

MONITORING OF AIR QUALITY IN THE CITY AREA ROVINARI

Adina Tătar, *Constantin Brâncuși University of Târgu-Jiu*

ABSTRACT: This paper initially up an analytic pollution of SO₂ in a quiet town Rovinari, substances emitted in the atmosphere creates more environmental problems: climate change, ozone depletion, air acidification, photochemical smog, the greenhouse effect, micro-pollutants , the production of tropospheric ozone, particulate matter. The main sources of air pollution in a quiet town Rovinari are the Thermal Power Plant and lignite mining in quarries in the area. Atmospheric environment related indicators are organized on three levels: pressure indicators (emissions of pollutants), status indicators (air quality) response indicators (measures taken and their effectiveness).

KEY WORDS: impact of pollutants, nitrogen oxides, emission

1. GENERAL CONSIDERATIONS

Air is the most important environmental factor for the transport of pollutants, as is the support that transport occurs fastest in their local geography, so the atmosphere is supervision first in monitoring. Air quality is one of the areas where the EU has developed and adopted many laws, provisions that Romania has transposed into the national law and for which he has undertaken to implement them. The main goal was to develop a strategy and unitary, establishing air quality objectives in the long term. Air pollution is the most serious emerging issue, as it has effects on short, medium and long term. On the basis of pollution are factors, of which the most important are: urbanism, industrialization, chemical processing, density of population.

Pollution appears as, by-product of civilization, which is not limited to within a company, a small corporate and includes cities, regions within a country and even areas which refers to large geographic areas, becoming a international problem.

Monitoring of air quality imply following items included in the four categories of issues: the sources and emissions of air pollutants; atmosphere pollutants transfer, pollutant concentrations and spatio-temporal distribution of their effects on human and environmental pollutants biotic and abiotic . The main sources of air pollution in a quiet town Rovinari are the Thermal Power Plant and lignite mining in quarries in the area. The most important pollutants are dust particles resulting from the combustion of coal energy by engaging in a gray atmosphere of ash and slag deposits, the entrainment into the atmosphere climatic conditions \ "good \" dust particles and clay minerals in lignite pits, dumps or tailings storage conveyors and heavy road traffic.

2. EMISSIONS OF AIR POLLUTANTS

Rovinari Thermal Power Plant has a significant own contribution both in generating dust (ash and slag deposits, traffic, combustion processes) and the emission of gaseous pollutants (SO₂,

NO_x, NH₃) generated in combustion processes of coal. Impact assessment of pollutants discharged into the atmosphere by the Thermal Rovinari is done in two ways: as emission quantities of pollutants from flue gases are compared with the limit values set out in the Government Decision no. 440/2010 and the dispersion (immission) of pollutants in the surrounding area of pollution source, the values obtained are reported in permissible limit values of the effectual regulations. The most significant air emissions resulting from fossil fuel combustion are sulfur dioxide, nitrogen oxides, carbon monoxide, particulates,

greenhouse gases, and heavy metals and halogenated dioxins emitted in small quantities, but significant effects on the environment due to their toxicity and persistence.

2.1. Monitoring of the emissions of sulfur dioxide

The content of sulfur dioxide in the flue gas depends on the sulfur content of the fossil fuels used. Content analysis of sulfur dioxide from flue gases revealed that the values measured at the 3 boilers that have worked in 2011, recorded different concentrations (Fig. 1).

