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BOREHOLE HYDRAULIC MINING OF ALLOWING USEFUL FOSSILS BY MOBILE MINIO-EQUIPMENT

The proposal was prepared for one of the domestic customers working in the extraction of placer diamonds and gold on the island of Madagascar.

The placer deposit has no peat, is located in the channel and valley of the river. The productive layer is composed of loose friable clays, clay sand, small pebbles and sandy clay washed and redeposited several times over the stream, not compacted over time, sand, rounded by fragments of bedrock and clay layers. The depth of the useful stratum is from 0 m to 28 m.

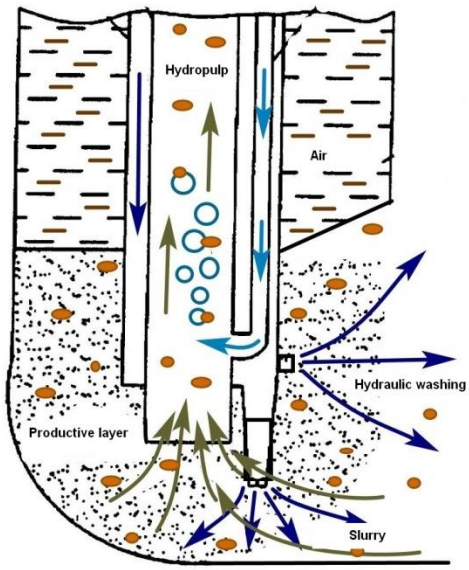
The area is impassable, is off-road, lacks electricity and labor. Material and technical base and supply of fuel and lubricants are not developed.

Before signing the contract, mining at the field being developed was carried out by bulldozer-excavator mini-equipment of foreign production from US, Japan and Germany. The maximum depth of diamond and gold mining was determined by the characteristics of the equipment itself and did not exceed 2-2.7 m. This method only allowed to create the appearance of manufacturability of the mineral extraction process, since according to the geological report on the deposit, the maximum content of the useful component is at depths from 6 to 24 m.

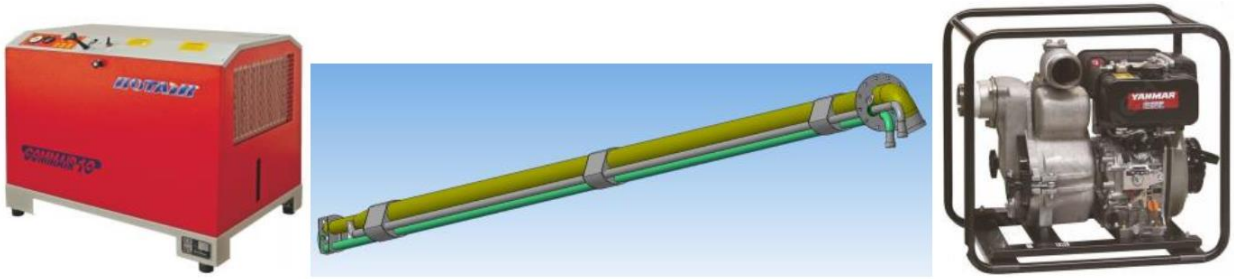
The customer has set a task in these conditions to increase mining and reduce the cost of time and resources on the process.

This became possible with the use of downhole hydraulic mining technology, which allows technically and economically the most expedient, cheaper, comprehensive and loss-free development of deposits not only of placer gold and diamonds, but also of platinum, zirconium, titanium, phosphorite, diatomite, sapphires, garnets, rubies, uranium, silver, sapropel, quartz sand, jet, amber, salt, leonardite, etc.

Under the direction of Ph.D. mining engineer, geotechnologist, hydrogeologist N. Bychek on the basis of the customer's technical specifications and the geological and geological conditions of the field, a technical solution was proposed on a fundamentally new approach to business using the technical capabilities of the customer, mobile self-propelled or trailed to an off-road vehicle, tractor, passenger car, drilling and production equipment (installation) providing all tasks of developing this type of deposits in hard-to-reach and non-infrastructural places.



The package of proposals included a technical design, an operational technological passport for conducting work in specific geological and mining conditions for mining, self-propelled / trailed mini equipment with caterpillar or pneumatic running. The maximum depth of field development was 30 m, the diameter of the production well for SRS is up to 300 mm.



In field trials, the performance of a mini-SRS mini hard installation (loose sand and clay productive layers): from 0 to 12 m deepening - up to 22 m^3 / hour, in the raft zone from 22 to 28 m deepening decreased to 12-15 m^3 / h.

The method of downhole hydraulic production (SHD) with mini-equipment consisted in the sequence of operations for drilling a technological well at the place of work, equipping it with downhole hydraulic production and washing equipment (industrial equipment), connecting them to water and air supply mini-units of the same complex, smooth chamber hydraulic washing of the productive layer with a pressure water jet through the well with the issuance of the resulting hydraulic fluid to the industrial device. On the industrial device, the solid was separated from water, the water was fed back to the technological process, and the solid residue was subjected to further enrichment or extraction from it of mined gold or diamonds.

In the process of the first few days of work at the field, results were achieved that provide high efficiency of the proposal with minimal costs for the process, especially fuels and lubricants, labor and time costs for moving around the field. So, when using SRS drilling and production mini-equipment installed on a pneumatic wheeled trailer to an SUV using a diesel drive of a pressure head water supply pump, compressor and the installation itself, a cost ratio of 1 m^3 extracted from a solid material industrial device, 2.2 liters of diesel fuel was obtained.

This equipment can be controlled by 1 person!

Complete set of a mini-installation: a drilling and production unit (BDA), a borehole hydraulic production shell (DHS), a pressure water pump, a compressor, a flushing device, connecting pressure hoses, tools, casing pipes. In addition, various standard sizes and an assortment of DHS are included in the delivery set, taking into account the mining conditions and the properties of the rocks containing the minerals.

It is transported on a trailer or body to a GAZelle car, SUV, tractor. The delivery time for the kit after preparation of the technical design and the equipment specification required by the customer is not more than 1.5 months. The cost of the minimum set is from 3.7 million rubles, the optimal - 5.44 million rubles.

A video of the proposed minicomplex is presented on the author's channel in YouTube: https://youtu.be/3BCkq01UR_8