Comparative study on energy groups of continuous emissions from CET MINTIA DEVA S.A.

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COMPARATIVE STUDY ON ENERGY GROUPS OF CONTINUOUS EMISSIONS FROM CET MINTIA DEVA S.A.

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Abstract: It was determined, interpreted and compared continuous emissions from energy units from CET. Mintia. The values obtained are included in the amount specified under the rules of Romania.

Key words: emissions, energy groups, pollutant concentration

1. Generalities

SC CET MINTIA DEVA S.A. whose main activity is the production of electricity and heat as a central co-generation with a conversion efficiency of about 32%.

Cogeneration, the combined solution and simultaneous production of electricity and heat. the energy benefits, economic and ecological shows they qualify as 'clean' technologies of energy production.

Deva Mintia power plant site

It is situated in the south of Transylvania, on the river Mures, 9 km from the town of Deva. It has an installed capacity of 1,285 MW in six energy groups: five energy groups (1, 2, 4, 5, 6) of 210 MW and energy group no. 3, 235 MW. Main fuel used: coal basin is the Jiu Valley mining (coal power), and are used as auxiliary fuel gas and exceptionally oil. Household solid fuel has a total capacity of 530,000 tones (in two deposits of coal and two feed streams). Electricity is delivered S.E.N., voltages of 220 KV and 400 KV. The plant was commissioned in 1969 ÷ 1980 and 1984, thermal power and heat supplies for Deva. Evacuation of combustion gases is by three chimney (height 220 m).

Points where they have been measured

The main sources of environmental pollution in SC CET MINTIA DEVA S.A. are shown in the following scheme:

