

AIR IMPACT AS A RESULT OF MINING ACTIVITIES IN THE BERBESTI CAREER PERIMETER

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***Abstract:** One of the problems facing any disturbance regime is the exploitation and pollution of surface and groundwater. If the operation is done in career mode is disturbed by changing the direction of groundwater flow and creating a vacuum in the area where it intersects hydrostatic groundwater aquifer. Given the specific activity and the constructive solutions adopted, no pollution sources physico-chemical or biological environment which can become a form of aggression upon it and to determine the functional influences. There is only the possibility of accidental chemical forms of pollution by dumping fuel on the ground and in the water. This possibility will be minimized but by compliance with labor protection and proper maintenance of equipment.*

Keywords: surface and groundwater, groundwater levels, measurements.

1. INTRODUCTION

Berbesti career with Panda I career and Oltetul career are units recently learned from component Society Complex Energetic Oltenia S.A. Branch Division Mining Tg - Jiu, runs sales at the beginning of 2015 in the Division Mining - Govora., Valcea County.

In terms of territorial-administrative career Berbesti is located in the western part of Valcea County, in the mining area Amaradia-Taraia and spanning the municipalities of Berbesti, Sinesti, Alunu, near the limit with the county of Gorj

2. AIR QUALITY

As is well known, the air is the carrier of many pollutants, which they easily spread on the land surface.

Specific activities in the area are:

- agriculture,
- lignite exploitation,
- Woodworking,
- Livestock.

Given the activities specific to the main sources of air pollution that can be considered are:

- lignite exploitation;
- burning for space heating and food production (producers of carbon dioxide, carbon monoxide, nitrogen oxides and sulfur oxides.);
- mobile sources (cars, vehicles) that generates carbon oxides, sulfur oxides, nitrogen oxides, lead, benzene.

3. POLLUTION AND POOR AIR QUALITY

The effects of changing air quality caused by the works of his career Berbesti will materialize by the possible increase in certain points of the mining area in the concentration of dust, gas and fumes resulting from technology development career.

Most important manifestation points are:

- excavation area;

- area deposition of tailings dump;
- discharge points in front of strips connecting bands;
- distribution nodes;
- coal deposit in the warehouse and his expedition;
- on driveways

Another potential source of impaired air quality is the self-ignition of coal from deposits or layers career. Due to incomplete combustion, air emit carbon monoxide and small amounts of sulfur dioxide, light hydrocarbons - toxic substances whose concentrations do not exceed the usual limits.

By oxidation occurs store coal calorific loss reported in combustible mass (Q_{smc}).

Given the technological process developed in perimeter sources of pollution of the atmosphere can be considered:

- Fixed machinery related "Technology extraction in continuous flow with high capacity machines"
- mobile equipment associated process:
- "Batch extraction in the classic machines and automobiles "
- material and supply spare parts to work on the technological point by car,
- Establish ground and superstructure lane
- Establish ground and superstructure technology and access roads,
- rehabilitation / installation of technological equipment,
- re-cultivation works and biological modeling field.

Fixed equipment related technological process

Work done in the career of pit lignite, the main source of air pollution with particulate matter.

Loose rocks being excavated for the most part, with low mechanical strength, plus a low humidity, especially in hot weather, yield settled particles.

Zone fouling the air with dust:

a. The working area in front of the excavator with working rotor

If the method of excavation block transverse to the advance direction during the cutting operation, spill with cups band number one excavator and still relay bands to discharge lane main stream, it releases a large amount of dust..

Other sources of dust in the working face is formed by rock fall on stage, to the base of the slope in the rotor during operation, cups falling of the material stored in the lane no. 1 and the crushing plant crushing lumps in the excavator

b. In the line of conveyor belts

Transportation route to mining mass discharge from one lane dust is formed.

The main factors influencing the high concentration in the transport belt are:

- Low humidity mining mass;
- reduced atmospheric precipitation;
- high-speed transport;
- Fall height tape takeover.

c. Spill points in production (concentration of production)

Besides the factors listed above occur and the concentration of production lines all of flow technology, distribution node, which makes increasing the concentration of dust. These areas are relatively isolated from human settlements.

d. In coal deposit

d.1 when storing lignite

From the point of distribution over the strip and coal is deposited using stacking machine. In addition to the above listed factors lead to the formation of coal dust is added to the band taking deposition equipment and its discharge from about 5 to 10 m high, deservent following the lowering or the lifting arm deposition corresponding increase in the cone so that the distance between tip of the cone and the band signed spillway body be minimized.

d.2. Excavating coal deposit

For excavating coal deposit using a machine removed. The main source of dust is the loading buckets, turning their height and discharge from coal by conveyor belt discharging production to shipping.

e. Expedition - loading wagons

Coal warehouse is fed by conveyor up to the dispatch station, where it is loaded in wagons. Fall from a height of approx. 1-2 m, favors the formation of a high concentration of dust.

f. The tailings waste dumping

Waste dumping tailings resulting from stripping layers of lignite in the career is the career inner dump and dump exterior JIGA. When submitting dumps dust is formed.

