Technopolis

Presentation of the
Management Company TRT
"Forest Venice”
&
VR Energie GMBH

Hydraulic borehole

Hydraulic borehole mining

Hydraulic borehole (HBH) - a method of underground mining of solid minerals, based on the reduction of mineral resources in situ in a mobile state through hydro-mechanical effects, and issuing it as a slurry to the surface.

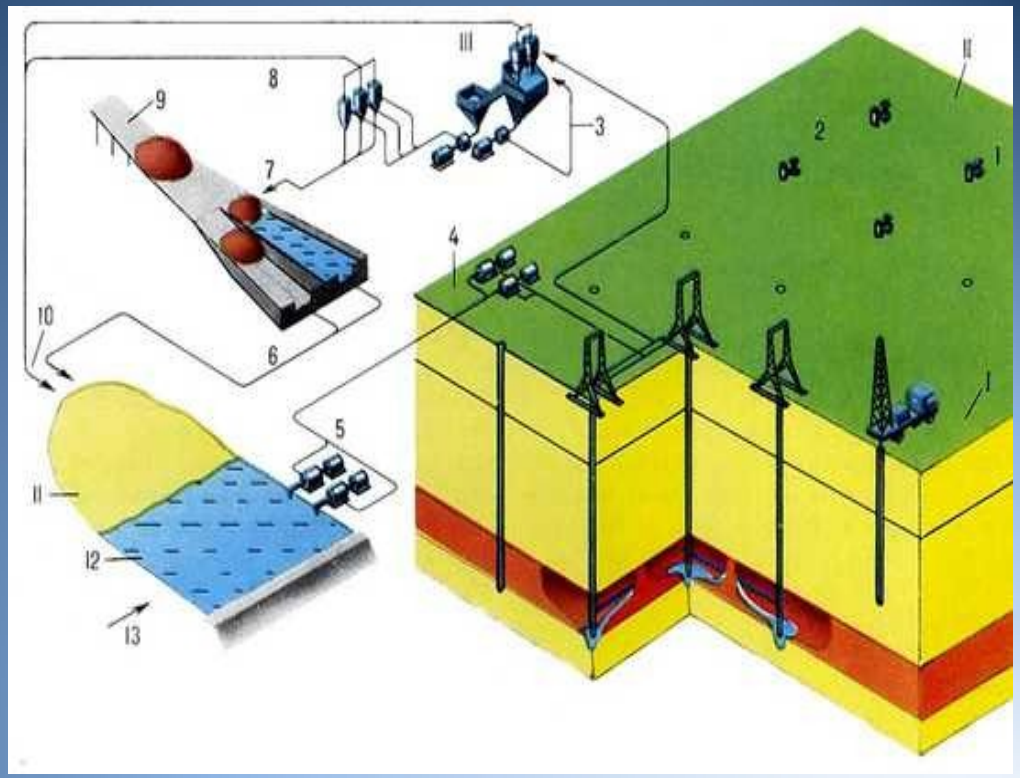
The main technological processes in hydraulic borehole are: opening the field with boreholes, hydraulic fracture (washout) by pressured jet of water (in dry or flooded clearing space), disintegration and translation in the slaughter of the destroyed mass in the slurry, transportation (gravity flowed or pressured) of the slurry from the slaughter to pulp receiving boreholes (output), lift the slurry to the surface, enrichment, storage of enrichment tailings, clarification of recycled water and water supply, management of rock pressure.

Flow sheet of the company of hydraulic borehole is shown on the next page.

Method of hydraulic borehole proposed by Soviet engineer V.G. Vishnyakov in 1935.

Flow sheet of the company of hydraulic borehole

I - peat deposits;
II - boreholes for water supply;
III - Technological area.
1 - borehole of water supply;
2 - boreholes of pumping pulp for the sorption;
3 - pulp;
4 - ground pumping station;
5 - pumps for water supply;
6 - sink;
7 - concentrate;
8 - sink;
9 - loading ramp;
10, 11, 12, 13 - returnable water.



Flow sheet of the company of hydraulic borehole

Venture HBH consists of: a polygon with drilled wells and the pipeline for compressed air, pressurized water and hydraulic slurry 3 to warehouse lighting pool, pump and compressor stations, power substations and other utility services.

Under the technology of mining by the HBH method we understand a set of manufacturing operations to ore destruction and wash, linked in time and space. Their sequence: the implementation of technological scheme of the HBH method.

