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PRACTICAL APPLICATION OF THE UNITED NATIONS FRAMEWORK
CLASSIFICATION FOR RESERVES/RESOURCES

Trial assessment of coal reserves in the Raspadskaya mine
using the United Nations Framework Classification

(Submitted by the Government of the Russian Federation)*

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* Prepared by the Ministry of Fuels and Energy, Moscow.

Trial re-evaluation of coal reserves at the Raspadskaya mine using the principles underlying the United Nations framework classification

The Raspadskaya mine is the largest in Russia. Opened in 1973, it produces 5.5 million tons of hard coal per year. The mine's potential is composed of proven balance reserves of coal in strata over 0.7 metres thick with an ash content of under 35%. The total quantity is 755 million tons, 502.7 million tons of which are to be found in blocks 4 and 5. The reserves were evaluated in 1974 using the classification in force in the USSR at that time, under which balance reserves comprised reserves whose use was *economically justified*, without defining that ambiguous expression. This approach was typical for the period of central economic planning in the former USSR.

The shift to market relations in Russia brought with it the need to re-evaluate the potential of the mine in order to identify coal reserves which would allow highly efficient operation of the enterprise in market conditions.

Your attention is drawn to the findings of the re-evaluation of the coal reserves in part of the coalfield, in blocks 4 and 5, in the light of the United Nations framework classification, which is based on market principles.

The raw material base of the coalfield is to be found in 21 coal seams which were formerly classified as balance reserves. The seams differ considerably in terms of thickness (between 0.7-0.9 metres and 4.0-4.5 metres), the consistency of the morphology in the area of occurrence, the degree of faulting, the commercial value of the constituent coals and their possible uses.

The economic viability of developing the coal reserves was evaluated for each seam by comparing the value of one ton of coal and the cost of producing it for sale. This ratio was converted into the comprehensive indicator of viability, and by this means the balance reserves were divided into categories and subcategories under the United Nations classification (see diagram).

A description of the reserves in terms of the various economic subcategories appears below.

Normal economic. Coal reserves of high commercial value (grades GZh [Gazovy zhirny] and Zh [Zhirny]) which are suitable for use as the basis of the charge in the manufacture of metallurgical coke. They are included in seams over 2 metres thick without bedding abnormalities (either morphological, linked with the formation of the original material and displaying bulges and pinches in the layers of coal and the layers of rock in the seam, or tectonic, in the form of undulations in the seam floor and discontinuities in the form of fractures plus displacement).

Exceptional economic. Reserves of coals of high commercial value (grade GZh), suitable for coking, in seams between 1 and 2 metres thick with normal or slightly abnormal bedding.

Marginal economic. Reserves of grade GZh coals, suitable for coking, in seams between 1 and 1.5 metres thick with normal or slightly abnormal bedding; coals of lower quality (oxidized, high-ash, hard to beneficiate), suitable only for use in the power industry, in seams over 2 metres thick with normal or slightly abnormal bedding.

Submarginal economic. Reserves of high-grade coals suitable for coking, in seams less than 1 metre thick; coals of lower quality suitable only for use in the power industry, in seams of any thickness with abnormal bedding and seams less than 1.2 metres thick with normal bedding.

Exploitable reserves. Calculated for the subcategories of normal economic and exceptional economic reserves by subtracting from them losses in the form of pillars under bodies of water, buildings and structures, and also operating losses.

The exercise demonstrated that the true level of reserves of coal suitable for viable exploitation in the Raspadskaya mine is substantially lower than indicated in the official statistics. Commercially exploitable underground coal reserves constitute 69% of the total reported, falling to 40% if the practical scope for extraction is taken into account. The share of reserves suitable for highly profitable mining is 63% (underground) and 37% (exploitable). Reserves which would be highly unprofitable to exploit account for a large share (28%) of the total quantity of balance reserves.

Conclusions and proposals

It may be concluded from the work carried out that the evaluation and classification of coal reserves at the Raspadskaya coalfield performed under the system of central economic planning are now obsolete. The market approach has shown that at the best mine in Russia (and formerly in the USSR), a third of the reserves classified as balance reserves are unprofitable to exploit.

The experience gained may be extended to other Russian coal mines. In the context of the ongoing restructuring of the mining sector, it would be advisable to institute a procedure whereby any decision to rescue coal-mining enterprises is preceded by a detailed analysis of the status of each mine in terms of raw materials, with reliable evaluations of the true level of coal reserves which can be exploited in market conditions.