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PROBLEMS ASSOCIATED WITH CLOSING UNDERGROUND MINES FOR ECONOMIC REASONS

1. Introduction

The mining industry in historical Czech countries is one of the oldest ones in Europe as well as in the world. The first mining law has been announced already in the year 1300; the first summary books devoted to mining industry and metallurgy were published in the middle of the 16th century. The mining industry development was caused by occurrence of ore deposits including deposits of precious metals; the importance of coal deposits was recognized later. The most important locality of hard coal underground mining in the past and also at present is the Ostrava-Karvina District. The greatest output in the district's history was achieved in 1979 when it achieved 24.8 m tonnes.

The economic development after the year 1989 led to restructuring and transformation of the mining industry. Mining enterprises were divided into the ones with prospects for development, which were transferred into newly created joint-stock companies. The other enterprises remained in the organizational structure of state enterprises with the aim to terminate the ineffective mining activity.

One of the requirements of the process of limiting production and closing mines was the speed of this process. Today, with some time elapsed, it is possible to consider whether the closures had any alternatives and to search for indicators signalling the necessity of closing mines for economic reasons. The attention will be paid to Ostrava-Karvina District.

2. Economic reasons of mine closures

In the mining industry, the transformation of economics was connected to restructuring of organizational structures into smaller units, getting rid of ineffective production units and changing of production programs. The goal was to achieve economic independence because the transformation process was connected with the cancellation of state subsidies.

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The joint-stock company Ostrava-Karvina mines (OKD) was established by the governmental decision on January 1, 1991. Until the end of 1990 coal production was subsidized, this support ended with the creation of the joint-stock company whose financing was set on the resources obtained from the sales of coal, coke and other industrial activities.

In this situation, the management of OKD joint-stock company embarked on the process of rationalization of the mining activity and closing of ineffective operations.

In coal mining, the system of selective mining and concentration of mine works was started up. The economic viability of mines, especially in Ostrava part of the Ostrava-Karvina District characterized by unfavourable mining and geological conditions, was analysed. These mines encompassed deposits mined for a long time, deposits occurring at great depths, in unfavourable micro-climatic conditions where there is the necessity to shorten the working hours during a shift.

The dates of phasing out of mining in OKD joint-stock company are presented in the Table 1.

TABLE 1

The dates of phasing out of mining in OKD joint-stock company

Mine	Phasing out commencement	Mining activity termination
“Jan Šverma” Mine	10.1991	12.1991
“Ostrava” Mine	11.1991	12.1992
“Heřmanice” Mine	01.1993	06.1993
“Odra” Mine	01.1994	06.1994
“Julius Fučík” Mine	01.1995	03.1998
“Paskov” Mine	01.1998	06.1999
“František” Mine	07.1999	07.1999

In the evaluation of economic development we will confine ourselves to mines in the Ostrava partial basin where “Šverma”, “Ostrava”, “Heřmanice” and “Odra” Mines are located. The economic results of individual mines can be monitored only at the first three of the named above because, with in the case of “Odra” Mine the costs incurred in the already closed mines were charged onto it.

The date of the announcement of phasing out and the date of termination of mining in individual enterprises are the important time milestones. To set a base for comparison the time period of 8 months antecedent to the time of announcing phasing out of “Jan Šverma”, “Heřmanice” and “Ostrava” Mines was selected. This time interval corresponded to the data accessibility on “Jan Šverma” Mine where phasing out was announced first. The values of cumulative development in the time close before the phasing out announcement and values of cumulative development in the month in which mining was terminated and the mine was closed were related to this default base. In this way, it was possible to consider the dynamics of basic economic indicators in the last phase of a mining enterprise’s service life.

The development of single indicators was as follows, however, it is necessary to take into account that the time period between the announcement of phasing out and the termination of mining lasted 3 months at “Jan Šverma” Mine, 6 months at “Heřmanice” Mine and 6 months at “Ostrava” Mine:

- **total costs:** slight fall (“Heřmanice” Mine), slight growth (“Ostrava” Mine) and strong growth (“Jan Šverma” Mine); in all cases the costs exceeded revenues so the economic result in all cases was negative in long-term; however, it is necessary to take into account that full liberalization of coal prices only took place since 1993;
- **fixed assets:** slight growth (“Jan Šverma” Mine), fall (“Heřmanice” Mine), strong fall (“Ostrava” Mine); the dynamics of development corresponds to the duration of phasing out in which the enterprise had the time space for the sale or disposal of unnecessary fixed assets; the development in the time period of 8 months before the phasing out announcement is congruent in all cases and is characterized by slight fall;
- **current assets:** growth of current assets caused by strong growth of receivables (“Jan Šverma”, “Ostrava” Mines) — the customers ceased to pay after phasing out was announced, the fall of current assets caused by decrease in receivables (“Heřmanice” Mine) where efforts were made to collect the receivables;
- **own resources:** slight growth of own resources for financing of the enterprise’s activity (“Jan Šverma” Mine), slight fall of own resources (“Heřmanice” Mine), strong fall of own resources (“Ostrava” Mine);
- **foreign resources:** slighter fall of foreign resources than fall of own resources (“Heřmanice” Mine, “Ostrava” Mine), strong growth of foreign resources (“Jan Šverma” Mine).

It can be assumed from the development of the basic economic indicators that one of the decisive economic factors of dynamics of development in the last phase of the mine service life is the time between the announcement of the phasing out process and the termination of mining. Greater time space will enable enterprises to dispose of unnecessary property, to achieve extraordinary revenues and not to increase the dependence on foreign sources of financing.

However, the basic economic reason for the mine closures was their negative economic result, which, in the past, was eliminated by subsidies from the superior economic authority. In case of absence of subsidies the mines could theoretically:

- increase foreign resources (especially bank credits and obligations),
- reduce assets (especially by limiting depreciation of fixed assets and reduction of stocks),
- improve economic result.

With respect to removal of subsidies and subventions in the new economic conditions a simulation calculation of a mine development was carried out which would be able to increase foreign resources and reduce assets with respect to values of relevant indicators achieved in previous years herewith the subsidy would be eliminated and the mine would show economic result as equal to zero.

The simulation calculation following from the actual limit values of “Jan Šverma” Mine showed that in case of absence of subsidy the following would happen after five months:

- fall in fixed assets by 9% under the lowest actually achieved level,
- fall in short-term financial property on fragment of average monthly values,
- fall in receivables by 4% of average monthly values,
- fall in stocks under the actual lowest value,
- fall in total assets by 15% under the lowest value achieved in the past,
- growth of obligations by 27% over the highest value achieved in the past,
- fall in own resources by 20% under the lowest value achieved in the past,
- growth of foreign resources by 30% over the highest value achieved in the past.

Further development can go neither in the way of reduction of fixed assets nor in the way of reduction of receivables which, on the contrary, actually grew. The only way would be to further increase obligations because increase of bank credits would be unrealistic and it was not planned in the simulation calculation at all. However, because of the fact that the obligations grew more than three times during 5 months, further growth cannot be expected. The enterprise would not have financial resources to continue re-capitalization process and would have to terminate its activity.

Then, it is evident that in economic conditions of the first half of the ‘90s of the 20th century the process of closing underground coal mines showing negative economic results was in long-term the only way under the circumstances of re-distribution and cancellation of subsidies.

At the same time it can be stated that following signals of economic problems of a company it is necessary not only to carry out auditing in the sphere of economic result but also in the sphere of circulation of capital.

3. Conclusions

The existing analyses of mines’ economic development in the last phase of their service life show positive impact of extending the time period between the moment of announcement of the phasing out process and termination of the mining activity. In case of unavoidable fall of revenues due to a decrease in production this longer time period gives greater space to decrease cost items of mixed character with high share of variable costs (e.g. production consumables) but also to decrease the costs of fixed character. The mine can sell or dispose of greater part of its property, obtain extraordinary revenues and extract coal under reduced costs due to discontinuation of preparatory works.

Decisive for the mining industry are the natural conditions substantially influencing the economic results achieved. While the whole Ostrava part of the Ostrava-Karvina District was closed, the production of coal with positive economic result goes on in its Karvina part characterized by better mining and geological conditions. The existing economic development and organizational measures in the Ostrava-Karvina District had no alternative; a discussion can be led about the speed of this process.

It is necessary to emphasize in conclusion that the existing phasing out of underground coal mines in the Ostrava-Karvina District was only caused by economic reasons. The second cause for mine closure is depletion of its mineral reserves as in the case of “František” Mine where phasing out was announced after the depletion of coal reserves there.

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