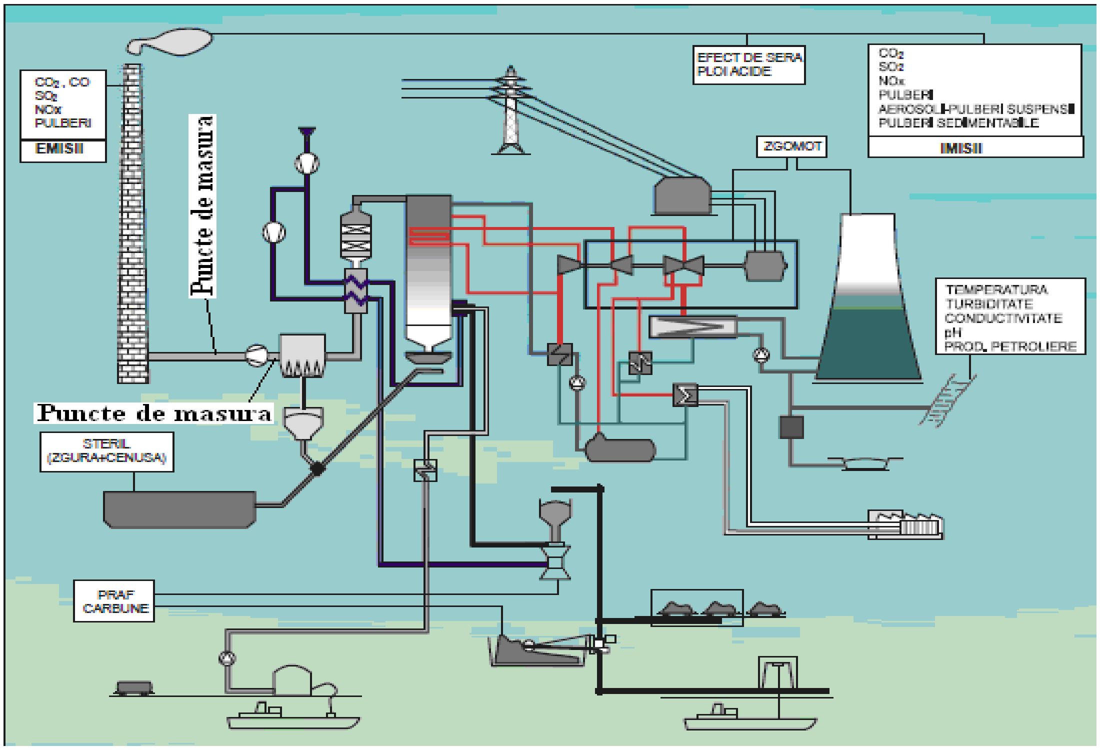

Fig. 1. Points where measurements were performed

2. Measurements. Results. Emissions comparative values of energy groups

In this paper have been followed: the flow of gases and airborne pollutants discharged flow up the chimney. Gauges used were:

-a portable automatic isokinetic sampling emissions BASIC ISOSTACK HV;

- a portable gas analyzer TESTO 350, including a Pitot tube to determine the speed of the combustion gas.

The flow of combustion gas and the mass flow rate of energy discharged into the environment.

Airborne contaminant flow is a flow of toxic material (ash, nitrogen compounds with oxygen, NOx, sulfur compounds with oxygen SOx, hydrochloric acid, HCl, unburned hydrocarbons, HC, etc.) discharged into the atmosphere, with exhaust gases.

Emission measurement campaigns were carried out in points situated by electrostatic filters and accessible points located after flue gas fan (fig. 1).

In Table 1 the average values were centralized in pollutants targeted by the units of measurement for equipment used. Determination of the particulates was performed for total dust, realizing the tie based on the data from the literature.

Determinations aimed concentrations (%, ppm) for indicators: O_2, CO, CO_2, NO_X, SO_2, particulate PM 10, PM 2.5 and total. The results are shown in Table 1. Values obtained from experimental determinations were corrected for atmospheric parameters (barometric pressure, temperature, relative humidity). Measurements were made at folowing energy groups: 3A, 3B and 5A, 5B.

Table 1. Experimentally determined concentrations on emissions from S.C. CET DEVA MINTIA S.A. during July-September 2012

Date/Sample	Energy Group/Discharge circuit	O_2 %	CO ppm	NO_x ppm	CO_2 %	SO_2 %/ppm	T_{gas} °C	T_{amb} °C	η_1^* %	Air excess λ	Powders mg/m^3_N	PM 2.5	PM 10	Coarse particles cu 10 µm<D<45 µm	Coarse particles between 15 µm<D<100 µm
02.08.2012 A.M./1	5/A	9.49	3	437	9.92	0.19/1972	165.2	24	91	1.8	235.19	10.73	32.05	85.52	106.89
02.08.2012 P.M./2	5/A	10.69	4	483	8.45	0.19/1981	174.5	30.8	89.9	2.01	215.63	9.84	29.39	78.4	98
06.08.2012 A.M./3	5/A	8.47	2	521	11.11	0.28/2853	151.8	28.3	95.4	1.66	187.49	8.56	25.55	68.17	85.21
06.08.2012 P.M./4	5/A	10.77	3	469	8.16	0.19/1934	175	32.5	88.8	2.23	218.67	9.97	29.8	79.51	99.39
02.08.2012 A.M./1	5/B	7.42	3	457	11.66	0.18/1895	163.9	23.3	92.2	1.53	220.52	10.05	30.05	80.19	100.23
02.08.2012 P.M./2	5/B	8.99	4	503	10.16	0.19/1979	176.1	32.1	91.2	1.73	204.17	9.31	27.83	74.24	92.79
06.08.2012 A.M./3	5/B	8.01	5	474	11.01	0.27/2768	193.5	34.5	91.7	1.6	198.13	9.03	27.01	72.04	90.05
06.08.2012 P.M./4	5/B	8.22	5	420	10.4	0.19/1987	172.1	35.7	92.1	1.63	224.71	10.25	30.63	81.7	102.13
31.08.2012 A.M./1	2/B	8.38	3	198	12.2	0.13/1381	152.1	27.3	92	1.79	202.64	9.24	27.62	73.68	92.1
31.08.2012 A.M./1	2/A	9.29	3	207	11.69	0.12/1257	164.2	29.2	91.5	1.77	221.18	10.08	30.15	80.42	100.53
26.09.2012 A.M./1	6/A	13.17	4	182	8.56	0.06/665	155.1	30.5	91.3	2.68	168.43	7.68	22.96	61.24	76.55
26.09.2012 A.M./1	3/B	8.63	3	146	12.85	0.11/1116	154.2	30.5	92.4	1.7	152.86	6.97	20.84	55.58	69.47

