



GOLDIAM LTD

RWANDA  
GOLD & DIAMOND

## GOLDIAM LTD. RWANDA

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## THE CENTER FOR SAPROPEL. RUSSIA

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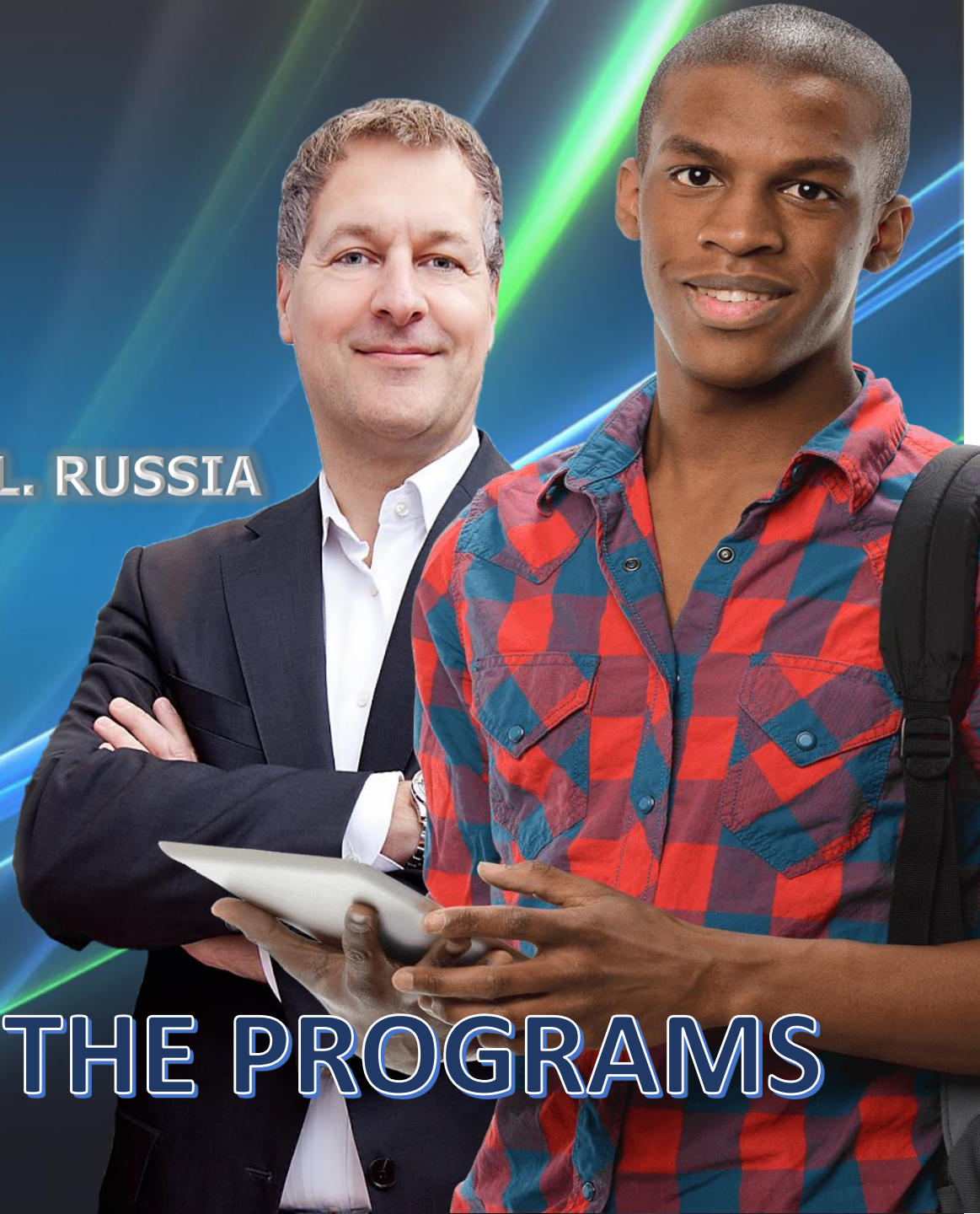
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In the market of services and equipment for  
mining since 1986

