IMPACTS OF ENVIRONMENTAL PRODUCTS THE THERMOELECTRIC POWER PLANT ROVINARI

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ABSTRACT. Some activity / produce technological, besides the direct effects which was designed for, a range of indirect effects, some harmful for the human being and the environment he lives in, which puts into question it's real utility. This is the reason that is necessary to study and assess the impact of an human activity on a human being and upon the environment in which he evolves. Environmental issues have a character that is becoming more and more pronounced as pollution increases, „pollution knows no borders", therefore is necessary to control the management of pollutants generated by mining activity.[1]

ВЛИЯНИЕ НА ТЕЦ РОВИНАРИ ВЪРХУ ОКОЛНАТА СРЕДА

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РЕЗЮМЕ :Някои технологични дейности, освен пряката дейност, имат ред косвени ефекти, вредни за човека и околната среда. Това поставя под въпрос тяхната полезност и обуславя необходимостта от изучаването им и оценката на влиянието. Екологичните проблеми стават все по-актуални във връзка с увеличаващото се замърсяване, което няма граници. Това налага управление и контрол за замърсяването при минните работи.

Introduction

The thermoelectric power plant is located in the Rovinari Basin, 16 km from Târgu-Jiu, the access is provided by the European Road E-79 and by railway Petroşani - Târgu – Jiu-Bucureşti, fig 1.1.

Fig. 1.1. The thermoelectric power plant Rovinari

Technological processes executed in CTE Rovinari generate negative impacts upon the environment: air, water, soil, human settlements.

The power plant location criteria were socio-economic (employment in the area and the small distances for transporting the coal), the action programs for framing with the environmental restrictions were imposed after the year 2000.

2. Air pollution, permissible values limit and measurement results

Coal storage and supplying C.T.E. Rovinari presents essential features besides the other power plants (Turceni, Govora, Işalniţa, etc), where the coal is transported by truck or train.Located in the center of the Basin, the thermoelectric power plant Rovinari uses coal brought by an continually transport system (conveyor belts) from the careers Gârla, Tismana I, Tismana II, Rovinari Est and Roşia de Jiu. Designing the deposits (configuration, types of equipment) on the level of the coal pits, it was generally done with the same criteria, intervening with some modifications after constructing the Complexul Energetic Rovinari (in 2004), in which coal deposits in quarries components are centrally managed.
Values of air pollutants are produced by:

- combustion gases: SO_2, nitrogen oxides (NO_x), powders discharged through chimneys;
- storage, transportation, crushing coal: coal dust, carbon monoxide from coal self-ignition;
- fuel oil storage: hydrocarbon vapors;
- storing HCl and NaOH, vapors;
- domestic traffic: NO_x, CH_4, Co, heavy metals (Pb, Cd, Hg).

Emission limit values for combustion plants are present in Table 1.1.

Tabelul nr 1.1. Emission limit values for combustion plants

Pollutant	Fuel	Allowable limit value (mg /Nmc)		Conditioning U.E
		Conf. HG nr 541/2005	Conf. Dir .UE	
SO_2	Lignite	400	20-200	Fuel
NO_x	Lignite	400	50-200	Flue gas desulphurization
		200 since 2015		
Powders	Lignite	50 since 2013	5-20	Waste gas scrubbing

Monitoring of emissions in air

Since the present control pollutants discharged into the air is achieved with an integrated system of continuous monitoring of emissions, according to EU requirements, consider it is appropriate to present comparative results shown in the previous period EU accession, with the results of measurements that we conducted in January-April 2011.

The data outlined in the CTE Rovinari and documents prepared by the Environmental Protection Agency [5] (Târgu – Jiu, Gorj) have revealed the following values of concentrates pollutants:

- in 2000 the biggest average value was 0.014 mg-m3representing about 16% of the maximum permissible concentration in STAS 12574/87;
- in 2007, the mean daily concentrations of sulfur dioxide are shown in fig. 1.2

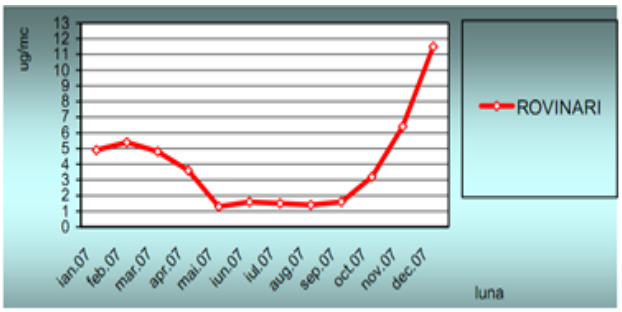


Fig. 1.2. The evolution of pollutant concentrations monthly average SO_2

It is noted that the maximum concentration of these pollutants was recorded in December, at a value of **11 µg/m³**.