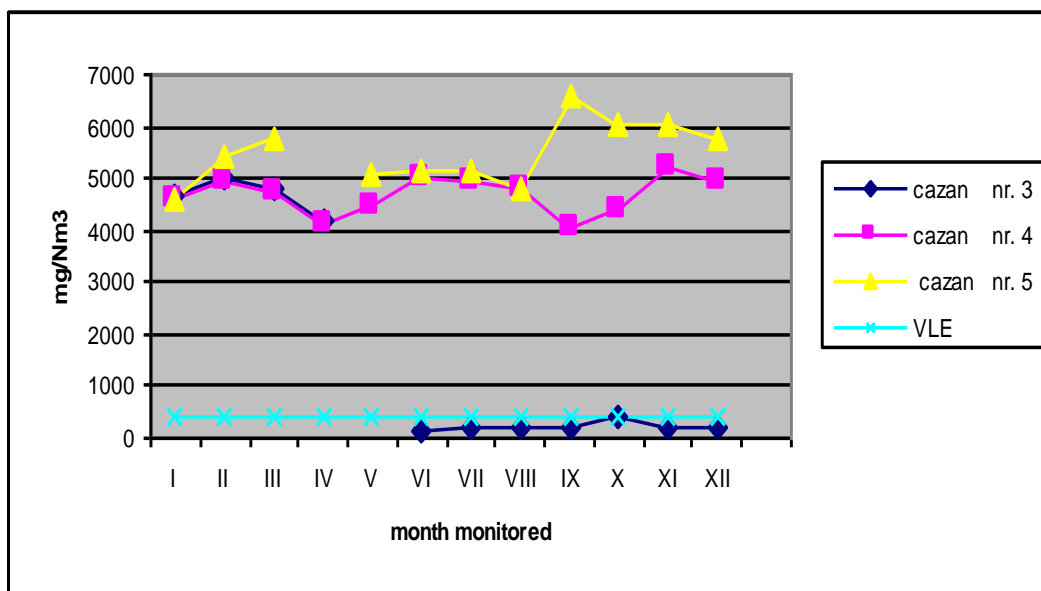


Fig.1. SO₂ concentration evolution in 2011

The boiler number 3, the first four months of 2011, concentrations of SO₂ from flue gases have exceeded the emission limit, being approx. 10.4 times the lowest, respectively the 12.5 times higher than the permissible limit of 400 mg/Nm³. In May 2011, the operation of boiler no. 3 has been stopped, and starting with June the desulphurisation facility has been operating, the concentrations of sulphur dioxide in burning gases being situated below the limits stipulated by regulations in force.

The lowest value of sulphur dioxide in burning gases was recorded in June (169.00 mg/Nm³), being 2.4 times lower than the limit value, and the highest concentration was measured during October (398.3 mg/Nm³) which was located near the limit value. For boiler no.4, all measured concentrations of sulphur dioxide were higher than the limit value. The lowest concentration was recorded in September (4020.54 mg/Nm³), representing 10 times the limit value, and the highest concentration was

measured in November (5201.15 mg/Nm^3), being 13 times higher than the limit value. Sulphur dioxide concentrations measured for boiler no. 5 reached the highest values in 2011. In this case, the lowest sulphur dioxide concentration was recorder in January (4595.92 mg/Nm^3), being 11.5 times over the admitted limit. The highest sulphur dioxide content was measured in September (6569.15 mg/Nm^3), being 16 times higher than the limit value.

2.2. Annual emissions of sulfur dioxide

In order of the assessment of air quality it was achieved annual assessment and inventory of pollutant emissions. Since 2000, emissions inventory was done according to the

Ministerial Order 524/2000 with CORINAIR methodologies and AP-42, which is more completely measure, the necessary data were obtained from emission assessment operators and authorities / local institutions involved . Air pollutant emissions inventory for 2011 was prepared in accordance on how to conduct national inventories and inventory in local air pollutant emissions, as required in EMEP/EEA-2009 Guide. Highest percentage (over 99%) in the total emission of SO_2 evaluated in the county hold emissions from fossil fuel combustion in energy industries and manufacturing industries and construction.

