

IDENTIFYING POLLUTED AREAS BY CET MINTIA

Andreea Cristina STANCI, Petru Dan COȘARIU

Scientific Coordinator: Assoc.Prof.Phys. Aurora STANCI PhD

University of Petrosani, 20 St. Universitatii,, 332006, Petroșani, Romania, Phone: +40254.542.994,
Fax: +40254.543.491, email: andreeastanci@yahoo.com

Corresponding author email: andreeastanci@yahoo.com

Abstract

One of the sources of pollution in the Hunedoara is the emisile of particulate on the chimney of CET Mintia and another source is ash resulting from the technological process stored in the cinder and ash deposits. The main purpose of this work is to identify areas affected by pollution produced by CET Mintia through the study of dispersion of atmospheric gases emitted by burning solid fuels and ash particles involved in dross and ash deposits. The main pollutants emitted the chimney are sulphur dioxide, nitrogen dioxide, carbon dioxide and particles of very fine ash. Deposits of dross and ash poses a major risk of radioactive pollution because of the high levels of radioactive elements.

Key words: pollution, evolution, dispersion , particles, gases.

INTRODUCTION

Thermoelectric Mintia - Deva (CTE Mintia), is located in the south-eastern the Transylvania, on shore of the Mures river, 7 km away from Deva.

CET Mintia is located in an area characterized by a temperate typical climate for the hills and plateaus with altitudes between 200-600 m. The average summer temperature is 21 degrees Celsius and average winter temperature is - 1 degree Celsius. The average annual temperature is 10°C. The average annual of the precipitation ranges around 600 mm / year. Atmospheric pressure varies between 962.9 mbar and 975 mbar, and relative humidity between 65-86%. The wind direction is V-NV. CET Mintia is a electrical plant of heating of cogeneration that provides electricity and heat. Works with coal as base fuel and provide heat for residents of surrounding areas.

MATERIAL AND METHODS

For the production of electricity, the thermoelectric plants use as a primary source of energy solid fuels. Chemical elements by reaction with oxygen develops heat (exothermic reactions) are the coal, hydrogen and sulfur. From the burning resulting as the

final product: carbon dioxide, water and sulfur dioxide

The solid fuels, in addition to fuel elements, contain and more sterile, which will be found in the process of combustion in the form of slag and ashes.

All products resulting from the combustion of solid, are pollutants in the sense that they are changing the balance in the external environment, or acts directly on the animal and vegetable regnum.

The main pollutants produced by electro power are: sulfur oxides (SO₂ and SO₃), nitrogen oxides (NO and NO₂), carbon monoxide and carbon dioxide (CO and CO₂), dust (fly ash, unburned carbon particles, clay, earth) and in smaller quantities: tars, hydrocarbons, soot, sulfates, organic acids, etc..

All usual fuels (coal, coke, fuel oil) contain ash from combustible solids.

Power plants are located near water sources such as rivers. The water used for cooling is reintroduced into the river at a higher temperature than that which was captured from the river. Therefore, power plants contribute to increasing water temperatures in the river, although the river as an ecosystem negative.

It is known that the burning of solid fuels and especially coal energy has a certain degree of radioactivity.

RESULTS AND DISCUSSIONS

To identify polluted areas after processes at CET mind, I used software the dispersion Meti-

Lis 2, applied both to the chimney emitted pollutants and at dust how high the ash and slag deposits related.