Mining methods of mining chamber may vary in the direction of the giant jet stream and delivery schemes of destroyed ore to the suction of the device:

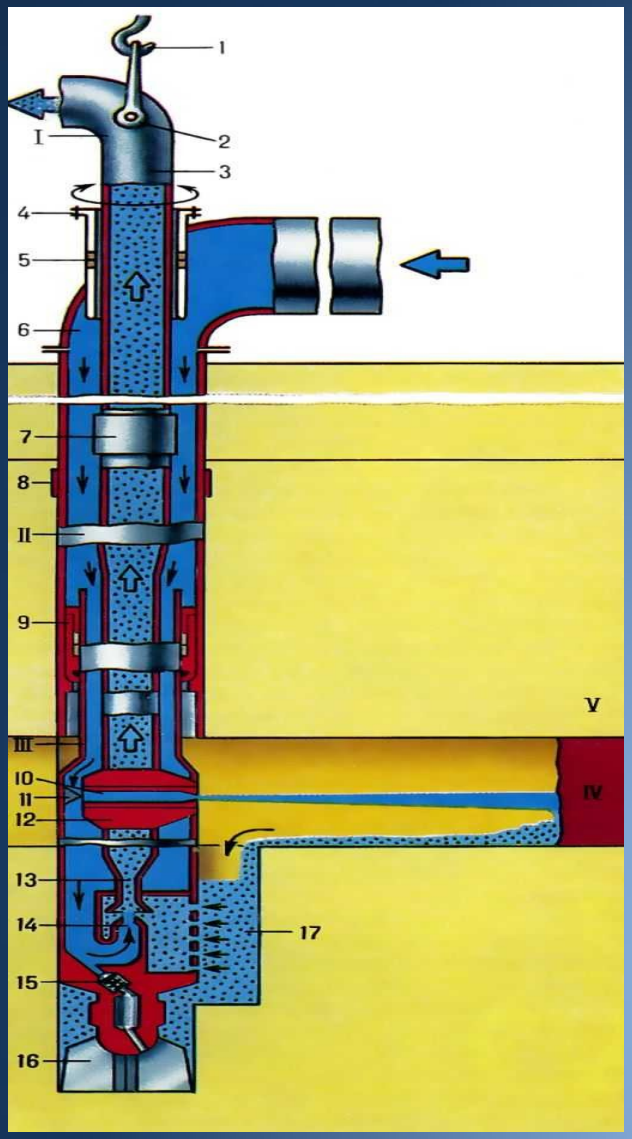
Counter faces - when the direction of the destructive stream is not aligned with the direction of the flushing nozzles;

FAIR faces - when they are fully or partially match;

Combined faces - when the stream of lateral giant nozzles using FAIR faces destroy the ore bed and wash it to the suction of pulp lifting mechanism, and the stream of front nozzle using counter faces develop a layer;

Combined faces - when the two nearly located cameras are worked out by counter or combined faces, and then using a FAIR faces a work off is produced of between cameras pillars and cleanup of the soil chamber.

Scheme of the bullet hydraulic borehole



Scheme of the bullet hydraulic borehole:
I - upper headroom feeder
II - a set of partitions composition (water pipe and slurry pipeline);
III - the lower head with jetting and issued by the device,
IV - ore formation,
V - backs.

Upper headroom HBH includes a lifting device 1, the upper curved portion of pipeline 2, positioning device 3, grundbuksu 4, the upper sealing gasket 5, conduit, mounted from the casing 6. Separate sections are assembled composition with fittings of pipeline 7 and conduit 8. In the backs before opening the reservoir is set packer 9.

Breaking the mineral by jetting 10, mode of operation is controlled by regulating valve 11. To check and reduce resistance to movement of the pulp slurry pipeline installed fairing jetting 12. The composition of the lower tip also includes a mixing chamber hydraulic elevator 13 with a nozzle 14. HBH flap mud end device 15 and the drill bit 16. Fuzzy tormyanaya mass accumulates in zumpfovoy of wells 17.

Hydraulic borehole of peat

Hydraulic borehole (HBH) is a method of remote underground mining through the boreholes in which the minerals are transferred into a state of suspension, capable of transporting to the surface. It can be used when developing inventory stacked legkodispergiruemymi loose or loosely coupled minerals. To those include the deposits of peat, sapropel, sand and clay, placer gold, tin, amber, diamonds, titanium and zirconium, the weathering crust, including mineralization of niobate, rare earth minerals, loose iron ores of the Kursk Magnetic Anomaly, South Urals and Western Siberia, oxidized and mixed manganese ore, brown and black coals, bitumen and asphaltites.

The point of innovative mining technologies takes into account the specific structure and properties of the peat deposits. Peat extraction is carried out on the technology of hydraulic borehole peat (HBHPT) by layering of gidrodispergirovaniya peat deposits using thin streams of high pressurized water with simultaneous suction of peat pulp and feeding it into a modular plant for enrichment and reprocessing. Mining plants are mobile and set up on the base of floating-terrain vehicles. HBHPT and complex for its implementation can achieve maximum environmental safety by keeping the top - rock forming the peat layer. Extraction ratio of reserves (ERR) of the peat deposits is up to 0.9 against 0.5 for a milling method of peat extraction. There is a rapid return of peat land to the initial state of a pond-swamp ecosystem that existed earlier.

Hydraulic borehole of peat

This allows us to completely exclude the occurrence of fires in all stages of production and restore of wetland ecosystems, in addition, to exclude completely the reset of the swamp sewage in open sinks, associated to drainage of wetlands for all existing methods of peat extraction, because this system of water use based on the new technology has got closed cycle.

Hi-tech complex allows almost year-round production of various products based on peat (9-10 months of mining and processing, 1 - Preventive maintenance and repair, 1 - a break for holidays). This reduces the overall costs and increases profitability of mining-processing enterprise.

