THE OBSERVATION OF THE POLLUTING EMISSIONS FROM THE SLAG AND ASH DEPOTS IN ROVINARI

TÃTAR Adina Milena
Grup Scolar Auto Traian Vuia Tg-Jiu
adddina.tatar@yahoo.com

Key words: emission, polluting substances mass capacity, sources, particles.

Abstract: This paper analyses the emissions of polluting substances in atmosphere from the slag and ash depots and their effect on the Rovinari town. The mass capacity for particles were measured depending on the dimensional spectrum and the effect of the polluting substances on population , ground and water was studied , too. The impact evaluation for the sources specific to the activities of modernization was made by mathematical simulation the results relating to the maximum concentration values.

1. GENERAL CONSIDERATIONS

The work carried out on site resulting emissions of pollutants from stationary sources (directed and undirected) and emissions from mobile sources (vehicles - emissions undirected). Stationary sources of air pollution / pollutant-specific:

- Large Combustion Plants (emission directed) / SOx, NOx, CO2, CO, PAH, CH4, HCl, HF, PCDDs / PCDFs, total dust, heavy metals, dust and vapor form (I, Mn, Cr, Pb, Ni, Cd Hg) baskets of dispersion related energy blocks
- fuel tanks (the vents - emissions routed) / VOC;
- HCl tanks (Emission undirected) / HCl;
- deposits of coal (carbon undirected) / particulate matter;
- Related to repairs, upgrades, demolition (operations welding, metal etc.).

Mobile sources of air pollution / pollutant-specific:

- Material transport vehicles, fuel, personnel, etc..,
- Equipment and vehicles used for demolition, repairs and RK on-site waste transportation (inert, non-recoverable).

The scale of emissions from mobile sources of pollution is not a significant factor, compared with exhaust emissions from stationary sources directed.

In accordance with the data, the main air polluting sources are represented by the power station from Rovinari and by the operations with lignite in the quarries around.

The most polluting substances are the powders , particles from the coal burning process, attracting the ash from the slag and ash depot in the air , involving the dust and the clay minerals in the coal dumps or on the transporting bands as well as in the heavy traffic.

The power station from Rovinari has its own important contribution both in generating the dust (the slag and ash depots, the traffic, the burning process) and in emitting the gas polluting substances (SO_2, NO_x, NH_3) generated in the coal burning process.

The emissions of the polluting substances in the air during these operations of building dams are of two categories:

- emissions of particles given by building the dams: the using of the asbes and slag taken with the bulldozer from the margin or with the lorry and the operating of the ground and rocks for consolidation.
- emissions of exit gases from the car fuel.

The emissions of dust often vary substantially from day to day, depending on the operation level, on the specific operations and on the weather conditions.

These sources of dust are accompanied by the emissions of the polluting substances specific to the internal combustion engines, that are the equipment used during those operations.

Whatever their type , the equipments work with Diesel engines, the exit gases containing the whole complex of polluting substances specific to the internal combustion by Diesel oil: NO_x COV_{nm}, CH_4, CO, CO_2, NH_3, Cd,Cu, Cr, Ni, Se, Zn, HAP, SO_2

The complex of organic and inorganic polluting substances has different levels of toxicity. Thus, we can also notice the presence of some cancer substances by epidemiologic studies made by the World Health Organization: Cd, Ni, Cr, and HAP.

2. THE MASS CAPACITY OF SOME POLLUTING SUBSTANCES EVACUATED IN THE AIR

Once existing data Gorj Environmental Protection Agency has a network of air quality monitoring in the area including a point for gaseous pollutants (daily average - 24 hours) and more points for depositing particulate sampling. Sedimentary dust in the indicator, it were excess of the maximum allowable concentration (MAC = 17 g / sqm / month) in several sampling points**.**

Frequency range of 8.3% exceeded MAC in virtue and Rovinari N (with averages of 10.66 and determined that 9.81 g / sqm / month), 36.4% in Rovinari S (15.20 g / m / month), 91.7% in Rogojelu (34.74 g / sqm / month) and 100% in Rosia (96.73 g / sqm / month).

Gorj Environmental Protection Agency imposed a series of economic measures to reduce dust emissions. Among other measures required to change routes conveyor belts to plant protection.

It also requires a careful verification of the status of the transmission, rhythmic splashing of storage dumps and tailings deposits of slag and ash, a better maintenance of roads in their area and regular watering.

The determination of the mass capacity for the polluting substances during a dam building was made using the following methodologies:

- the US EPA /AP-42/2009 methodology for particles results from operating the materials, from the disturbance of the surfaces and from the wind erosion.
- The EEA / EMEP / CORINAIR – 1997 methodology elaborated by the European Environment Agency for polluting substances from the equipments.