# INTRODUCING THE PROGRAMS





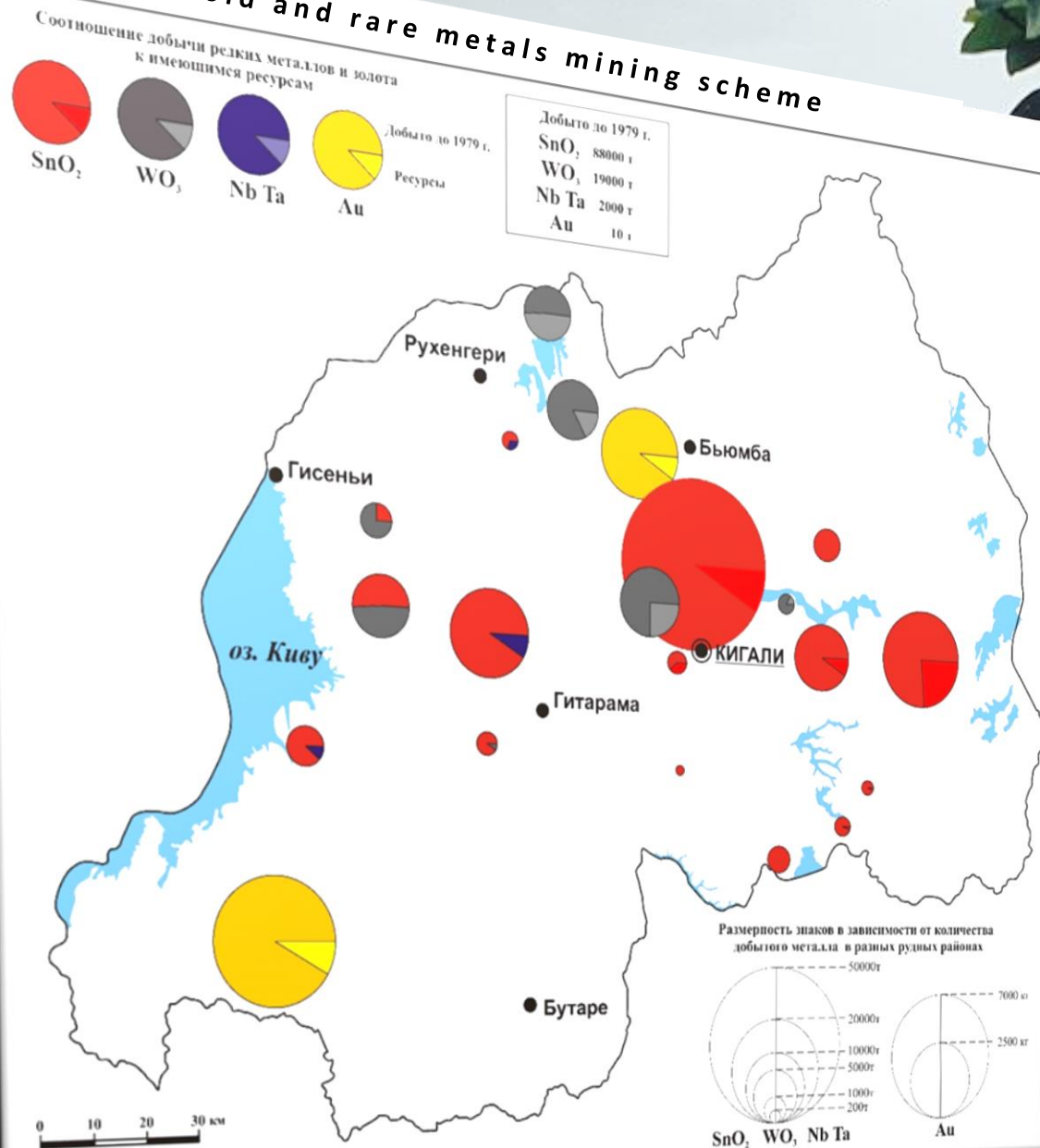
INDIGENOUS AND PLACER GOLD  
РЕДКИЕ  
METALS  
ORGANIC SILTS - SAPROPEL

# DEVELOPMENT NATURAL RESOURCES RWANDA





# Gold and rare metals mining scheme



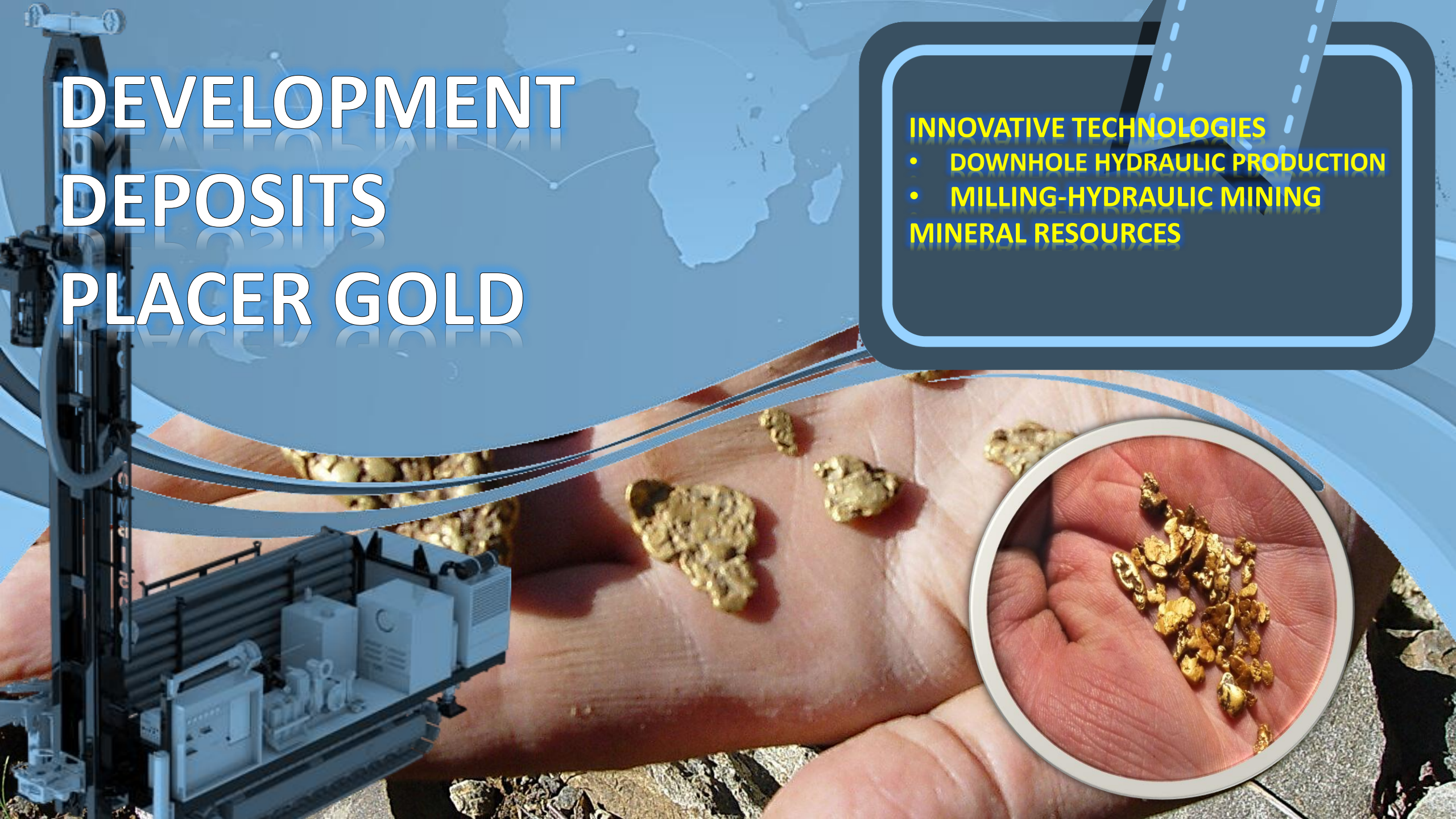
The territory of Rwanda is the most promising for gold, rare metals, productive organic silts