The proposed complex of technologies and equipment can reduce in 10-25 times the total cost of raw materials extraction and the finished product receiving, compared with the most progressive of milled peat separate cleaning from the integrated roll, persistently imposed on businesses as a new, more than 20 years in Finland and some Russian Peat lands. The reason for its rejection lies in the enormous cost and the irrationality.

Hydraulic borehole of peat

In all ways of the opencast peat field development in the first 3-5 years the peat deposits are drained by net of conductive and drainage channels. The costs of these operations make up 30-40% of the cost of production. Then, after a 5-year pre-operational drying, milling crumb is milled and dried. It's still up to 60% of the costs, and then using trucks it is delivered to a processing production or TPP, with the apparent loss of quality peat fuel (moisturizing, self-heating, salinity, etc.). After that, artificially dried, crushed and re-hydrate (water or steam) to improve the process of briquetting or extrusion, and then artificially finally re dried to the required quality of finished fuel products. In such not optimal technological processes, energy consumption per 1 ton of finished product are obtained in 8-12 times higher than in the proposed technology. In addition, separate located production units have got up to 20% of waste of the volume produced peat products in the form of waste of low-quality raw materials or small and crumbling dust components, which are not used.

For extraction, for example, 30 tons of peat fuel by milling method with a separate cleaning peat from the scalable roll is required to drain not more than for 5 years, to prepare, maintain and pay (taxes and no forest land) of about 250 hectares. For the extraction of the same amount of peat fuel offered by HBHPT requires an area on the field in 70 times less (at a depth of peat deposits, 3-4 m). Consumption of diesel fuel for 1 ton of extracted peat fuel is in 16 times smaller than the milling method of peat extraction, which is essential part for increased prices on diesel fuel.

Hydraulic borehole of peat

Calculations made by the definition of pollutant emissions into the atmosphere, convincingly demonstrate significant environmental clean technologies HBHPT. For example, emissions of carbon oxides and sulfur into the atmosphere during the application of developed technologies for the extraction of peat in 19 times less than peat milling method and the draining of peat deposits. The extraction of peat using open-milling method during the mining process and after it there is a significant greenhouse gas emission on peat fields - methane, which is 21 times more dangerous than carbon monoxide. HBHPT technology almost completely exclude this negative effect. For Northern and Western Siberian regions use of local fuels, which include peat, provides for the creation of new jobs (each one thousand tons of peat fuel creates in the municipalities and rural areas further 4-6 jobs), and increases the social level of the population. This ensures the growth of tax revenues to local budgets. Funds allocated to the current purchase of imported environmentally hazardous fuels will remain in the municipalities. Currently, only four federal districts (Central, North West, Volga and Ural) are working on imported coal and fuel-oil more than 12 thousand boilers. Transfer only a part of them to the local fuels would give a significant economic impact, and most important, improve the reliability of the population with heat. The cost of heat for many regions now becomes comparable to the cost of heat produced by burning gas. Given the accelerated growth rates for the heat in housing, rising prices for oil and gas, "ennobled" local-based peat fuel can find a decent niche in the market of fuels in the next few years. Integrated environmental and economic risk is reduced with up to 0,80-0,90 0,25, and КПЗ increased from 0.55 to 0.90, which is very attractive for investors and venture funds.

Hydraulic borehole of peat

Thus, the production of various products, heat and electricity from the proposed innovative technology allows in complex conditions of rapidly changing market and the constant rise in prices for heat and energy to vary the volume of production and competitive types of peat products. In addition, they allow you to seasonally adjust the amount of heat and electricity, as well as ensure a reliable supply of them for housing and population.

Promising, but long known in the practice of burning peat fuel is its gasification to produce biogas. Of the modern combustion technologies of "ennobled" peat fuel - энергопеллет most effective is technology of fast pyrolysis. Combustion heat, developed and patented by us peat biofuels, with rapid burning contains more than 25 MJ / kg, which is in 2 times energy effective than conventional peat fuel. From one tonne of peat energopellet can get about 500 MH of clean biogas using pyrolysis. Also very promising is technology for producing bioethanol (C.H.OH), as well as polyatomic ethyl alcohol and gasoline. For example, a gas generator of 100 kW, operating at the same peat composite biofuel can produce 86 Gcal / h of heat. Cost of 1 Gcal of heat generated by it, for different regions, is ranging from 400 to 800 rubles, instead of the current 2000 rub. The use of such boilers would allow dozens of times to reduce the cost of thermal power generation, which will also contribute to low growth rates.

Thus, the model of a modern extracting-processing of small thermal power complex is the extraction and production of technologically innovative composite energy-efficient peat biofuel, its pyrolysis, and realization to the consumer of heat and electricity.

Advantages of hydraulic borehole of peat

- Relatively low investment (5 times less than the development of peat deposits by traditional technologies);
- Short-term input to the development of the peat or sapropel deposits (up to six months);
- Rapid payback of capital investments;
- High quality of the product (reduction of the drying process);
- High performance;
- A small amout of personnel;
- The ability to profitably work off a small fields on a rotational basis;
- High safety of mining operations;
- Low impact on environment.