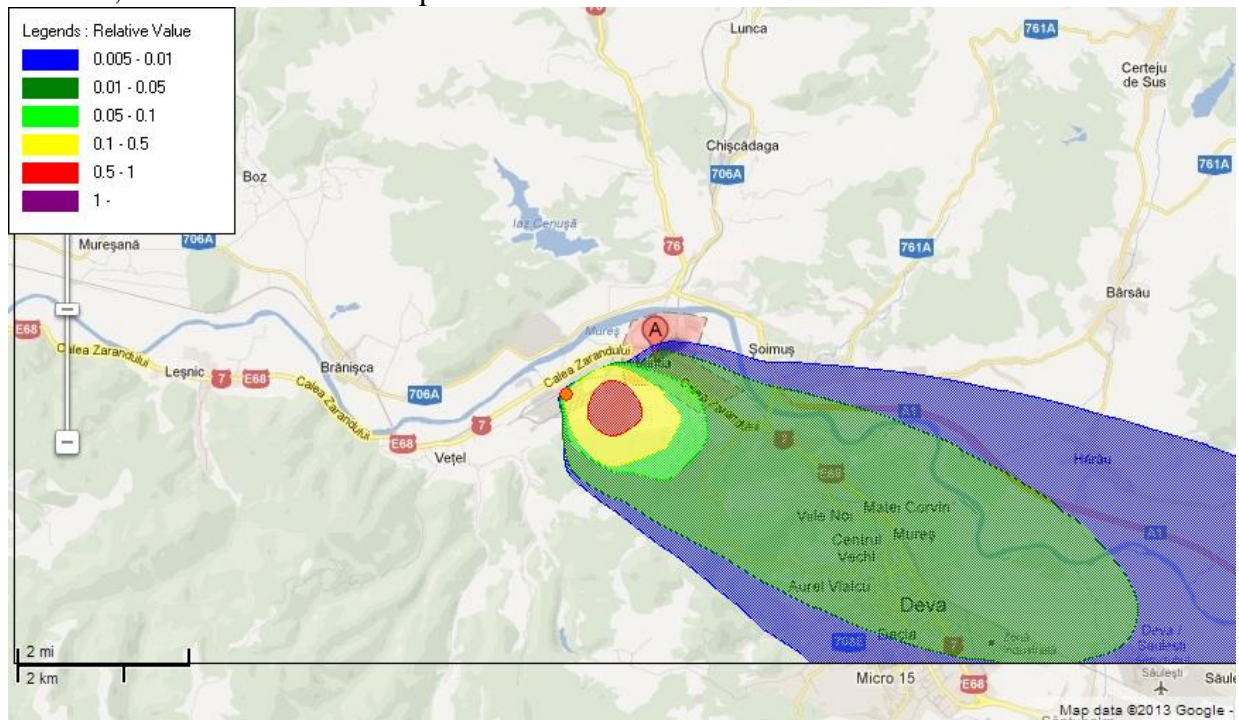


Figure 1. Dispersion of dust particles emitted by the chimney

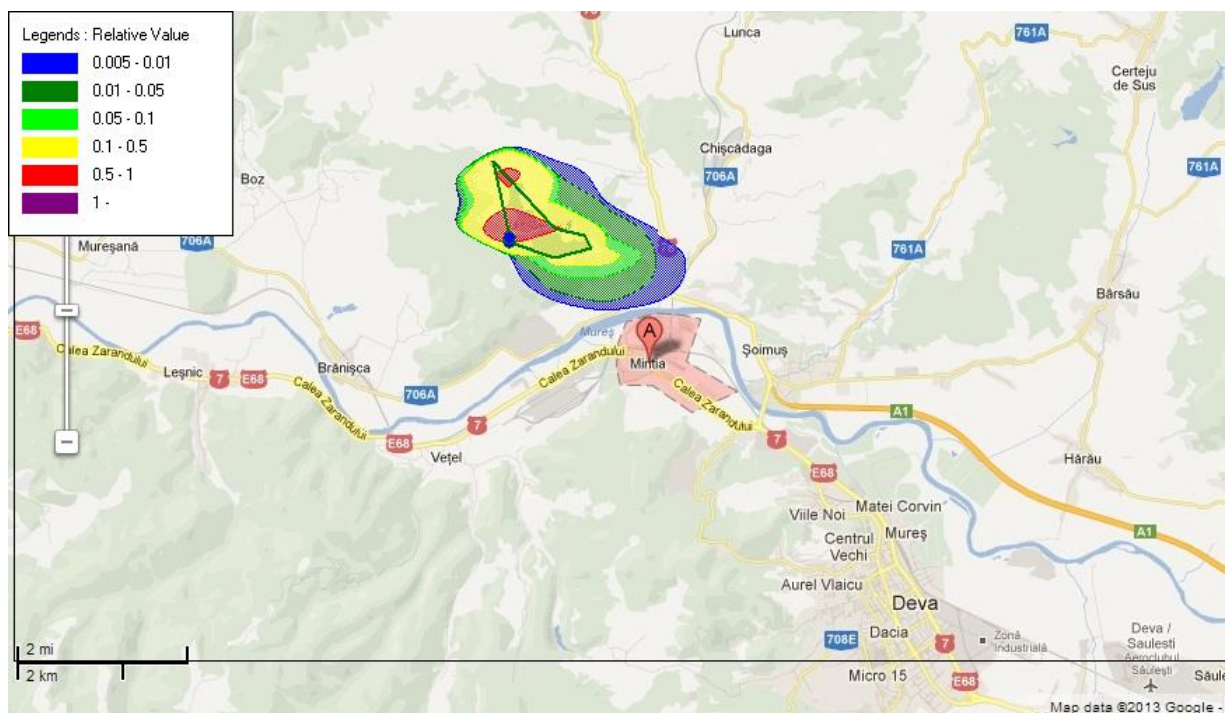


Figure 2. Dispersion of dust particles entrained by the air currents from the ash and the slag deposits