# DEVELOPMENT DEPOSITS PLACER GOLD

## INNOVATIVE TECHNOLOGIES

- DOWNHOLE HYDRAULIC PRODUCTION
  - MILLING-HYDRAULIC MINING
- MINERAL RESOURCES





**GOLD.** On the territory of Rwanda there are two gold-mining regions - Nyungwe and Miyove, which produced 7 tons and 2.5 tons of gold, respectively. Within the Miyove ore region there are three small deposits Karenda, Baradega and Masogwe, mined from the surface to a depth of about 60 m. Currently, ore and placer gold is mined by local prospectors.

Gold ore objects are associated with quartz veins and streak-vein zones lying in clay shales or at the contact of shales with sandstones. In addition, there are poor ore bodies of high thickness (up to 60 m) belonging to zones of disturbed rocks, fractured, with complicated fine folding, intensely ironed and including quartz veins.

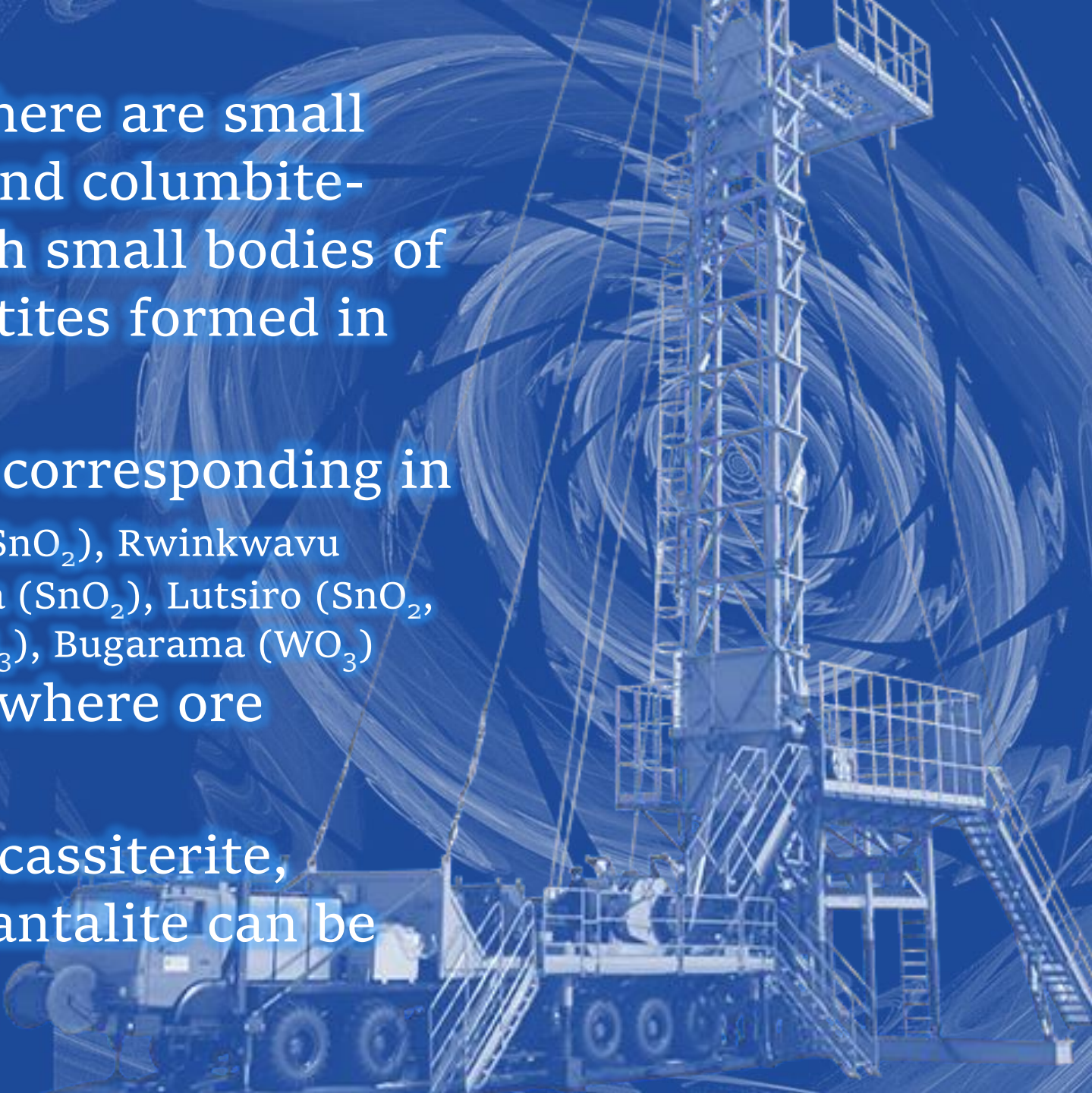




**RARE METALS.** In Rwanda there are small deposits of tin, wolframite and columbite-tantalite ores associated with small bodies of alkaline granites and pegmatites formed in the Upper Riphean.