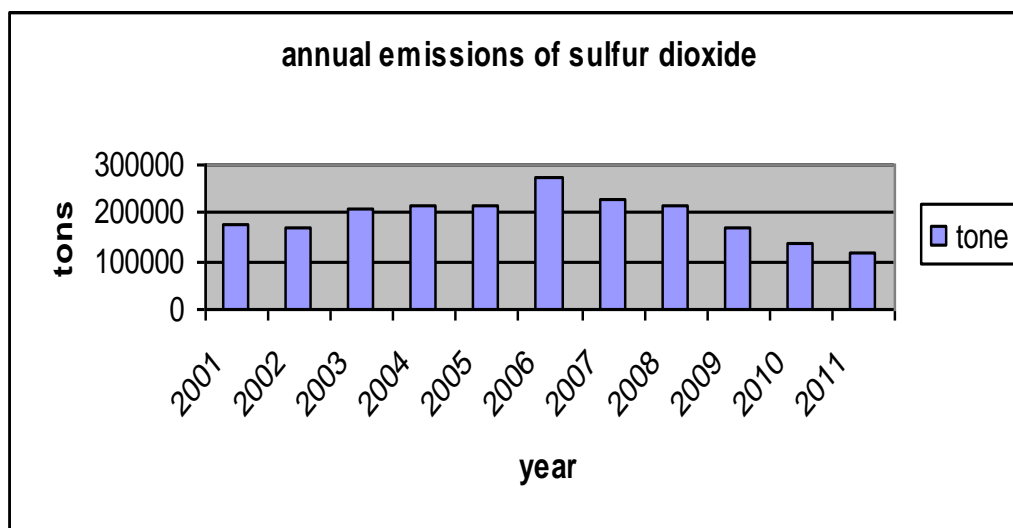


Fig. 2. Annual Evolution of SO_2

In 2011, emissions of SO_2 recorded as a result of a bet on service installations of flue gas desulphurisation at Rovinari Energy Complex.

2.3. Immission monitoring of SO_2

Gorj Environmental Protection Agency has a network for monitoring air quality (GJ-2 station - industrial as part of the National Network for Air Quality Monitoring established in the country) in

an area including gaseous pollutants (average daily - 24 hours) and more points for sampling sediments. Pollutants monitored through them are: SO_2 , NO, NO_x , NO_2 , CO, O_3 , particulates (PM_{10}). In addition, there laboratory equipment used to measure the concentrations of lead and other heavy metals as well as by the gravimetric method for the determination of the concentration of dust (PM_{10}). Also interpretation of data to air quality are monitored and a number of

meteorological parameters: temperature, precipitation, wind direction and speed, The relative humidity, pressure, radiation solară. Law no. 104/2011 on ambient air quality for SO₂ provides limită orară value (350 mg/m³) (not more than 24 times a calendar year while in town), the human health protection limit/24 hours (125 mg/m³) and threshold (500 mg/m³).

In 2011, the station recorded 10 GJ-2 overflows of VL, VL zones and three overflows of 24 hours, the source is lignite SC Energy Complex Rovinari SA

which owns two large combustion plants and put into operation two desulphurisation flue gas (block No.3 and No.6. overflows during the second half of 2011 had as a major cause, high demand for energy in power plants due to the prolonged drought during August to December 2011, and and frequent calm situations that favored the accumulation of persistent atmospheric pollutants. For SO₂ pollutant were recorded overflows of VL (value limit) daily (125 mg / m³).