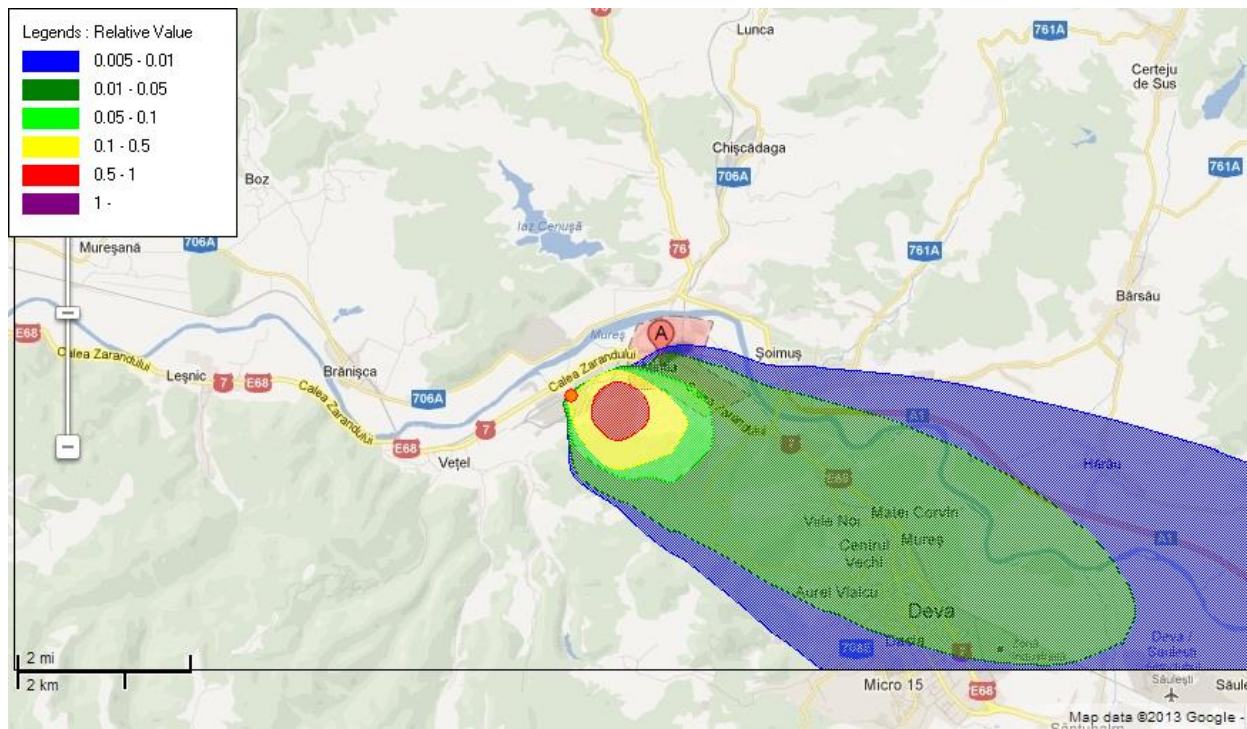


Figure 3. Sulfur oxides dispersion from the chimneys

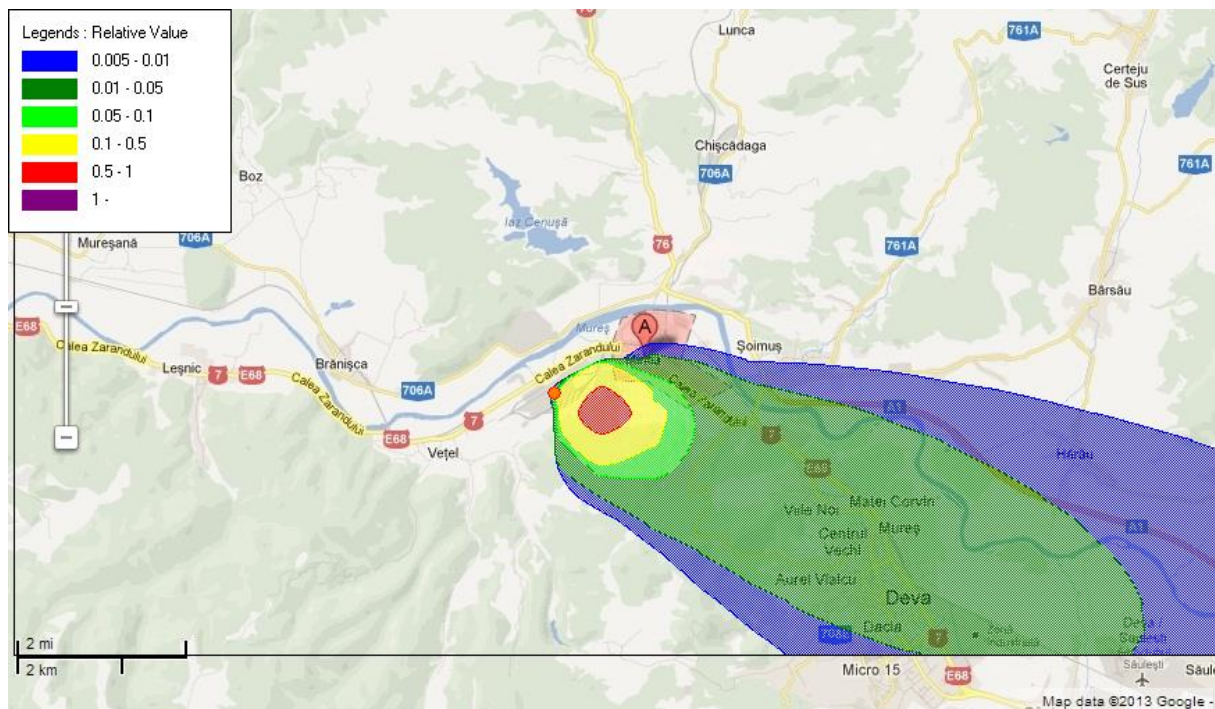


Figure 4. Nitrogen oxides dispersion from the chimneys

Studies were conducted on mean values of September 2012, data are presented in the following figures for the following pollutants: dust particles emitted chimneys (Figure 1), dust particles entrained air currents from the deposits of slag and ash (Figure 2), oxides of sulphur (Figure 3) and nitrogen oxides (Figure 4) from chimneys.

Following the analysis of dispersion maps we can see that pollutants produced by chimneys from CET Mintia are trained by air currents and dust driven towards Deva ash pollute the lake vicinity of CET Mintia.

CONCLUSIONS

Areas affected by pollution produced from the CET Mintia, present danger through sulfur dioxide that with water gives rise to sulphurous acid or sulfuric acid through the aggressiveness and their toxicity, nitrogen oxides and nitric acid are extremely dangerous to human biochemical mechanism.

From this point of view the sulfur dioxide is problematic for equipment; there is a danger acidic corrosion and ambient environment, causing acid rain affecting the fauna and flora. Together with the dust in the atmosphere, appear the phenomenon of fog (smog). For humans is in particular harmful effect on the respiratory system.

REFERENCES