Rare-metal promising areas corresponding in scale to ore regions: Rutongo ( $\text{SnO}_2$ ), Rwinkwavu ( $\text{SnO}_2$ ), Gatumba ( $\text{SnO}_2$ ), Musha-Ntunga ( $\text{SnO}_2$ ), Lutsiro ( $\text{SnO}_2$ ,  $\text{WO}_3$ ), Nyakabingo ( $\text{WO}_3$ ), Gifurwe ( $\text{WO}_3$ ), Bugarama ( $\text{WO}_3$ ) and a number of small sites where ore minerals were mined.

On the territory of Rwanda, cassiterite, wolframite, columbite and tantalite can be successfully mined.





## DOWNHOLE HYDRO-MINING MINI EQUIPMENT FOR PLACER GOLD

Technology, project, self-propelled or trailed equipment for small business for geological testing and downhole hydraulic development (DHM) of placer and sedimentary deposits of minerals such as gold, diamonds, agro-ores, amber, semi-precious stones, uranium ... The equipment consists of mini-drilling and mining rig, compressor, pressure water pump, downhole hydro-mining tool (DHM), pipe and hose connection. Additionally, it can be completed with a washing device. The depth of DHM-approbation - up to 200 m, confident DHM-development of deposits and shallow deposits – up to 40 m. Pulp productivity - up to 150 m<sup>3</sup>/ hour. The terms for designing the complex and preparing the equipment specification do not exceed 2.5 months, for equipment manufacturing - 2 months. Downhole hydro-mining of a mineral can be carried out from one production and pumping well or a cluster of wells, where the pumping well is the central one, and the peripheral along the perimeter is hydraulic washing with slurry washing to the central pumping well. The equipment is also applicable in permafrost regions. The complex is served by 2 people.





# EXTRACTION OF ALLUVIAL AND SEDIMENTARY MINERALS BY THE DHM

METHOD



Technology and equipment for single or cluster downhole hydro-mining (DHM) of placer and sedimentary minerals, including permafrost deposits.

It includes: a technical project for the development of a specific field, a self-propelled self-driving drilling and production unit with a high-pressure water pump, a compressor, downhole hydro-mining equipment, a pipe and hose binding with accessories and tools for work. Mineral extraction is carried out by a single well or a cluster of technological wells, in the center of which is a pumping well, on the periphery-wells of hydraulic fracturing of rocks of the useful thickness of the mineral Deposit.

Pulp capacity - up to 150 m<sup>3</sup>/hour, development depth-up to 140 m.

Service staff - 2 people.

Terms of preparation of the technical project - no more than 2.5 months.

Production and delivery of equipment-up to 2.5 months.

The cost of the kit is from 5.7 to 36 million rubles.

Details on innovative technologies of the DHM can be found on the page of the author "Nikolai Bychek" in the VK, section Documentation.



Technical design and self-propelled trailer equipment for geological testing and well hydraulic extraction of alluvial and sedimentary minerals by high-pressure hydro-monitor and hydro-elevator jet.

The equipment consists of a self-propelled drilling and mining installation, with autonomous drives of a trailed compressor, a high-pressure water pump, as well as a downhole hydraulic projectile for destroying the high-pressure jet of gold-containing rocks of the useful layer and pumping the resulting hydraulic pulp to the industrial device for enrichment.

It can also be used for the extraction of other precious metals and stones, amber, leonardite, phosphorite, uranium ...

Time of preparation, manufacture and commissioning of equipment is up to 3.5 months.

The cost of the kit depends on the design performance of the equipment, mining and geological conditions of the field, from 5 million rubles.

Staff: 2-3 people.

## **DOWNHOLE HYDRO-MINING OF GOLD FROM LOW-POWER PLACERS**





# DOWNHOLE HYDRO-MINING GOLD IN PLACER DEPOSITS



Technical design and self-propelled trailer equipment for downhole hydro-mining (DHM) of alluvial and sedimentary minerals with a high-pressure jet. The equipment consists of a self-propelled drilling and mining unit, with autonomous drives of a trailed compressor, a trailed high-pressure water pump, as well as a downhole hydraulic projectile for destroying the high-pressure jet of gold-containing rocks of the useful layer and pumping the resulting hydraulic pulp to the industrial device for enrichment. It can also be used for the extraction of other precious metals and stones, amber, leonardite, phosphorite, uranium ...

Time of preparation, manufacture and commissioning of equipment is up to 3.5 months.

The cost of the kit depends on the design performance of the equipment, mining and geological conditions of the field, from 5 to 23 million rubles.

Service staff: 2-3 people.

The complete set of DHM equipment can be carried out on the drilling rig available to the customer.



# INSTALLATION OF DOWNHOLE HYDRO-MINING AND TESTING OF ALLUVIAL AND SEDIMENTARY MINERALS

Self-propelled autonomous mining equipment based on a pneumatic or tracked drilling rig for testing and developing placer and sedimentary mineral deposits, such as gold, platinum, titanium-zirconium, uranium, diamonds, sapphires, rubies, amber, agricultural ores, construction sands, etc.

Depth of development - up to 120 m or under the order,

Productivity - from 5 to 60 m<sup>3</sup>/hour or under the order,

Service personnel-2 people.





# ROTARY TESTING AND MINING WITH MINI-EQUIPMENT

The technical design and equipment are designed for small businesses for geological testing and extraction of alluvial landing minerals from a depth of up to 40 m. It includes a trailer for an SUV, tractor, all-terrain vehicle with autonomous power supply, installation and a set of different diameter buckets.