TABLE Nr. 1. Quantifying emissions after their excavation, transport and dump scrapping.

Monitoring point	The measured value (media)
Access road T703	12 μ m ³
Access road T704	11 μ m ³
Coal deposit access road	13 μ m ³

The recorded values do not exceed the limit values according to STAS in force.

Mobile machinery. The main specific pollutants are represented by:

- particulate matter and sediment particles;
- flue gas.

If the supply of material and spare parts at the work on the technological flow by car, on driveways career, there is dust, which if not sprayed with water is a health hazard for personnel who operate activity in the area.

We appreciate that air pollution in the activities of fuel, maintenance and repair of vehicles is low and can be neglected.

Mobile machinery involved in the work perimeter will cause emissions powders and combustion gases (NO_x, SO₂, CO, CO₂, CH₄, NMVOC's).

TABLE No. 2

Construction type	Cod SNAP	Consum specific
Bulldozer	080810	13-16 l/h
Excavator	080805	28 l/h

loader	080823	15 l/h
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According simple methodology to apply analyzed the situation following emission factors presented in the tables below:

TABLE No. 3. Emission factors for the main components of the flue gases

No	Pollutant	UM	Emission factor
1	NOx	g/kg diesel	48,8
2	NM-VOC		7,08
3	CH4		0,17
4	CO		15,8
5	NH3		0,007
6	N2O		1,3
7	PM		5,73
8	Cadmium	µg/kg diesel	0,01
9	Copper		1,7
10	Chromium		0,05
11	Nickel		0,07
12	Selenium		0,01
13	Zinc		1
14	Benz-a-anthracene*		80
15	Benzo(b)-fluoranthene*		50
16	Dibenzo(a,h)anthracene*		10
17	Benzo(a)pyrene*		30
18	Chrysene*		200
19	Fluoranthene*		450
20	Phenanthene*		2500

NOTE: emission factors for POP, in Corinair specifies that these values shows still a degree of uncertainty, requiring revisions as new data occurring. For transport activity performed by trucks exceeding 3.5 tonnes and uses diesel fuel, emission factors are presented in the tables below.

TABLE No. 4

Emission factors	NOX	CH4	VOC	CO	N2O	PM	CO2
gr/km	10,9	0,06	2,08	8,71	0,03		800
gr/kg diesel	42,7	0,25	8,16	34,2	0,12	4,3	3138
gr/MJ	1.01	0,006	0,19	0,80	0,003		73,9

TABLE No. 5
Emission factors for heavy metals contained in the flue gases

No	Polltant	UM	Emission factors
1	Cadmium (Cd)	µg/Kg consumed diesel	0,01
2	Copper (Cu)		1,7
3	Chromium (Cr)		0,05
4	Nikel (Ni)		0,07
5	Selenium (Se)		0,01
6	Zinc (Zn)		1

CONCLUSIONS

The machines, regardless of their type, works with diesel engines, the exhaust gases discharged into the atmosphere containing the entire complex pollutant specific burning domestic fuel oil: nitrogen oxides (NO_x), volatile organic compounds non-methane (VOCs), methane (CH₄), oxides (CO, CO₂), ammonia (NH₃), particles of heavy metals (Cd, Cu, Cr, Ni, Se, Zn), aromatic hydrocarbons (PAH), sulfur dioxide (SO₂).

Complex organic and inorganic pollutants emitted into the atmosphere through exhaust gases contain substances with different degrees of toxicity. Such notice is present, besides pollutants common (NO_x, SO₂, CO, particulates) of substances with potential carcinogen evidenced by epidemiological studies under the auspices of the World Health Organization, namely: cadmium, nickel, chromium and polycyclic aromatic hydrocarbons (PAH). Remarkable also present nitrous oxide (N₂O) - substance incriminated in stratospheric ozone depletion - and methane, which, along with CO₂ effects on the environment on a global scale, the greenhouse gas emissions.

The quantities of pollutants emitted into the atmosphere by machines depend mainly on the following factors:

- the technological level of the engine;
- engine power;
- fuel consumption per unit of power;
- machine capacity;
- aged motor / machine

Emissions of pollutants decreases as more advanced engine performance, the trend in world production of engines with lower consumption per unit as power and control more restrictive emissions. For transport, they are also valid, the above considerations regarding the correlations between pollutant emissions and technological level of the engine, fuel consumption per unit of power or 100 km, vehicle age, etc. Aria main emission of pollutants from activities automobiles tailings, as well as the supply of material and spare parts at the point of working on the technological flow is considered footprint area of activity extended

laterally by both sides of the shaft road by about 25 m, which leads to an impact area of approx. 50 m width. Machinery (excavator, bulldozer, loader) instead moving short distances, work area; appreciates a uniform distribution along the work areas of emissions. Maximum concentrations of pollutants are made in this area. Studies completed by dispersion measurements show that, outside this area, concentrations of pollutants in the air are reduced substantially. Thus 20 m outside this strip concentrations are 50% and 50 m reduction is 75%. Along the transport path, uniform distribution is considered pollutants.

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