MINERAL RESERVES AND RESOURCES CLASSIFICATION OF UKRAINE 2024

Implementation of the UNFC in Ukraine
CURRENT VERSION OF THE CLASSIFICATION IS A RESULT OF A LONG-TERM EVOLUTION OF VARIOUS CLASSIFICATION SYSTEMS

In 1997, Ukraine was the first country in Europe and worldwide to implement the UNFC standards at the state level.

USSR Classifications
1981 (solid minerals), 1983 (oil and gas)
A B C1

Amendments according to the CMU regulations:
- No. 850 dated 05.07.2004
- No. 264 dated 26.03.2008

Amendments according to the CMU regulation:
- No. 764 dated 19.09.2018

PROJECT 2024

1997
The Classification was approved by the Resolution of the Government of Ukraine dated 05.05.1997 No. 432

2004
2008

2024
UNFC PRINCIPLES AND METHODOLOGICAL APPROACHES

Exploration Targets
Exploration Results
Mineral Resources

Mineral Reserves
Scoping Study
Pre-feasibility Study
Feasibility Study

State Accounting of Mineral Deposits
Statistical Data on Production/Extraction
Statistical Data on Resources and Reserves
Licensing and Tax Policy
PREREQUISITES FOR THE UPDATE OF THE CLASSIFICATION OF MINERAL RESERVES AND RESOURCES

EXPANSION AND IMPROVEMENT OF SOCIAL AND ENVIRONMENTAL FACTORS INFLUENCING PROJECT’S VIABILITY

REGULATORY ASPECTS OF RESOURCE MANAGEMENT

UPDATE 2019 UNFC & CRIRSCO

UNFC & CRIRSCO

REGULATORY ASPECTS OF RESOURCE MANAGEMENT

EXPANSION AND IMPROVEMENT OF SOCIAL AND ENVIRONMENTAL FACTORS INFLUENCING PROJECT’S VIABILITY
<table>
<thead>
<tr>
<th>Project 2024</th>
<th>EXPANSION AND IMPROVEMENT OF SOCIAL AND ENVIRONMENTAL FACTORS INFLUENCING PROJECT’S VIABILITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td><strong>Environmental, socio-economic study</strong> – environmental protection, ecology social development economic efficiency</td>
</tr>
<tr>
<td>2</td>
<td><strong>Technical and technological study</strong> – development technology enrichment technology commodities production</td>
</tr>
<tr>
<td>3</td>
<td><strong>Geological study</strong> – quantity, quality and technological properties of mineral raw materials geological, mining-geological and hydrogeological structure</td>
</tr>
</tbody>
</table>
REGULATORY ASPECTS OF RESOURCE MANAGEMENT

SUBSOIL CODE OF UKRAINE

- UNFC
- CRIRSCO
- PRMS
- NEA/IAEA

Viable Projects
- Coking coal, Graphite, Manganese, Silicon metal, Titanium, Vanadium, Zircon

Potentially Viable Projects
- Beryllium, Cobalt and Nickel, Copper, Hafnium, Lithium, REE, Scandium, Tantalum and Niobium

Prospective Projects
- Aluminium, Barite, Fluorspar, Germanium, Magnesium, Strontium

Unified data of the State Balance of Mineral Reserves on Critical Mineral Raw Materials
Reserves of graphite ores and graphite are accounted for in the State Balance based on categories of geological study (G-axis) for 9 subsoil areas:

- **balance** $A+B+C_1 = 224,778$ thousand tonnes of ore, $C_2 = 99,742$ thousand tonnes of ore
- **off-balance** $A+B+C_1 = 11,710$ thousand tonnes of ore
- **conditionally balance** $=$ 15,561 thousand tonnes of ore

In 2021, 17,000 tonnes were produced.
## Harmonization and Comparison of Categories of Reserves and Resources of Graphite Ore Deposits