The performance of 3 to 15 m<sup>3</sup>/hour,


Maintenance - 2 people.

Terms of project preparation and equipment delivery - up to 3.5 months.

Cost - from 4.24 million rubles.





The background image shows a yellow mining machine, likely a small-scale hydro-mining unit, mounted on a black air-wheeled trailer. A red Honda generator is attached to the front of the trailer. The machine has a long, articulated arm with a yellow hose. It is parked on a gravel surface next to a paved area with cars and a building in the background. In the bottom left corner, there are stylized 3D models of grey, brown, and yellow rocks.

## A small borehole hydro-development of the diamond fields

Technological solution, project and equipment for small business in mining. Development of alluvial diamond-bearing deposits from loose productive layers by the method of downhole hydro-mining (DHM).

Performance on solid - up to 25 m<sup>3</sup>/hour.

Development depth - up to 30 m,

Service - 2 people.

The cost of diamond mining is 6-10 times lower than traditional open pit mining. All equipment is mounted on air-wheeled trailers and is easily delivered by off-road vehicles, tractors, etc.

Included in the delivery: technical project of the business, drilling and mining mini-equipment.

It can also be used for the extraction of placer gold, precious stones, phosphorite, sand, clay, sand and gravel mix, amber, trepel, dolomite, glauconite, chalk, sapropel, peat, etc.



# **MILLING-HYDRAULIC SYSTEM ALLUVIAL GOLD MINING**







The technology was developed by a team of designers under the control of the State Institute of Engineering, Ph.D. Nikolai Dmitrievich Bychek, mining engineer, geotechnologist, hydrogeologist (Russia. Astrakhan. The Center for sapropel).

The design solution can be successfully applied to the development of sedimentary and placer deposits of gold, other rare and precious metals, as well as agro-ores, such as phosphorites, leonardite, brown coal...

Working body in the process of mining useful fossil protruding mechanical cutter combined with hydraulic lifting of useful material pulp and feeding it for enrichment with a slurry pump.

The depth of mining reaches up to 80 m, productivity (on solid) - up to  $112 \text{ m}^3/\text{h}$ .

The equipment includes: crawler crane self-propelled base, hydraulic cutter, unit dehydration (enrichment).

The complex is served by 2 specialists.



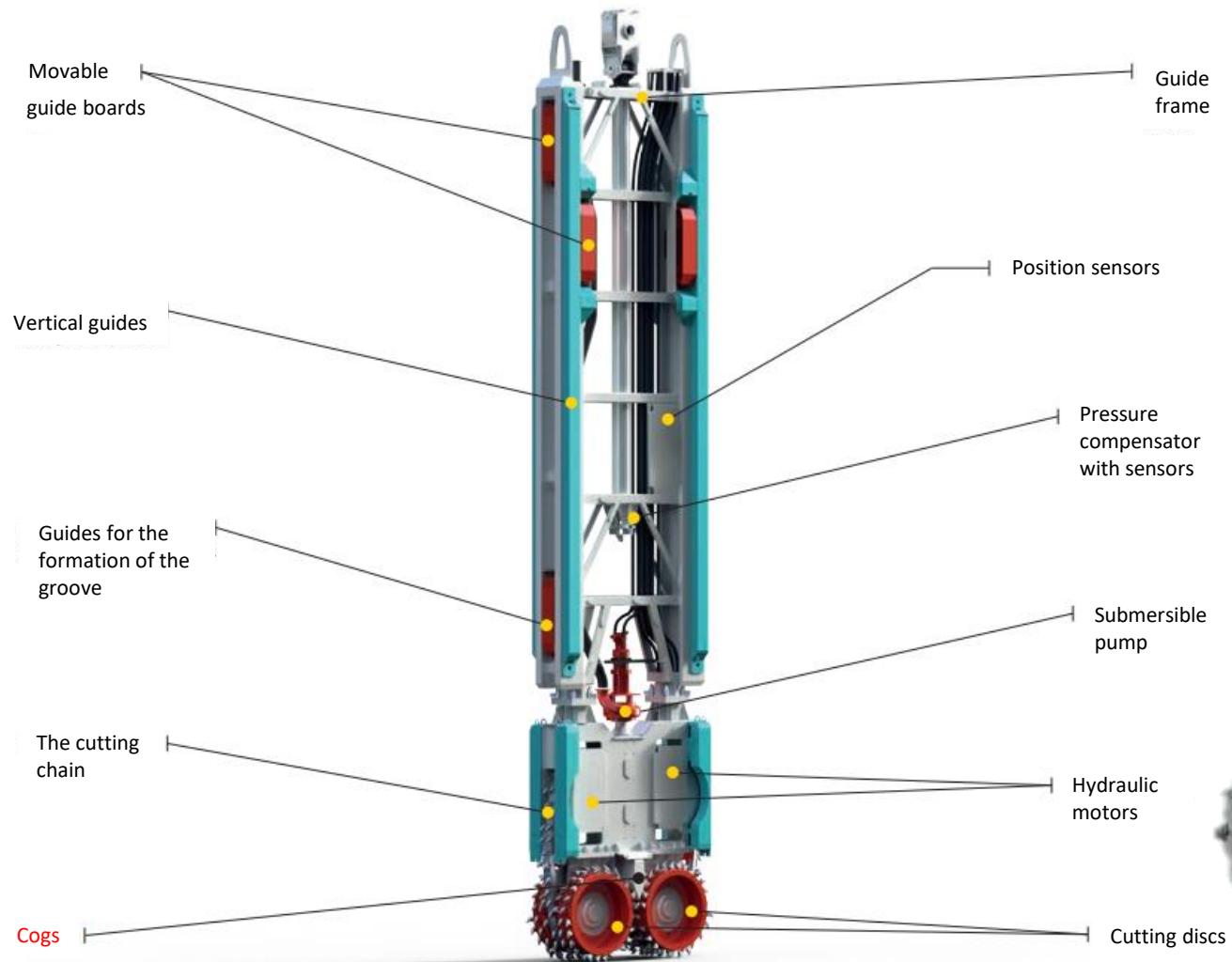
## Hydraulic milling cutter:

- The massive construction guarantees high performance even when working with difficult soils.
- The long frame of the cutter guide provides complete control over the orientation and verticality of the cutter.
- Control of the cutter position is provided by a tilt sensor with information displayed on a monitor in the operator's cabin. The vertical operation of the cutter is carried out with the help of guide boards.