The annual average concentration levels of nitrogen dioxide in the period 2000-2007 are shown in fig. 1.3.

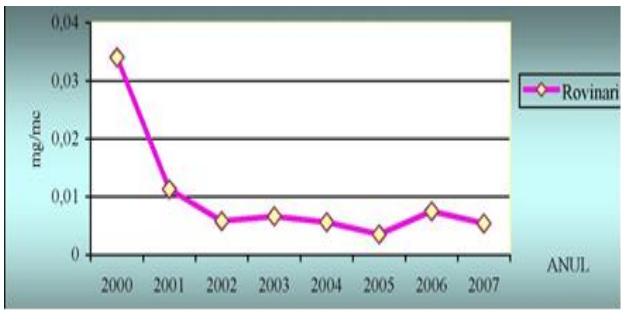


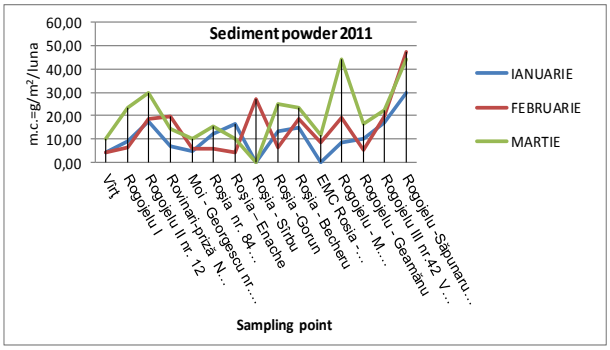
Fig. 1.3. Evolution of annual mean concentration of NOindicator

The highest value (0.035 mg/m³) registered in the year 2000, does not exceed the maximum permissible concentration of 0.006 mg/m3 provided in the standard.

2. Sediment powder pollution

Solid particles with a diameter bigger than 10-4mm significantly pollute the atmosphere during the deposition on the ground depending on the intensity of these precipitates and electrostatic phenomena.

The maximum permissible concentration set in STAS 12574 / 87 is 17 g/m3/month. Measurements taken in the year 2011 in 15 sampling points, set at different distances from the power plant, highlighted values shown in fig. 1.4, the values of concentrations of sediment, where they were recorded



exceeded the maximum permissible concentration, especially in March 2011.

Fig. 1.4. Evolution of sedimentable powders in the year 2011

3. Water pollution, limit values and results of measurements

Wastewaters are discharged through sewage indoor and outdoor facilities and discharged into the river Jiu. The pollutants maximum values of sewage and idustrial waters are presented in Table 1.5

Industrial wastewater discharge is made subject to regulations and employment asindicators of wastewater within the limits provided by GD 188 / 2002, as amended by Government No 352/2005. The frequency of monitoring of quality indicators is established by the water management permit and may be changed with it. For water quality monitoring Jiu River, samples were taken and physicalexamination were performed - two chemical zones:

Tab. nr 1.5. The maximum amounts of pollutants from sewage and industrial

Water category	Quality indicators	Maximum values (mg/l)
Domestic wastewater	pH	6,5 – 8,5
	suspension	60
	phosphates	1
	ammonium	2
	detergents	0,5
Water purification technology that does not require	pH	6,5 – 8,5
	suspension	60
	sulphates	600
	ammonium	3
	lead	0,2
	petroleum products	5

 upstream of water intake;
 downstream of waste water used in thermal power

Processing and interpretation of results is done according to the Ministry of Environment and Water Order No 161 / 2006, and water quality assessmentindices measured in the year 2010 are those shown in Fig. 1.6.