*- η_1 is the combustion efficiency

To determine the mass flow of pollutants we used the annual average values of hourly flue gas flow.

Comparative histograms were created for the emission energy groups analyzed, based on data in Table 1.

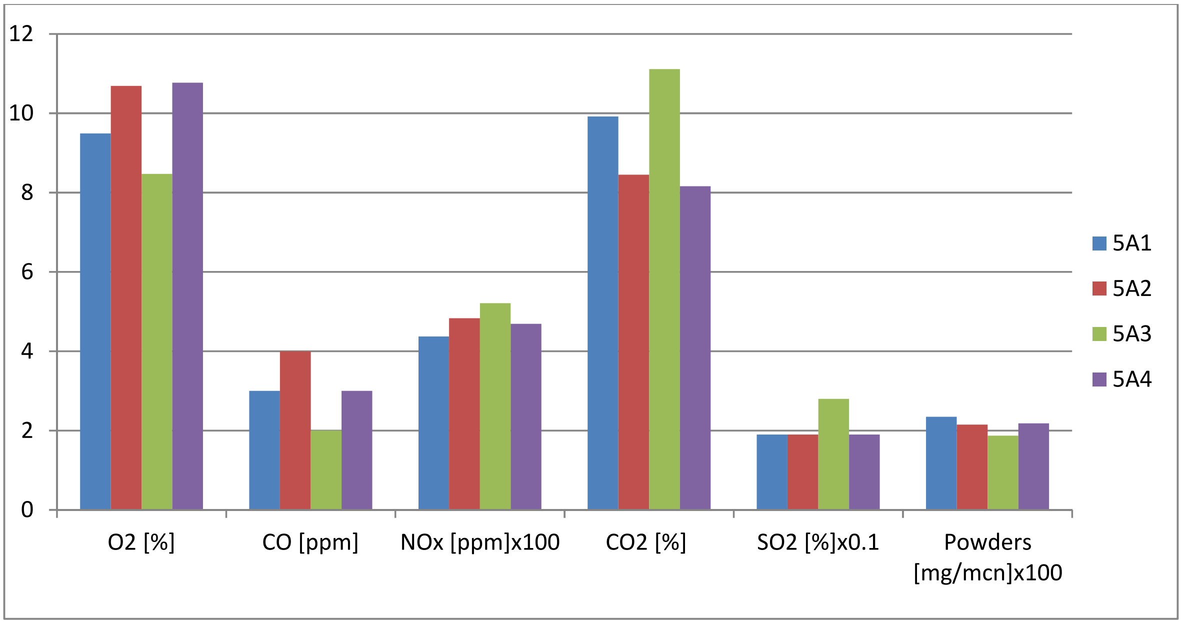

Fig. 2. Emission of energy group 5 - Exhaust A

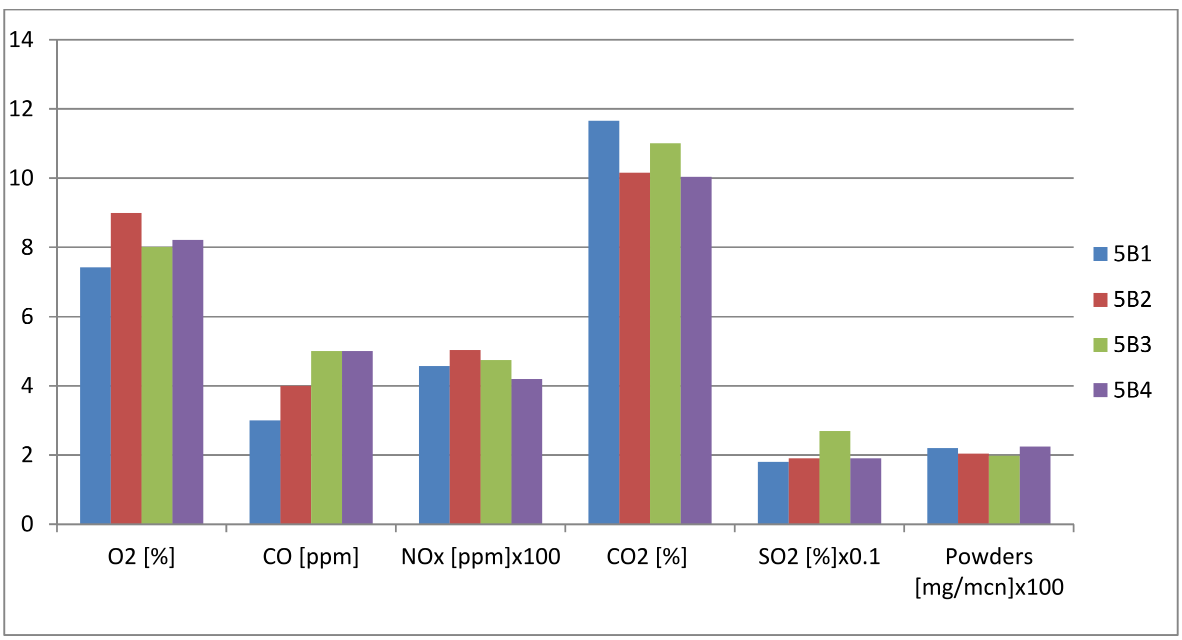