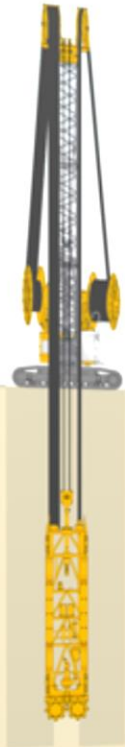




# Hydraulic cutter design







System for measuring and recording vertical deviations

Hydraulic cutter control panel

Display of operating parameters of the hydraulic cutter

Display of crawler crane operating parameters

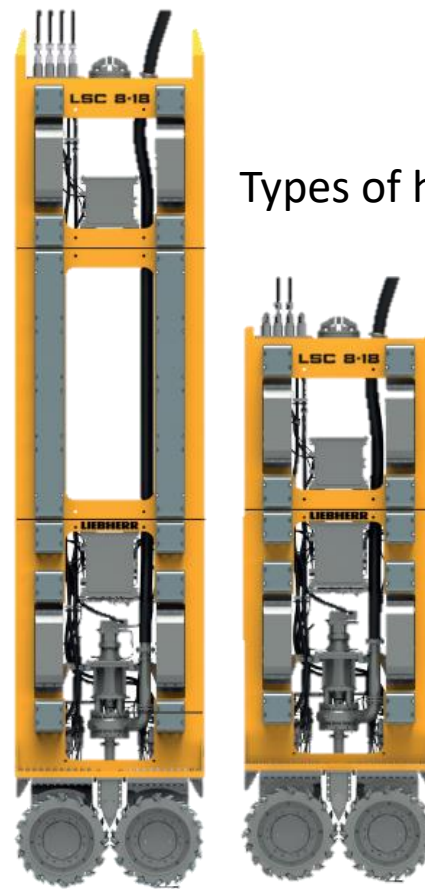
Operating and control elements in the operator's cabin



Technological area  
at the field

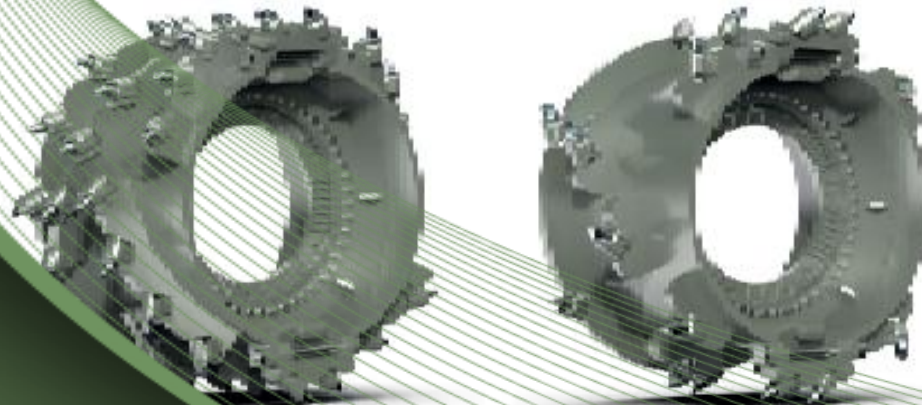






Types of hydraulic cutters

Development of rocks from I to IX categories





Dehydration(enrichment) unit  
of mineral resources





Included in the package:

- Technical design of the site of milling and hydraulic mining of minerals, for example, placer gold.

Preparation time - no more than 2.5 months.

