RESULTS OF ONE YEAR CONTINUOUS MONITORING OF THE PCDD/PCDF EMISSIONS OF WASTE INCINERATORS IN THE WALLOON REGION OF BELGIUM WITH AMESA®

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Introduction

The continuous monitoring of the emissions of dioxins and furans of incinerators is a topic which is in discussion since several years. Until today no liable online monitoring system is available and according last reports, there will be no system available in the next few years, which is able to give an information of the PCDD/PCDF emissions as TEQ value, as demanded by EN-1948 or the new EU directive for incineration of waste 2000/76/EC[1]. Therefore a continuous sampling by a long-term sampling system is an alternative and one big step nearer to a continuous information of the dioxin/furan emissions of incinerators. Special in comparison to short time sampling of only a few hours (acc. EN-1948 or US EPA method23A) on 1 to 3 days per year, this method gives quite more statistical information's.

After the development and the TUV approval of AMESA® according the European Union notified minimum requirements for long-term sampling systems[2], AMESA® became more and more as an standard for continuous dioxin control in Europe. More than 50 installations give a lot of information's. In Belgium a complete network of dioxin emission control was built up by controlling every waste incinerator with AMESA®. First installations in Asia were finished and additionally were projected.

Newest results[3] of the Walloon region show, that some plants have to be modernised to fulfil the regulations. Of course, these leads at first to new investments, but after these investments, the operators have an instrument to calm down the public by showing continuously that their plants are running properly and the stress of the environment will be reduced.

This presentation will give you an introduction into the AMESA® system, realised applications, newest results and a forecast.

Material and Methods

In several publications[4,5] the function of the TÜV approved[5] AMESA® was explained in detail. AMESA® extracts a part of the flue gas isokinetically and adsorbs the dioxin and furans which are combined in the gas, the dust and the liquid of the flue gas in a cartridge filled with XAD-II material and quartz wool.

This cartridge has to be send to a dioxin laboratory which is familiar with the analysis of dioxin and furans. Contrary to the usual three single measurements every year, by means of continuous sampling over a period between 6 hours and 30 days, the AMESA® ensures continuous documentation of dioxin/furan emission for each single sample. This ensures that fluctuations in system operation and in the composition of fuels etc. are also recorded with the AMESA®.

Depending on the used probe, AMESA® fulfils the requirements of US EPA method 23A. Additionally a remote control software is available. With this equipment a world-wide control of the instrument via phone network is possible. This feature is used very successfully for the installation in Taiwan.

Results and Discussion

After starting the continuous control of the dioxin emissions in the Flemish region of Belgium with the 1st January of 2000, the Walloon region started on the 1st January of 2001. The results of the first complete year of the continuous control of the dioxin emissions are available now. These results are published in the internet[3] and show, that some plants fulfil the demands of low emission very well also by continuous control, but some plants have from time to time too high dioxin emissions. All these plants were controlled before by short time measurements and had good results. The actual results show once again , that only a continuous control gives the security to get constantly low dioxin emissions.

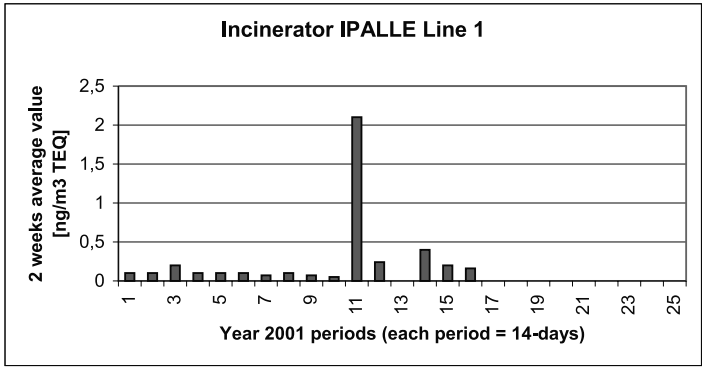

Figure 1. Two weeks average values of the dioxin emissions of incinerator 1 of IPALLE

As to see in Fig. 1 this plant had 20 weeks good emission values and than in period 11 the limit value was exceeded by a factor of 21. The reason for this peak was never found explicit. Still after this peak, the dioxin emissions did not come below the limit value of 0,1 ng/m^3 TEQ. Therefore the burner was stopped after period 16 and will be restarted after the installation of a new dioxin reduction device.

New results of long-term ambient dioxin control (Fig. 2) confirm the possibility of such short time high dioxin emission peaks[6]. The next figure shows the results of the first long-term ambient air control, near a Japanese incineration plant. During these measurements, the ambient air near an incineration plant was controlled 56 days continuously. In average, the dioxin amount in the ambient air was around 7 pg/m^3 TEQ, but on the 41st day, there was recorded a peak of 56 pg/m^3 TEQ. It is easy to imagine, that such a high ambient air value of dioxins was created by extremely high dioxin emission caused by bad operating conditions in the incinerator or technical problems in the flue gas cleaning device.