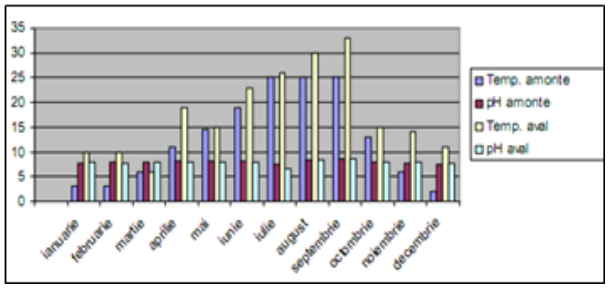


Fig. 1.6. Indicators of temperature and pH of wastewater

As the largest volume of water used in the Jiu river cooling water pollution is reduced. Because the correct operation of cooling systems, values of the thermal regime of the downstream water did not exceed normal limits.

4. Noise pollution

Noise pollution is produced by machinery, plant and equipment consist of mass and energy flows: fans, coal mills, turbogeneratore, pump stations, fuel oil andheating, boilers, compressors, etc.Noise levels specified in the permit in areas such facilities is high, exceeding themaximum value of 90 dB:

- fan area of coal: 95 – 105 dB(A);
- area of coal mills: 95 – 115 dB(A);
- heat pumps stations: 95 -98 dB(A);
- compressor room 93 -98 dB(A);
- boiler room 96 -98 dB(A);

Record the noise level near the limit allowed in areas burners, valves and purge in the machining workshop. To limit the premises, noise levels do not exceed the established norms. To reducenoise levels from eşapărilor steam silencers were fitted to the energy block no.3, aiming to schedule installation of these devices at 4.5 and 6 blocks no.

5. The impact of waste management

Waste-generating sources and their types are:
- fuel combustion process: slag and ash;
- replacement of lubricants: oils;
- Maintenance and repair activities and equipment: ferrous scrap metal;

Administrative activities: household waste. Because of poor planning and operation of landfills are considered significant sources of impact, consisting of changes of scenery, air, surface water and soil degradation. Slag and ash from the combustion of fuel in boilers CTE Rovinari deposits are discharged hydraulic central to final disposal. The deposits are located about 4.5km from the center and have the following areas:[2]

• Deposit Cicani - Beterega surface of 70 ha and a capacity of about 2 million / cm;
• Deposit Gârla with an area of about 160 ha and a storage capacity of 30million / cm., (fig. 1.7.).

Fig. 1.7. Deposit Gârla

Reducing negative environmental effects caused by traditional process slag andash storage (warehouse Cicani - Beterega) was required by EU law rules. Gârla waste storage warehouse run by dense fluid evacuation technology, solution 1 / 1 (1 part solid / 1 part water). This new technology (slurry density) eliminates impacts:

• soil and groundwater pollution due to textile waterproofing system;
• air pollution (fly ash), because fixing solids.

6. Conclusions

CTE Rovinari, part of the energy complex Rovinari, to the main electricity and thermal energy have 4 groups, each with a boiler of 1035 t / h, steam turbine,electric generator of 330 MW and 40 MVA transformer, 20/400 W.

CTE Rovinari used as fuel for power generation:

• Basin coal mining Rovinari extracted from quarries, with calorific value of 1400 - 1800 Kcal / Kg;

- natural gas with calorific value of 8050 Kcal / m 2;
- fuel oil, the calorific of 9200 Kcal / m2.

Water supply is provided by the following sources:

- drinking water - two deep wells, flow of 9l / s;
- Industrial water - 6 deep wells flow of 9l / s;
- surface water from the river Jiu, the pump stations.

Detention facilities, evacuation and dispersal of pollutants in the environment are:

• flue gas fan;
• electrostatic two on each boiler;
• installation of air pollutants dispersion (2 chimneys);
• de-dusting equipment;
• warehouse sprinkler installations slag and ash;
• facilities for detention and water pollutants (sedimentation, cooling towers, water collection networks treated).

Recommended for publication
of Editorial board

In the management of waste slag and ash should be noted that at present has moved from traditional waste disposal process, the new technology in the dense sludge, which provides a significant reduction of pollution of soil, water and air. Noise factor is deemed significant impact on business and human health because of noise mitigation measures are ineffective and costly.

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***** *Environmental Protection Agency Târgu-Jiu.*