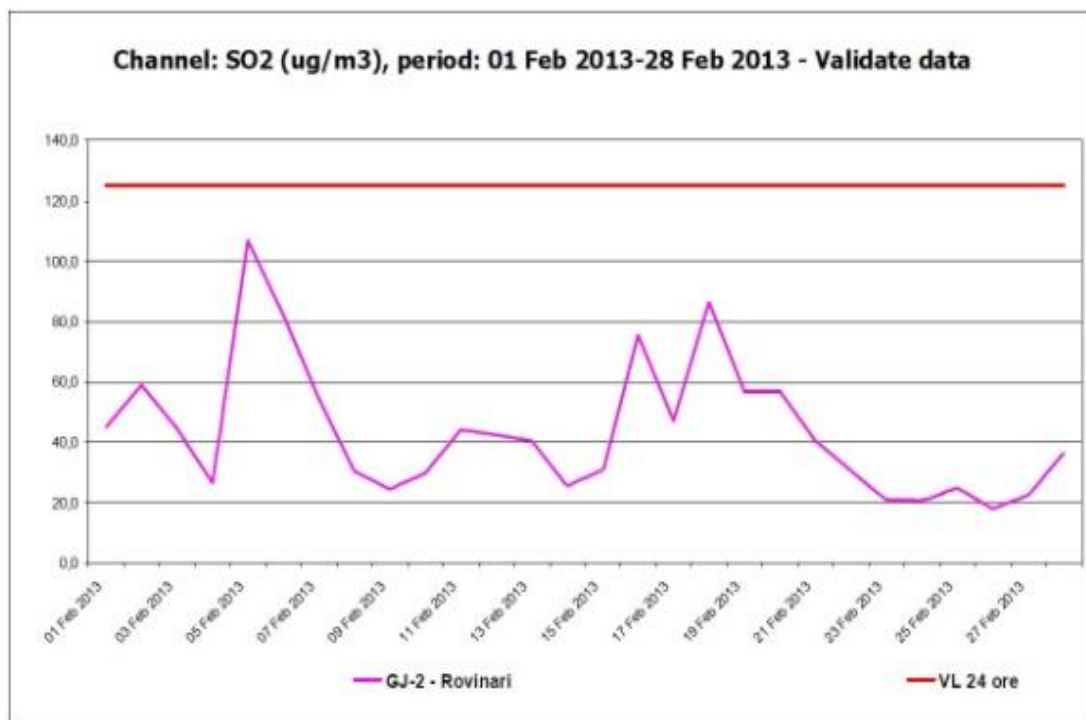


Fig. 4. Fate daily averages of SO₂ automatic station Rovinari / month February 2013

2.4. Air Quality

Under MESD Order no. 1095/2007 for the approval of the Norms regarding the establishment of air quality indices for public information, air quality is represented by the general and specific quality indicators, derived from the main air pollutants concentration values measured by. General and specific indices

are represented by integers between 1 and 6 and found appropriate adjectives: excellent-1 very good, 2 good, 3 medium-4-5 damage him very damage him-6 also marks a code associated color. Daily general index is established as the highest of the monitored pollutants found appropriate specific indications bet on that day.

