

Atmospheric emissions of PCDD/PCDFs from the municipal solid waste incinerator of Fusina (Venice)

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Introduction

Polychlorinated dibenzo-p-dioxins (PCDDs), polychlorinated dibenzo furans (PCDFs) are considered as the most serious pollutants generated in municipal solid waste incinerators (MSWI). Consequently, MSW incinerators have been subject in recent years of considerable research and regulatory interest (1).

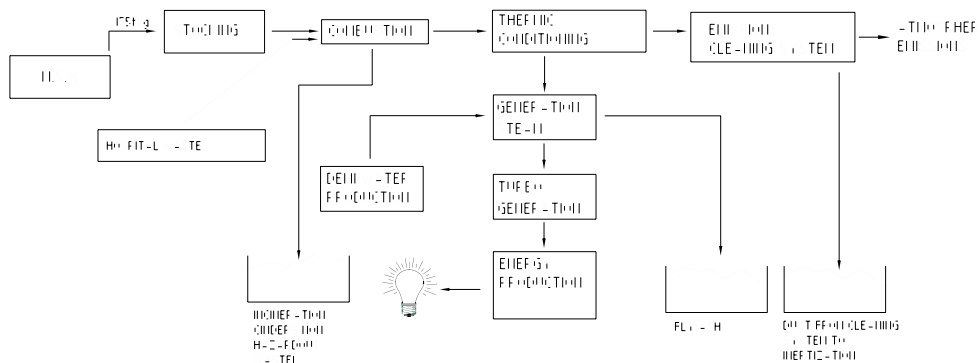
During the first year of operation of the newly constructed MSWI in Fusina, near Venice, special attention was addressed to the environmental monitoring by increasing the frequency of sampling and analysis of the stack emissions (the Italian regulation require PCDD/F be measured only two time per year (2). This attention is justified by the location of the MSW incinerator, in the industrial area of Porto Marghera, near the lagoon of Venice. The incinerator was monitored over the functional test period, and monthly since 03/99.

Actually experimentation is in progress including the incineration of hospital waste, since the Provincia di Venezia, who give the authorization for emissions, allowed both municipal solid waste and hospital waste to be burned.

Plant description

The MSWI in Fusina has 2 identical combustion lines, but only one actually on operation. The incinerator is designed for burning 175 t/day (Fig.1).

Figure 1: MSWI of Fusina



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The MSWI is equipped with a combustion chamber with grate, and with a secondary combustion chamber (950 °C for 2 second).

The cleaning system of emissions consist of a selective non catalytic reduction of NO_x (SNCR) by injection of NH₃ in water solution into the secondary combustion chamber; a semi-dry scrubber, a injection of activated carbon, the bag filter and a scrubber with NaOH.

The MSWI recovery energy by a turbine, the production is 2300 Kw/h.

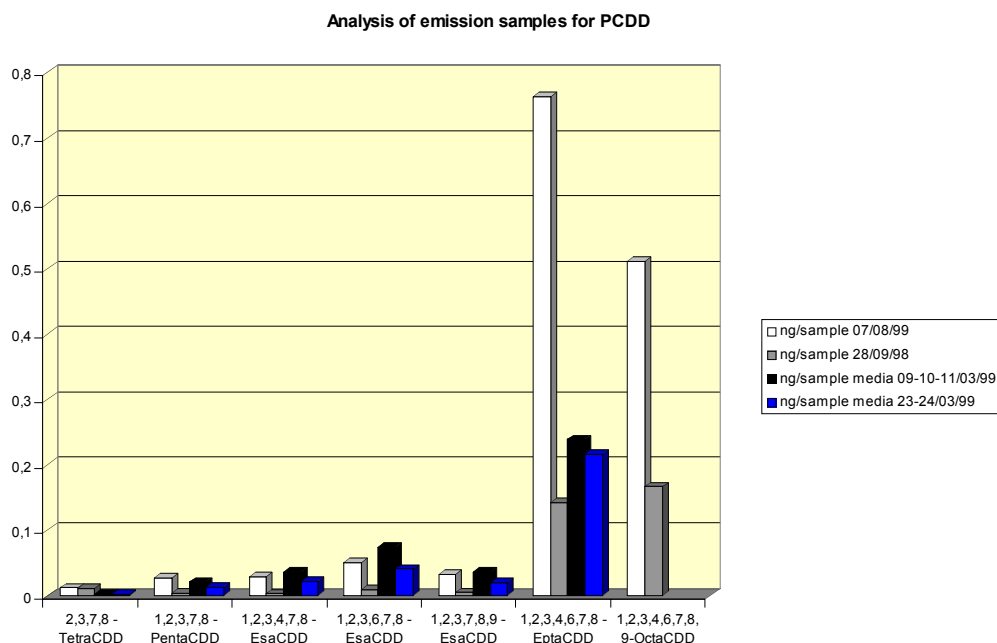
Sampling and Analysis

The sampling was conducted according to the EN 1948/96 procedure. In the samples the following halogenated pollutants were analyzed: Polychlorinated Dibenzodioxins/-furans (PCDD/PCDF) (sums of the Tetra- to Octachlorinated PCDD/PCDF 2,3,7,8-substituted congeners with calculation of the I-TE).