The example in Fig. 3 shows a problem which was created by a blocked filter in period 16. So the flue gas was going through the bypass-system and was not cleaned. During these period the filter was cleaned but still in period 17 the emissions were too high. Therefore the burner was stopped for checking what happened. After checking the filter, it was recognised that the seals of the internal bypass system of the flue gas channel were defective. So still a part of the flue gas stream was passing unfiltered through the system.

But still after the repair of this trouble, the filter problem could not be solved. Therefore the burner was stopped after period 20 to repair the filter devices. In period 22 was a trial restart, but AMESA®

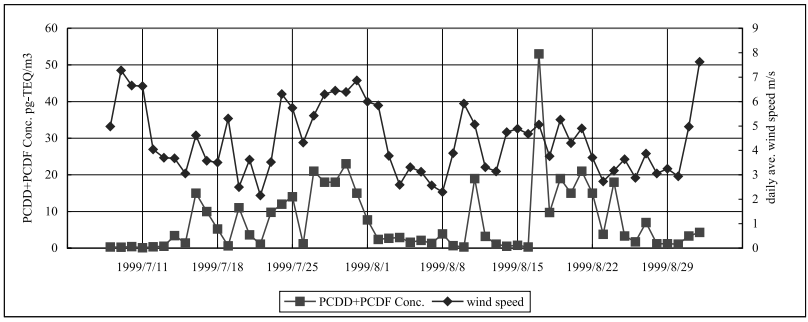

Figure 2. Ambient air D/F concentration at Site B.,Source: Japan-US Joint monitoring survey in NAF Atsugi [7]

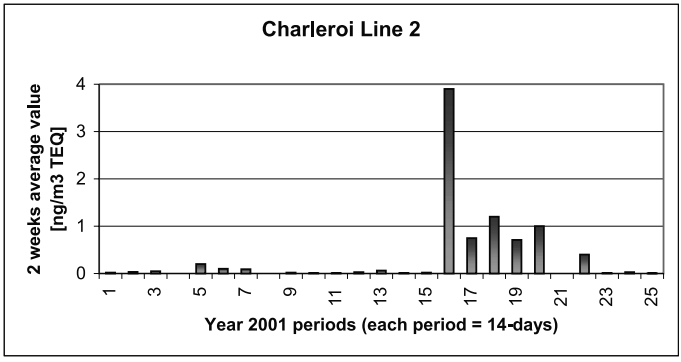

Figure 3. Two weeks average values of the dioxin emissions of incinerator 2 of Charleroi

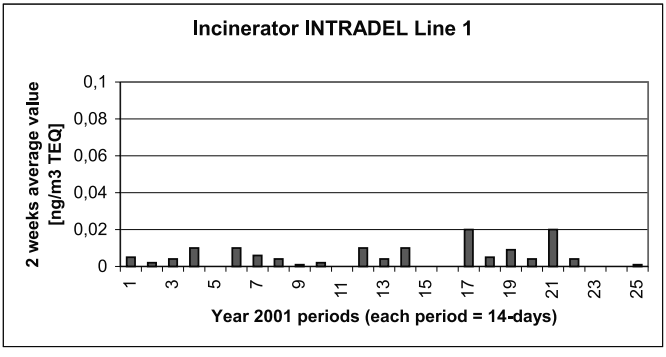

Figure 4. Two weeks average values of the dioxin emissions of incinerator 1 of INTRADEL

was running only for 24 hours. So this result can be interpreted like a start up value, which is, as well known, normally higher.

In period 23 the burner was restarted finally and since this time the emission values are between 0,002 up to 0,03 ng/m^3 TEQ.

This example shows very well, that a long-term sampling of the dioxin and furan emissions is a big help to find any disturbances in a faster way. In case of control such a plant with short time collection one or two times per year, it could spend months until such a fault will be recognised. During this time the environmental and the population could be stressed by very high dioxin emissions.

If an incineration plant runs very properly, like in the next example, AMESA can help to get more acceptance and trust by the public around.

Only by publishing these results, the public can be calmed down, because low dioxin and furan emissions are proofed continuously. Operators in Germany and Asia are using this instrument to get more acceptance by the public, so that they are able to run the incinerators with 100 % capacity.

Conclusion and forecast

The actual results of the Walloon region of Belgium show the different advantages for all, the public, the environmental and the operator. If defects in the plant happen, which lead to higher dioxin emissions, these defects are recognised earlier and help to reduce the dioxin emissions. On the other side, if the values are constantly low, the public acceptance is higher and help to increase or to keep high the capacity of the plant.

More and more countries start to think about a continuous control of the dioxin emissions of the waste incinerators. Therefore in different countries verification projects were started. If such regulations will be introduced global the dioxin emissions can be reduced world-wide in a strong way.

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