### Case #1

Objects that have been subjected to the state expertise

<table>
<thead>
<tr>
<th>Subsoil area / deposit</th>
<th>Preliminary accounting data from the State Balance</th>
<th>Confidence in commercial significance (E-axis)</th>
<th>Confidence in technological efficiency (F-axis)</th>
<th>Confidence in the degree of study (G-axis)</th>
<th>Results of the state expertise and proposal for accounting</th>
</tr>
</thead>
<tbody>
<tr>
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<td>Class code</td>
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<td>UNFC</td>
</tr>
<tr>
<td><strong>Zavallivske 1</strong></td>
<td>B+C₁: 98612</td>
<td>Reserves were approved by the Protocol of the SCMR of Ukraine №4355 dated 19.04.2018</td>
<td>Acknowledged by the Protocol of the SCMR of Ukraine as prepared for further commercial development</td>
<td>Detailed exploration GEA-1 On Production</td>
<td>111 - 7712 211 - 15561</td>
</tr>
<tr>
<td></td>
<td>C₂: 14612</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Balakhivske</strong></td>
<td>B+C₁: 23936</td>
<td>Graphite ore reserves were approved by the Protocol of the SCMR of Ukraine №5420 dated 16.12.2021</td>
<td>Acknowledged by the Protocol of the SCMR of Ukraine as prepared for further commercial development</td>
<td>Detailed exploration GEA-1 On Production</td>
<td>111 - 22297 122 - 20356 331+332 - 26328</td>
</tr>
<tr>
<td></td>
<td>C₂: 18469</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td><strong>Burtnyske 1</strong></td>
<td>No assessment</td>
<td>Detailed exploration were approved by the Protocol of the SCMR of Ukraine №915 dated 20.12.2004</td>
<td>Acknowledged by the Protocol of the SCMR of Ukraine as prepared for further commercial development</td>
<td>Detailed exploration GEA-1 On Production</td>
<td>111 - 113390 122 - 16586</td>
</tr>
</tbody>
</table>

**Crystalline graphite ore, thousand tonnes**
## HARMONIZATION AND COMPARISON OF CATEGORIES OF RESERVES AND RESOURCES OF GRAPHITE ORE DEPOSITS

### Case #2

Objects that have not been subjected to the state expertise

<table>
<thead>
<tr>
<th>Subsoil area / deposit</th>
<th>Preliminary accounting data from the State Balance</th>
<th>Confidence (E-axis) (F-axis) (G-axis)</th>
<th>Results of applying the conversion methodology and proposal for accounting</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Zavallivske 2</strong></td>
<td><strong>A+B+C₁: 18950/1052 C₂: 14613/744</strong></td>
<td>Reserves were approved by the Protocol of the SCMR of the USSR № 11046 (1991) Detailed exploration 1982-1991</td>
<td><strong>221: 18950/1052 222: 14613/744</strong> Potentially viable projects</td>
</tr>
<tr>
<td><strong>Zavallivske 3</strong></td>
<td><strong>A+B+C₁: 6305/597</strong></td>
<td>Reserves were approved by the Protocol of the SCMR of the USSR № 9100 (1982) Detailed exploration 1982</td>
<td><strong>221: 6305/597</strong> Potentially viable projects</td>
</tr>
<tr>
<td><strong>Zavallivske 5</strong></td>
<td><strong>A+B+C₁: 5028/310</strong></td>
<td>Reserves were approved by the Protocol of the SCMR of the USSR № 9100 (1982) Detailed exploration 1982</td>
<td><strong>221: 5028/310</strong> Potentially viable projects</td>
</tr>
<tr>
<td><strong>Zavallivske 6</strong></td>
<td><strong>A+B+C₁: 5177/322</strong></td>
<td>Reserves were approved by the Protocol of the SCMR of the USSR № 9100 (1982) Detailed exploration 1982</td>
<td><strong>221: 5177/322</strong> Potentially viable projects</td>
</tr>
<tr>
<td><strong>Petrivske</strong></td>
<td><strong>A+B+C₁: 7523/540 C₂: 1696/115</strong></td>
<td>Reserves were approved by the Protocol of the SCMR of the USSR № 2156 (1958) Detailed exploration 1958</td>
<td><strong>331: 7523/540 332: 1696/115</strong> Prospective projects</td>
</tr>
</tbody>
</table>

**Crystalline graphite ore, thousand tonnes**
**RESULTS & COMMENTS**

**Terminology update according to the UNFC (Text)**

**Expansion of study during geological and economic assessment (development of additional specifications for the methodology of geological and economic assessment)**

**Provision of extended definitions of classification features according to the UNFC (Text)**

**Consideration of amendments in the updated UNFC & CRIRSCO classification systems (concept of “project”, specifications for new types of resources, reinterpretation of the E2 & F2 categories)**

**Clarifications, definitions and criteria for the classification of reserves and resources (Text, harmonization of the Classification with other regulatory and legal documents)**
Thank you!

STANISLAV LYTVYNIUK
Deputy Chairman of the State Commission of Ukraine on Mineral Resources on Ore, Non-Metallic and Solid Combustible Minerals

SERGII PAIUK
Chairman of the State Commission of Ukraine on Mineral Resources

UNECE
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