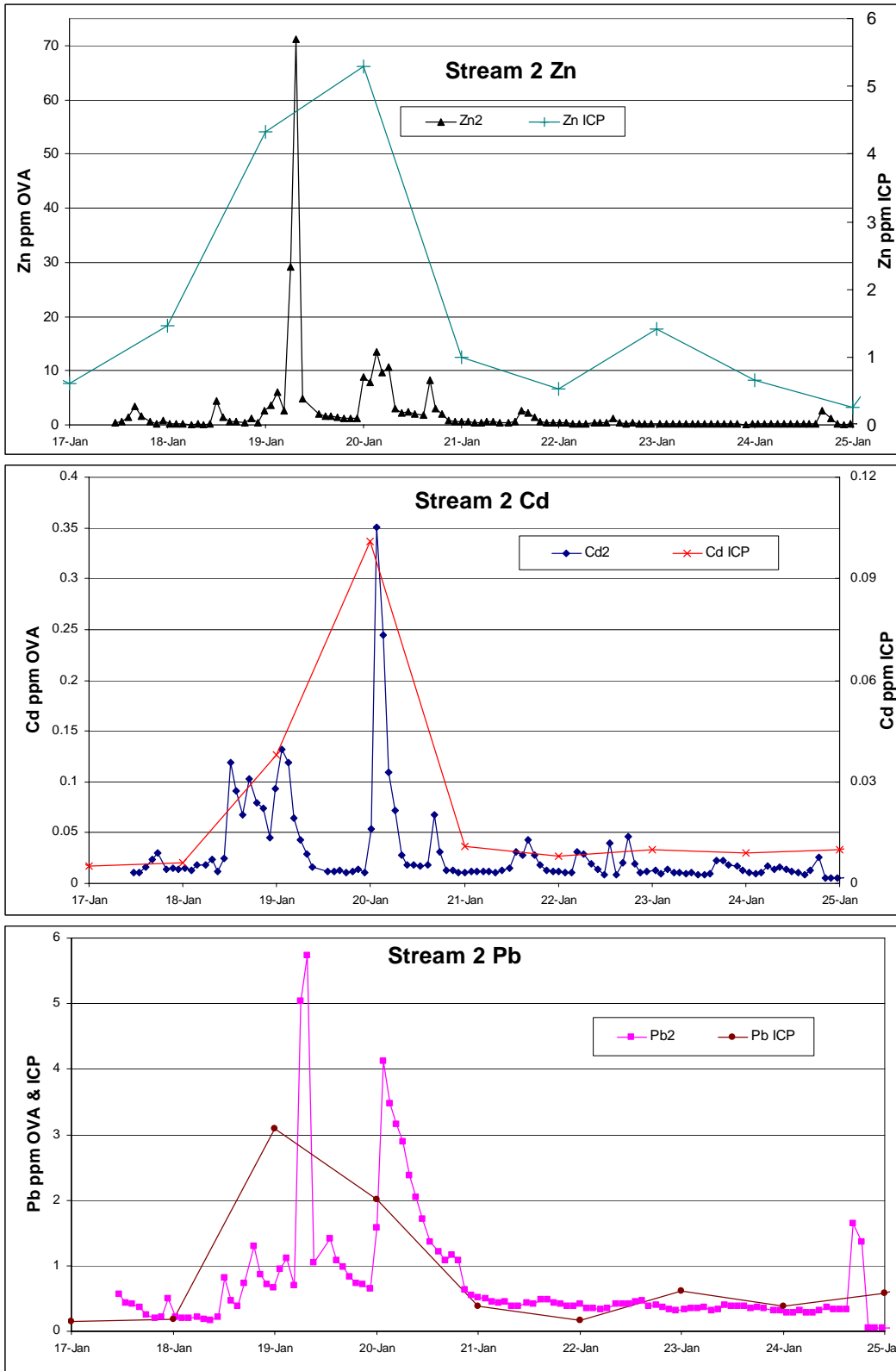


Figure 1. Zn, Cd & Pb results for stream 2 with ICP and OVA 5000. ICP results 24 hour average.



## **Conclusions**

Despite environmental challenges such as high temperature, sea grass fouling, dirty environment and organic contamination of stream 2, the OVA 5000 has produced on-line data showing correlation with known events in the effluent. Valuable information has also been learned regarding the instruments abilities and limitations as well as it's practical application in such an operation.

The OVA 5000 also shows that high results of a daily average can be the result of one or more quite short events lasting a couple of hours or less, which would not have been resolved with the standard daily average sampling. Coupled with the fast response time, this detailed information allows operators to identify events and their sources much more quickly. This would be useful information for any plant operation.