- Drăghici A., Hoară M., Petrar A., Staicu Ș. Gh., 2009, Poluarea radioactivă a atmosferei produsă de arderea cărbunilor, *Analele Universității "Constantin Brâncuși" din Târgu Jiu, Seria Inginerie*, Nr. 3, pg. 183-192.
- Marcu Gh., Marcu T., 1995, *Elemente radioactive– Poluarea mediului și riscurile iradierii*, Editura Tehnică, București.
- Oncescu M., Panaitescu I., 1989, *Dozimetria și ecranarea radiațiilor Rontgen și gamma*, Editura Academiei R.S.R., București.
- Stanci A., 1999, *Metode și mijloace pentru determinarea caracteristicilor fizice ale materialelor*, Editura Universitas, Petroșani.
- Stanci A. C., 2012, *Monitorizarea emisiilor radioactive din atmosfera orașului Petroșani*, Sesiune internațională de comunicări științifice studențești Z.C.S.S.U.C.B. ~ 4-6 mai 2012 ~, ISSN 2066-1339, pag. 56-60.
- Stanci A. C., 2013, *Studiul poluării radioactive produsă de cenușa rezultată în urma procesului tehnologic de la CET Paroșeni* Sesiune internațională de comunicări științifice studențești Tg. Jiu.
<http://www.scrigroup.com/carbunele-Carbunii-fosili-sau-35185.php.htm>
[http://www.scrigroup.com/geografie Carbunii-Fondul-Funciar-Resursele-de-Apa.htm](http://www.scrigroup.com/geografie_Carbunii-Fondul-Funciar-Resursele-de-Apa.htm)
<http://www.scrigroup.com/Centrale-Termoelectrice.htm>
<http://www.scritube.com/ENERGETICA-MONDIALA93744.php.htm>
<http://web.ubbcluj.ro/ro/pr-acad/rezumat/2010/geologie/VARGAăILDIKOăMELI NDAăRO.pdf>