The calculation of the I-TE were conduct in accordance to NATO/CCMS and German 17.BlmSchG-V.

The determination of PCDD/PCDF was carried out according the German VDI 3499 method and, if appropriate, the German sewage sludge ordinance.

Fig. 2: PCDD before, during and after functional check



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Result and Discussion

The results shown in Fig. 2 and Fig. 3 for PCDF represent the values recorded in the periods before, during and after functional test. The presented are mean values of samples collected in three or two days during the same week.

In all cases the levels of emissions are below the regulatory limit, which demonstrates the efficiency of the emission cleaning system.

The characteristic pattern of dioxins from incineration are centered on EptaPCDD/F and OctaPCDD/F (3).

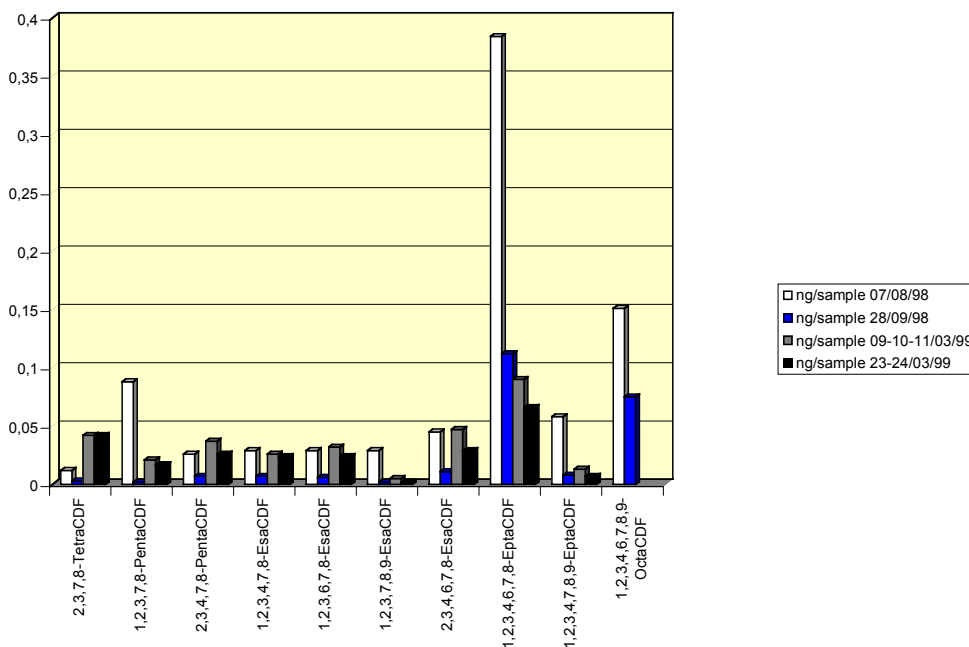
Another important conclusion is that considering the medium value of I-TE (Tab.1) , the dry flue flow (corresponding oxygen 11%) over a period of one year a total emission is 0,016 g I-TE/year is expected.

Any information on pollutants release from the incinerator will be provided to the public.

Table 1: I-TEQ data

07/08/98 I-TEQ	28/09/98 I-TEQ	09/03/99 I-TEQ	10/03/99 I-TEQ	11/03/99 I-TEQ	23/03/99 I-TEQ	24/03/99 I-TEQ
0,081	0,024	0,014	0,099	0,080	0,032	0,057

Fig. 3: PCDF before, during and after functional check



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Aknowledgement

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References

- (1) Daughoon S. *et al.*; Dioxin '98 Acts 1998, 143 – 146 “The effects of operation on PCDD/Fs emission in MSWI: stock gas measurement and evaluation of operating conditions”.
- (2) D.L. 503/97
- (3) Viviano G. *et al.*, “Perizia tecnica tossicologica sull’impianto di incenerimento di rifiuti solidi urbani di Sacca Fisola – Venezia – e sulle sue emissioni”1984.