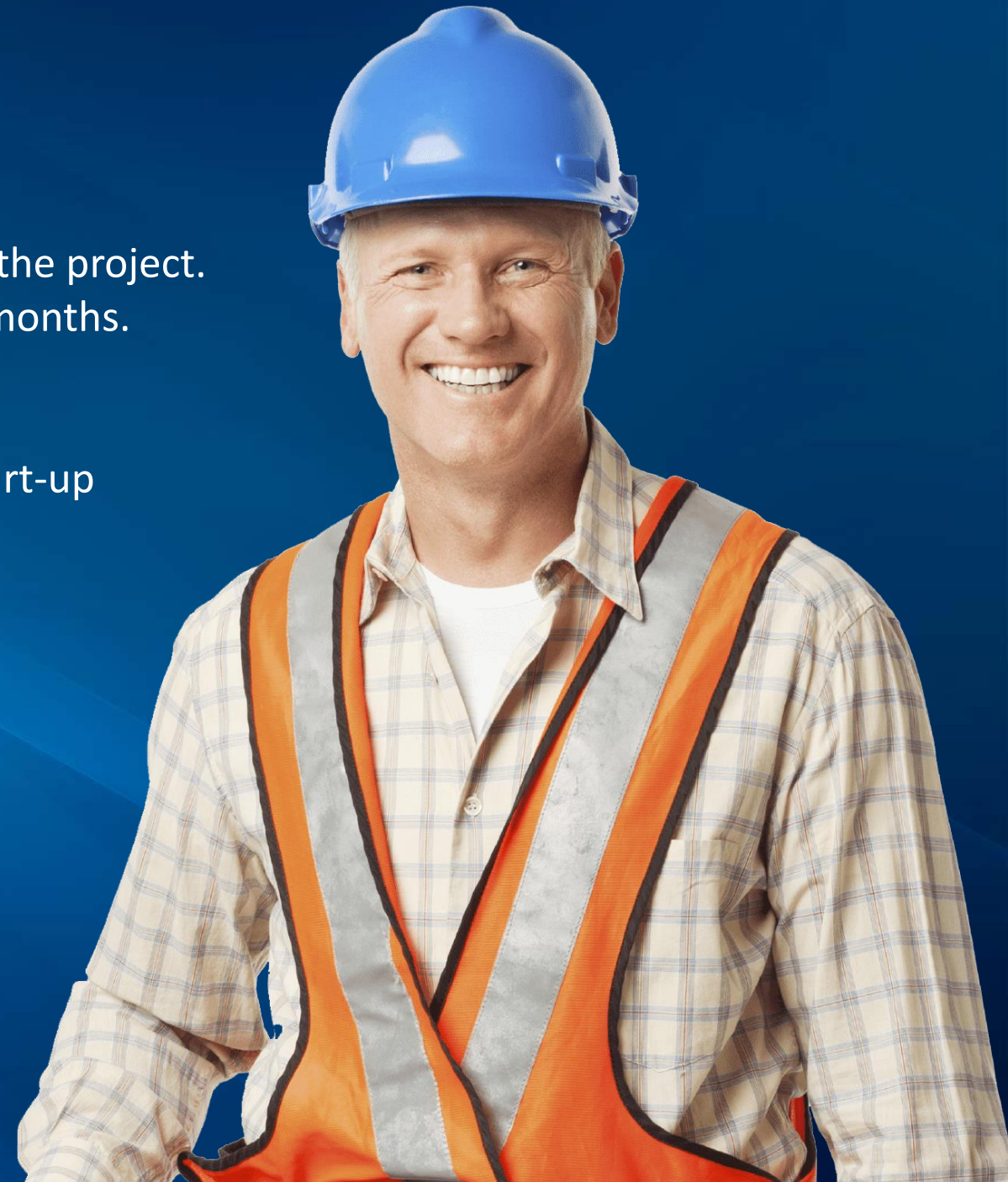
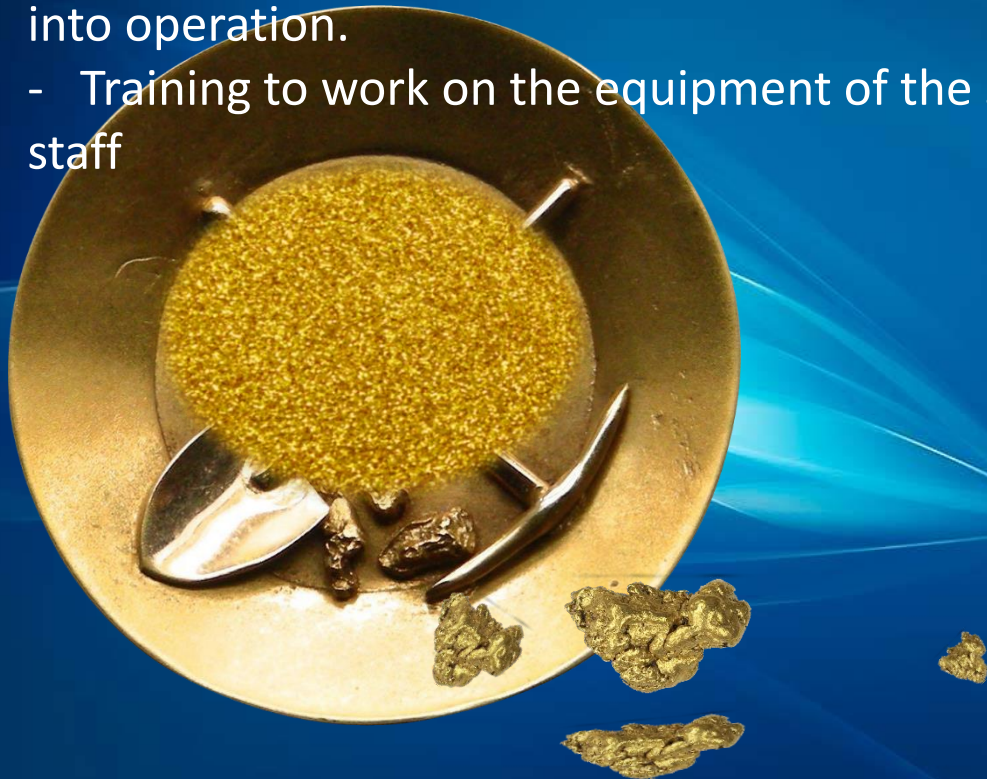
- Mining equipment according to the specification from the project.

Terms of production of the equipment - no more than 3 months.

Additionally:

- Delivery of equipment to the work site, installation, start-up into operation.

- Training to work on the equipment of the service staff





# ТЕХНИЧЕСКИЙ ПРОЕКТ

ЦЕНТР  
ПО САПРОПЕЛЮ

Под управлением  
к.т.н. Н.Д. Бычека  
горного инженера,  
геотехнолога,  
гидрогеолога

Типовые и  
технические проекты.  
Спецификации  
оборудования.