We may say that concentrations in emission are not characteristics to the placement of the objective, because they are free sources. Also, they can't be evaluated in accordance either with M SO 462/93 or with other normative regarding emissions.

The determination of the mass capacity for the particles emitted in the air was made in accordance with the dimensional spectrum characteristic to the particles and material involved in each activity and source. The mass capacities for particle specific to the activities or sources mentioned above where established for the following diameters similar (d) to the particles:

- Particles of d ≤ 30μm:
- Particles of d ≤ 15 μm
- Particles of d ≤ 10 μm
- Particles of d ≤ 2,5 10 μm (particles that pierce the lings, the so called " breathable " particles)

The particles resulted from the exit gas belong to the breathable particles.

Particles of d ≤ 30 μm are in the air as particles in suspension.

The some witch move a larger diameter rapidly deposit on the ground.

Table 1 - The mass capacity for the particles emitted in the air during a damming operation.

No.	Mass capacity of dimensioned spectrum(kg/h/km)			
	d ≤ 30μm	d ≤ 15μm	d ≤ 10μm	d ≤ 2,5μm
Total of the dam operation	1.17	0.76	0.55	0.17
Erosion	0.13	0.08	0.06	0.03

Table 2. - The mass capacity for the polluting substances in the air emitted by vehicles and equipments (quantity/ hour)

Source	NO_x	CH_4	COV	CO	N_2O	SO_2	PM_{10}	Cd	Cu	Cr	Ni	Se	Zn	HAP
	g/h/km						g/h/km*10^{-3}							
Vehicles	1613,4	9.4	308.3	1292.2	4.5	377.8	162.5	0.38	64.23	64.23	2.64	0.38	37.78	0.00
Equipments	1053.7	3.7	152.9	341.1	28.1	215.9	123.7	0.22	36.71	26.71	1.51	0.22	21.59	71.68
Total	2667.1	13.1	461.2	1633.4	32.6	593.8	286.2	0.59	100.9	100.9	4.16	0.59	59.38	71.68

The air polluted sources associated to activities which will take place in the ash dump are free open sources, disseminated on the surface the work develops, having other particularities than sources specific to industrial activities. As results, we can't think of a capitation purification evacuation unit for the polluted air and residual gases.

The impact evaluation for the sources specific to the activities of modernization was made by mathematical simulation, the results relating to the maximum, concentration values stipulated by:

- the national standard for the air quality (STAS 12574-87)
- the air quality standards in the E.U . , partly transpired in the national legislation (Order No. 592/2002)
- The guide – values for the air quantity recommended by the World Health Organization.

3. **CONCLUSIONS**

Population: In the damming area the maximum concentrations in 30 minutes or1 hour regarding the main polluting substances (TSP,NO_2, NO_x) can reach: TSP 280-340μg/m^3 (below the maximum concentrations values set by 12574-87) NO_2 137-150μg/m^3 (below VLEU)

Taking into account the national legislation, the population may be affected only by the synergic effect of the particles in suspension and NO_2. The overrun helming of the health protection limit for the synergic effect of these two polluting substances show rep only for short period of 30 minutes.

Vegetation: During the damming period short termed situations may be produced by the chemical stress on the vegetation because of the exposing of the NO_x polluted.

Soil and subsoil: During operations, in the dump the equipments and vehicles will emit particles charged with heavy metals which will deposit on the soil around. So there is the possibility of the soil contamination with Cd, Cu, Cr, Ni, Se, Zn in the nearly.

Buildings: the acid gases (NO_2 ,SO_2) and the particles emitted in the air during operations will produce temporarily, the increasing of the aggressiveness regarding the air medium.

Possibilities of diminishing or eliminating the impact.
The continuous moistening of the ash and slag surfaces.
The technological process which produces a lot of dust such as the ground, ash or slag padding will be reduced during strong winds.
Using the low-emission engines specific to EURO II.
The equipments and the vehicles will be checked up regularly concerning the CO level and the emission concentrations in the exit gases and will be used only after they are remedied.
It is recommended that only Diesel equipments and vehicles should be used because they don't evacuate Pb of little of CO.

REFERENCES

[1]. Huidu E, Sisteme de depozitare a carbunilor, Ed. Tehnica, Bucuresti, 1996
[2]. Racoceanu C., Popescu C., Evaluarea emisiilor poluante rezultate prin arderea lignitului in C.T.E de mare putere, Ed. SITECH, Craiova, 2006
[3]. STAS 11103/78 Puritatea aerului. Determinarea Pulberilor in suspensie
[4]. Tatar Adina -Milena, Modelarea proceselor dinamice din atmosfera 2010, Referat nr. III, Universitatea din Petrosani, 2010