

Trace Organics Analysis



Globally there is growing concern over the environmental impact of dioxins and the effects on human health through dioxins entering the food chain. "Dioxins" is a collective term that is applied to the members of two closely related families of chlorinated tricyclic organic compounds, namely, polychlorinated dibenzo-p-dioxins (PCDDs) and polychlorinated dibenzofurans (PCDFs). There are 210 dioxins, of which 17 are considered to be toxic. Dioxins are not generally commercially produced, but are generated as contaminants or by-products in a number of industrial processes, such as the combustion of organic materials, and in other high-temperature processes.

Corus has adopted a strongly proactive stance in the pursuance of its environmental policy, and set up this state-of-the-art facility in 1995 for the sampling and analysis of dioxins. The aims are to assess the impact of dioxin releases from the company's operating plants and to aid the development of appropriate control strategies through greater understanding of dioxin formation mechanisms. To the best of our knowledge, Corus is the only steel producer in the world to have established such a state-of-the-art facility.



ANALYTICAL FACILITY

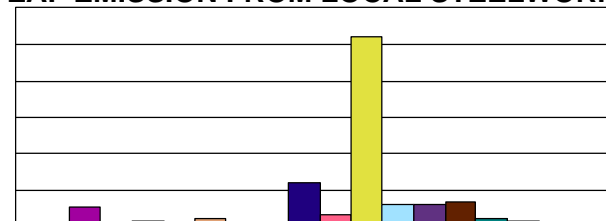
The facility became fully operational in February 1996, achieved UKAS accreditation for the analysis of dioxins in September 1996 and for sampling in 1999. It has dedicated equipment and instrumentation to collect and prepare a range of samples for analysis of dioxins, including environmental samples (dusts, sediments, soils), stack gas samples and ambient air samples. Sample preparation consists of extraction, concentration and sample clean-up to remove other compounds that may interfere with the analysis. Analysis is by high resolution gas chromatography - high resolution mass spectrometry using isotope dilution with ^{13}C -labelled dioxin compounds for quantitation.

A range of iron and steelmaking processes have been characterised for dioxin emissions, including sintering, EAF, BOS, reheating and coating line processes and the results have been reported to the Environment Agency as part of plant authorisation under Integrated Pollution Control. Studies have shown that different sources of dioxins have characteristic profiles of the 17 targeted components which can help in source identification studies.

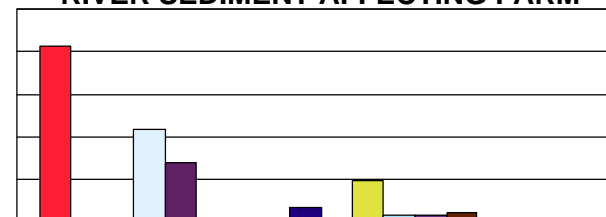
DIOXIN PROFILES

An important example of source identification was recently when MAFF (Ministry of Agriculture Fisheries and Food) published the results of a dioxins in milk survey that revealed unexpectedly high results for a farm in the Rotherham area. This appeared to implicate a local steelworks as the source of dioxins, but extensive source tracking and pattern recognition studies demonstrated conclusively that emissions from the steelworks were not responsible for the elevated milk dioxin concentrations. The source was traced to cows grazing on land affected by flooding of a local river that was contaminated by a chemical waste incinerator upstream of the farm, as shown in the dioxin profiles above.

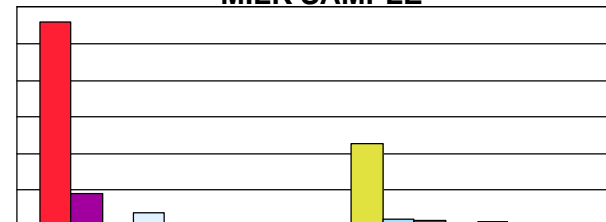
EAF EMISSION FROM LOCAL STEELWORKS



RIVER SEDIMENT AFFECTING FARM



MILK SAMPLE



The main advantages of this integrated sampling and analysis facility are that it provides the company greater control over these resources, permits greater flexibility in investigating the environmental impact of its operations, and leads to the development of in-house expertise in this important and complex environmental area.