



CRM of Ukraine Database Supplements

Mineral target:	Kalush-Golynske deposit
Commodity:	Magnesium salts

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Location: 2 km west of Kalush railway station, Ivano-Frankivsk region.

Research: The deposit was discovered in 1804. The presence of potassium salt deposits within the Kalush-Golynska group of deposits was established in 1927-1929 based on the results of geological exploration conducted by the Polish Joint Stock Company TESP.

Today, the Kalush-Golynske deposit consists of two sites - Dombrovska and Piyllo.

Dombrovska site. Reserves of potash salts were first calculated and approved by the All-Union Commission on Reserves (protocol No. 2164) based on the materials of Polish geologists. In 1950-1958, the Lvivska Complex Expedition carried out detailed geological exploration works with the approval of reserves by the State Commission on Reserves of the Soviet Union (protocol No. 2517 of 12/27/1958).

Site area: 128.7 ha.

Geological characteristics: the Dombrovo site (according to the protocol, the Dombrovske deposit) belongs to the Kalush-Golynska group of potassium salt deposits, confined to the Fore-Carpathian depression, filled with Miocene sediments.

Deposits of potash salts of the Fore-Carpathian potash basin belong to the Kaluski layers of the Stebnytska and Vorotyshchenska Suites of the Neogene and lie among them in the form of sheet-like and lenticular deposits with a thickness of 3 to 120 m. A significant part of these reserves is concentrated at depths of 600-700 m.

The productive sequence of the Dombrovska area belongs to the sediments of the Lower Baltska Suite of the Lower Miocene and is represented by an intricate complex of potassium, mainly sulfuric acid salts, which create a potassium-bearing zone with a thickness of 150-200 m.

Potassium salts are represented mainly by sulfates, chloride-sulfates and chlorides of sodium, potassium and magnesium. The most common minerals are kainite (15-20%), langbeinite (7-12%), sylvine (5-8%) and halite (20-40%). The content of potassium oxide in raw salts is: in sylvinites - 12-22%, in carnallite - 6-9%, in sulfuric acid salts - 7-13%.

The potassium salts of the area are divided into chloride (non-sulfate), represented by sylvinites and carnallite rock, and sulfuric acid (sulfate), distributed much more widely than chloride and represented by much more complex mineral compounds such as kainite, langbeinite, polyhalite, shenite, etc. The content of potassium oxide in them ranges from 9 to 21%.

Mixed sulfuric acid-chlorine salts in the form of compounds such as kiserite, leonite, sylvin, halite, etc. were also found in the Dombrovo area.

In general, the potash-bearing zone is represented by alternating layers of salt-bearing clays, halite rock, salt-bearing breccias, and potash salts. In the zone, 5 horizons, the most enriched with potassium salts, can be traced. At each horizon, one or more disconnected lenses are distinguished, the sizes of which vary from 300 to 1500 m in strike and from 200 to 800 m in dip.

The 3rd (lower pack) and 4th (upper pack) horizons are of industrial interest; the latter is the main one. The potash deposit of this horizon has a complex configuration due to the erosion cut in the northeastern part of the deposit. Its depth varies from 15 to 200 m, thickness - from 7 to 100 m.

The main rock-forming minerals of the 4th horizon are kainite (17%), langbeinite (17%), halite (27%); less common (3-7%) – polyhalite, kiserite, sylvin, shenite, carnallite. Accessory minerals are represented by gypsum, anhydrite, epsomite. In addition to the listed minerals, clay substance (15-30%) is of great importance in the composition of the productive pile.

The lower saline pack has a limited distribution and is exposed only in the northeastern part of the deposit. Its thickness does not exceed 50 m; the content of K₂O ranges from 9 to 14%.

The main part of salt reserves (about 75%) is represented by sulfuric acid varieties, suitable for the production of potash fertilizers.

At the contact of Quaternary sediments, represented by loams and pebbles with a total thickness of 5 to 30 m, and salt-bearing sediments, gray plastered clays lie - a gypsum-clay "hat", the thickness of

which varies from 3 to 30 m. In these rocks, karst sinkholes with a diameter of 0.3 to 1.0 m, filled with different-grained sand and pebbles.

Underlying rocks include marly clays of the Stebnitska Suite.

The hydrogeological conditions of the Dombrovska site (field) are complex and are determined by the presence of an aquifer above the salt-bearing stratum, suprasaline brines, the proximity of the Sivka River, and significant atmospheric precipitation.

The suprasaline aquifer is limited to pebbly sediments of the Quaternary age with a thickness of 4 to 25 m. The chemical composition of the water is sodium chloride, less often bicarbonate-calcium with mineralization from 0.1 to 2.5 g/l.

Supersaline brines are not widespread and accumulate in karst cavities in contact with rocks of the gypsum-clay "hat".

The Dombrovska site of the Kalush-Golynske deposit was developed by the open-cast method by the subsidiary company "Potash Plant" of JSC "Oriana", which includes the Dombrovskiy quarry, the Piyllo mine, an enrichment plant, a potash fertilizer plant, and a magnesium plant. The design capacity of the processing complex was 250,000 tons of ore per year. The mined salt was sent to the concentration factory, where, by dissolving, technical commercial salt, potassium sulfate, calimagnesia, and chlormagnesium brine were obtained from it.

Piyllo. Within the boundaries of the Golynska syncline, the Piyllo site (in the protocol, a deposit) was also discovered - the object of exploration of the Lvivska geological expedition in 1960. Reserves of potassium-magnesium salts were approved by the State Commission on Reserves of the Soviet Union (protocol No. 2954 dated February 4, 1960).

Site area: 121.9 ha.

The deposits of potash salts here are also confined to the deposits of the lower half of the lower Baltska Suite of the Miocene, represented by alternating layers of salt-bearing clays, halite rock, salt-bearing breccias, and potassium-magnesium salts. The power of the lights in different areas ranges from 130 to 530 m.

From the surface, the complex of rocks that make up the site is overlain by pebbles and loams of Quaternary age with a total thickness of 15 m.

The site is confined to the northeastern limb and the middle part of the wide and gentle Golynska synclinal fold of the southwestern extension with dipping angles of 15-25°. The potash-bearing world of the Miocene with layers and lenses of potash salts is composed of salt-bearing clays, siltstones, less often sandstones, sometimes with samples of carbonate rocks. Its thickness in the Golynska syncline is 300-600 m. Lenses of potassium-magnesium salts lie in the cross-section of the salt-bearing stratum in multi-layered layers, according to the rocks that contain them. In plan, the lenses have a complex outline, often arranged in a stage-like manner. The dimensions along the extension are 1-1.5 km, along the dip - 0.5-1.0 km. The depth of potash lenses reaches 1100 m.

The main rock-forming minerals: halite, kainite, sylvine, carnalite, polyhalite, anhydrite.

There are three main types of ores on the site: sulfate (kainite), chloride-sulfate (sylvin-langbeinite-kainite) and chloride (sylvinite). Sulfate ores predominate.

The Piyllo site of the Kalush-Holinsky deposit was not involved in industrial development.

The Kalush-Golynske deposit is complex. In addition to potassium salts, the balance includes magnesium salts, the mineral reserves as of January 1, 2023 is by category (thousand tons):

Magnesium salts: A+B+C1 – 442,427.0 (raw salts), 22,388.0 (MgO); off-balance: 5,628.0 (raw salts), 295.0 (MgO).

Potassium salts: A+B+C1 – 410,294.0 (raw salts), 45,280.0 (K₂O); off-balance: 4,515.0 (raw salts), 426.0 (K₂O).