Fig. 3. Emission of energy group 5 - Exhaust B

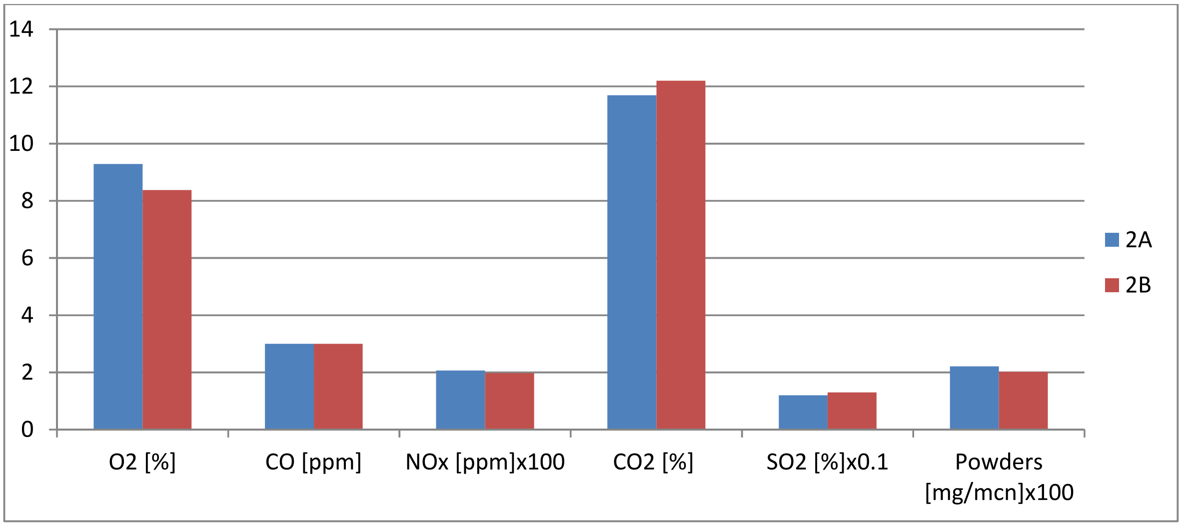

Fig. 4. Emission of energy group 2

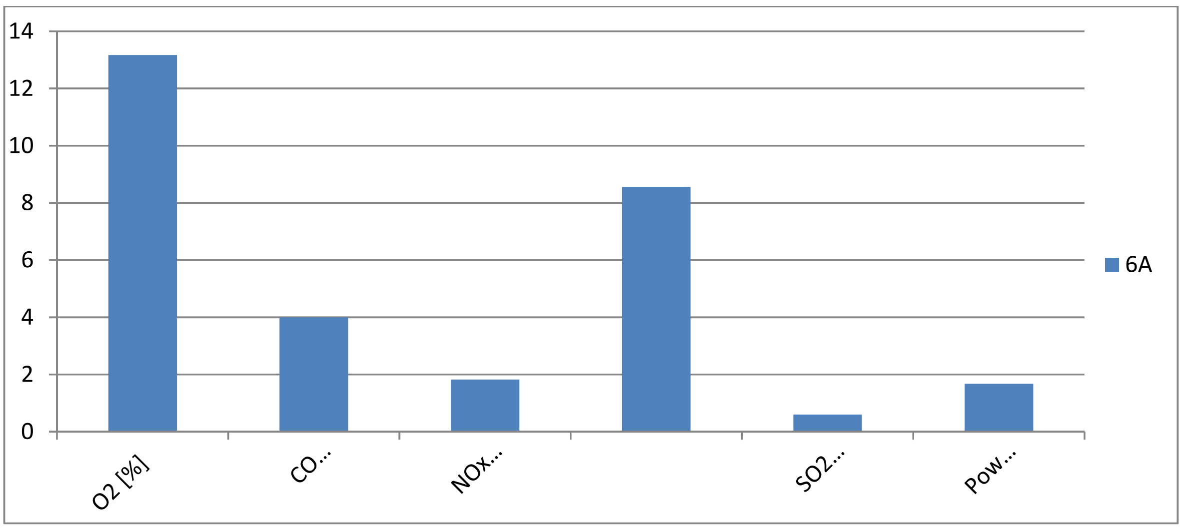

Fig. 5. Emission of energy group 6 - Exhaust A

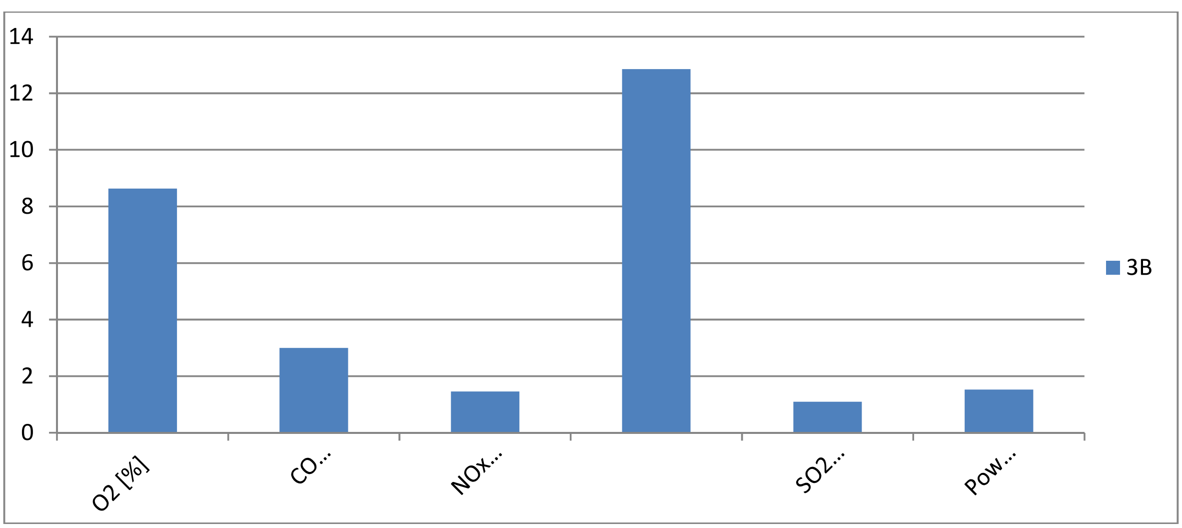

Fig. 6. Emission of energy group 3 - Exhaust B

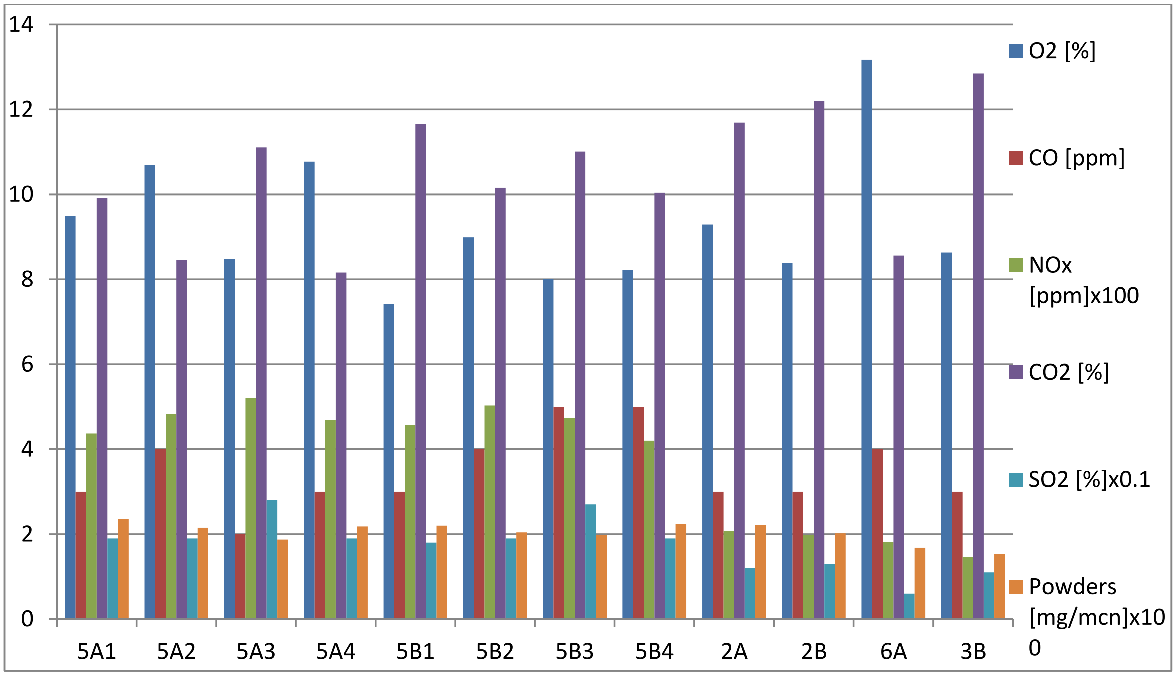

Fig.7. Emission comparative values for the energy groups analyzed

3. Conclusions

Continuous emission measurement systems are certified according to current regulations. The sampling points, frequency measurement and calibration procedures were adequate measurement requirements. Therefore, the values obtained can be seen as a method of providing data for the validation of other semi-analytical analyzes and/or numerical methods.

Comparing the values obtained with the maximum permitted under the rules (PE-1001/1994, and Annexes 3-8, Section A of GD no. 541/2003, amended by GD no. 322/2005) pointed out a framed pollutant emissions at the upper limit of pollution standards.

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