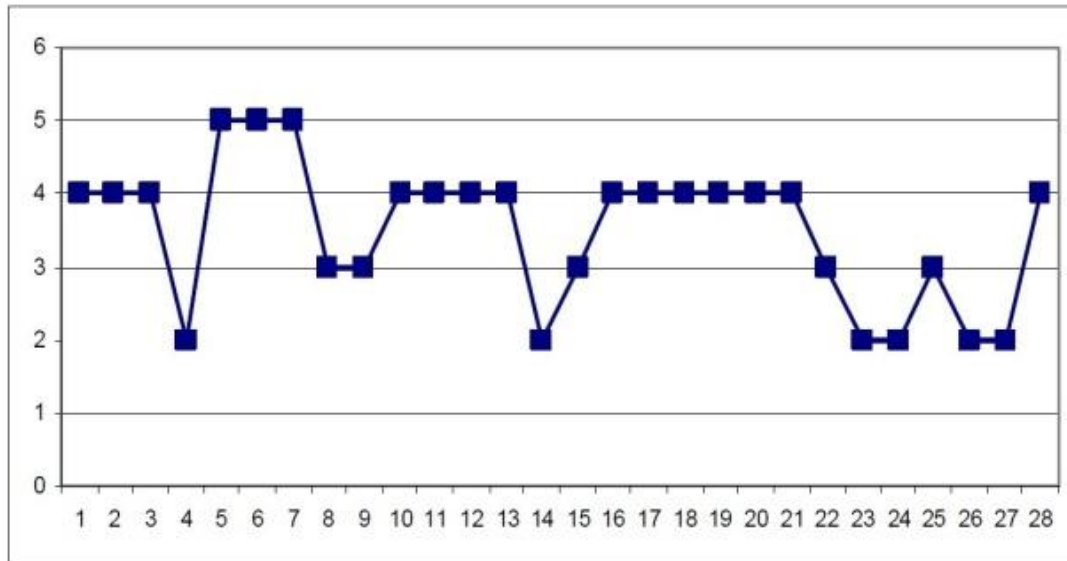


Fig.5. The index overall air quality station-2 GJ / month February 2013

In February the station GJ-2 were monitored pollutants: SO₂, NO_x, particulate matter PM₁₀, CO and O₃.

General index 5 (damage him) from days 5, 6, and 7 February set for station GJ-2 were determined by specific index of PM₁₀ (potential sources: coal extraction in the exploitation quarry, traffic-slip material resuspension, calm atmosphere).

Indices of air quality are brought to and consent to the information public through the outer and inner panels, a national site www.calitateair.ro and the daily bulletin of information for the public.

3. CONCLUSIONS

Air quality can affect people and the environment as whole health. Short or long term exposure to high levels of concentration of pollutants can lead to a number of negative effects on health from minor irritation of respiratory system to increased incidence of cardiovascular disease and even premature death. Pollution is an additional risk factor for heart patients with respiratory or other chronic diseases. It can, also, unintended negative effects on ecosystems, corrosion of materials including cultural heritage

objects. Environmental protection is the area that requires an approach specific subject in all branches of the national economy. Industry economic sector represents the largest contribution to environmental pollution, the large amount of gaseous, solid and liquid released in the environment air, water and soil. The purpose of the integrated system is the implementation of the measure by preventing or reducing emissions, and liquid and soil, including the measure by Waste Management to achieve a high level of environmental protection as a whole. In this regard, the regulation is realized and integrated control of this activity, and ensure compliance with legislation on environmental protection and the sustainable development principles (IPPC Directive 2008/1/EC). Production of electricity by burning lignite in Thermal Power Plant Rovinari that consume coal, releasing the dust and gas funnel and solid slag and ash.

It was stored by hydraulic transport deposits that occur large areas, but at the same time represent the high and structure a potential risk of loss of stability. Energetic industry is represented throughout the country, the production units of heat and electricity. As a result of this activity, result

significant emissions of pollutants (mainly CO₂, SO_x, NO_x and particulates). They also affect other natural elements (soil, vegetation, wildlife) and generates large wasted quantities. The most important releases and while most harmful are the activated carbon from burning. In order to improve te air quality in the county, it was developed in 2010 and was in the implementation phase integrated program management air quality in Rovinari areas for indicators of sulfur dioxide (SO₂) and particular matter (PM₁₀). The document contains appropriate precautions to be taken during the period 2010 - 2013 in order to reduce emissions of pollutants such manner that have health limit values for human and ecosystem protection.

REFERENCES

- [1] GD 440, Romanian Government Decision no. 440 of 2010 on the establishing of measures for limiting emissions of certain pollutants coming from the large combustion plants, 2010.
- [2] Law 104, Romanian Law on the quality of environmental air, 2011.
- [3] Order 833/545/859, Order of the Ministry of Environment and Water Management, Ministry of Economy and Trade and Ministry of Administration and Interns, on the approval of the National program for the reduction of sulphur dioxide, nitrogen oxides and powder emissions coming from large combustion plants, 2005.
- [4] Tătar A., *Study of methods and techniques for depolluting the air from Rovinari area*, PhD. Thesis, University of Petrosani, Petrosani, Romania, 2011.
- [5] [w.w.w.apmgj.ro](http://www.apmgj.ro)
- [6] <http://www.cerovinari.ro/>