2020

ФРЕЗЕРНО-ГИДРАВЛИЧЕСКАЯ ДОБЫЧА  
ОСАДОЧНЫХ И РОССЫПНЫХ МЕСТОРОЖДЕНИЙ





# SMALL DOWNHOLE HYDRO-MINING OF MINERAL RESOURCES



TECHNOLOGIES  
TECHNICAL PROJECT  
SELF-PROPELLED EQUIPMENT  
TRAILER EQUIPMENT



The proposal relates to innovative methods of geological testing and mining of alluvial and sedimentary deposits, such as gold, diamonds, other rare and precious metals and stones, phosphorite, diatomite, leonardite, quartz and construction sands, etc. and is aimed at small businesses in mining.

The development of a mineral Deposit is carried out by underground chambers with pressure jets of industrial water from a technological well drilled into the productive layer. Washing out and pumping out of the hydraulic mixture from the chamber can be carried out through one technological well or bush, where a pumping well is located in the center, and washout wells are located along the perimeter of the bush.

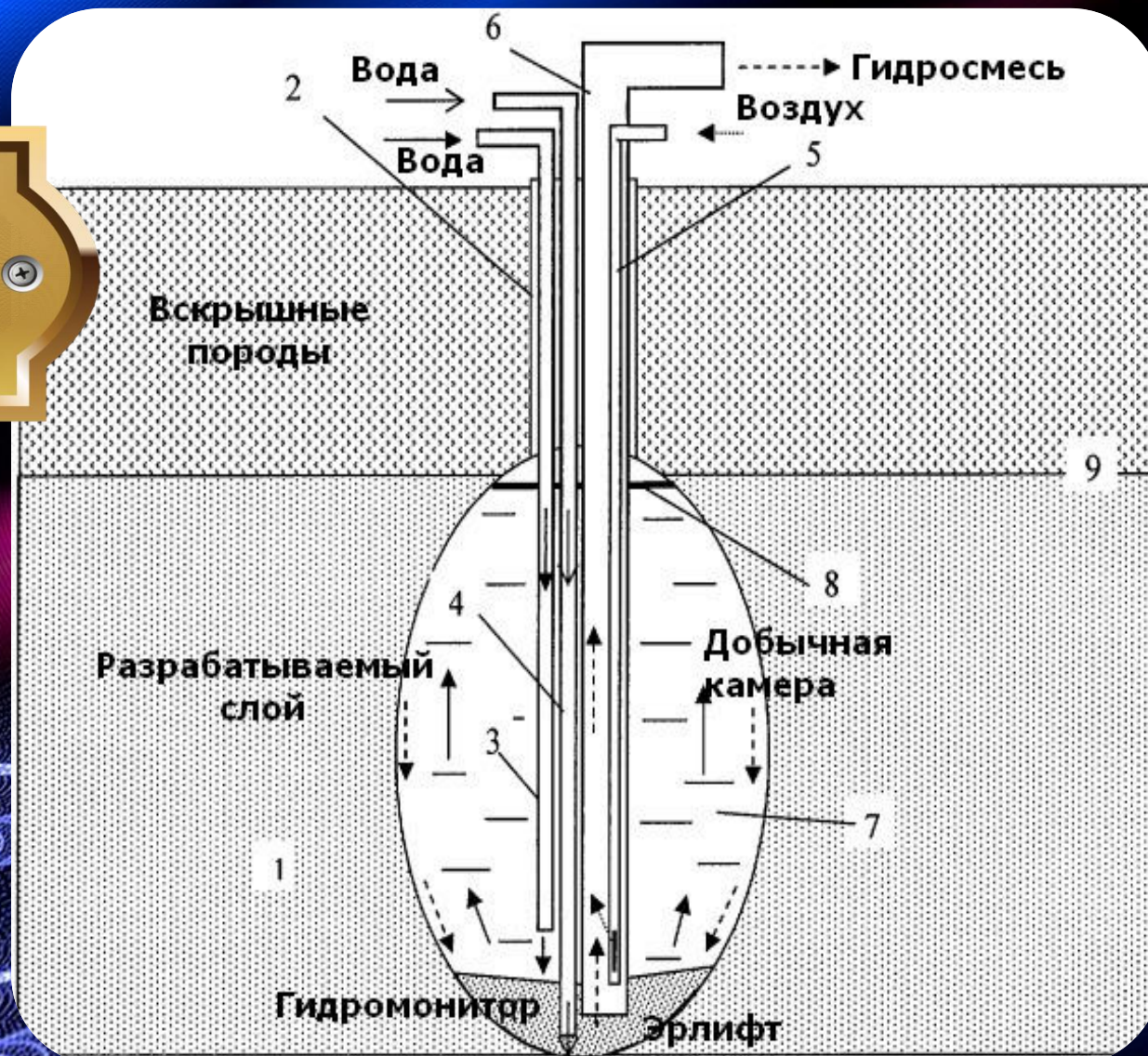
Delivery set: technical design and equipment for Specifications from the project. The project is carried out according to the standards of the Russian Federation.

The equipment consists of a drilling and mining unit, a downhole hydro-mining projectile and an auxiliary kit. Serve the process of downhole hydro-mining (DHM) 2 people.





# TECHNOLOGY OF DOWNHOLE HYDRO-MINING OF MINERALS





The most efficient technology of small downhole hydro-mining (DHM) of alluvial and sedimentary minerals is used :

1. on shallow deposits (up to 40-80 m) with a capacity of 5-15 m<sup>3</sup> /h on solid with a category of host rocks up to IV-V,
2. during geological testing,
3. on low-power and small-area deposits,
4. on the development of off-balance and polymetallic tailings of enrichment,
5. in hard-to-reach regions.

The installation time of the equipment at the field does not exceed 2 hours.

In addition, the equipment completed with a washing device







# SELF-PROPELLED CRAWLERS DHM EQUIPMENT

Mineral extraction depth - up to 140 m,  
Best conditions - up to 40 m  
Service - 2 people.





up to 30 m



up to 40 m



up to 60 m

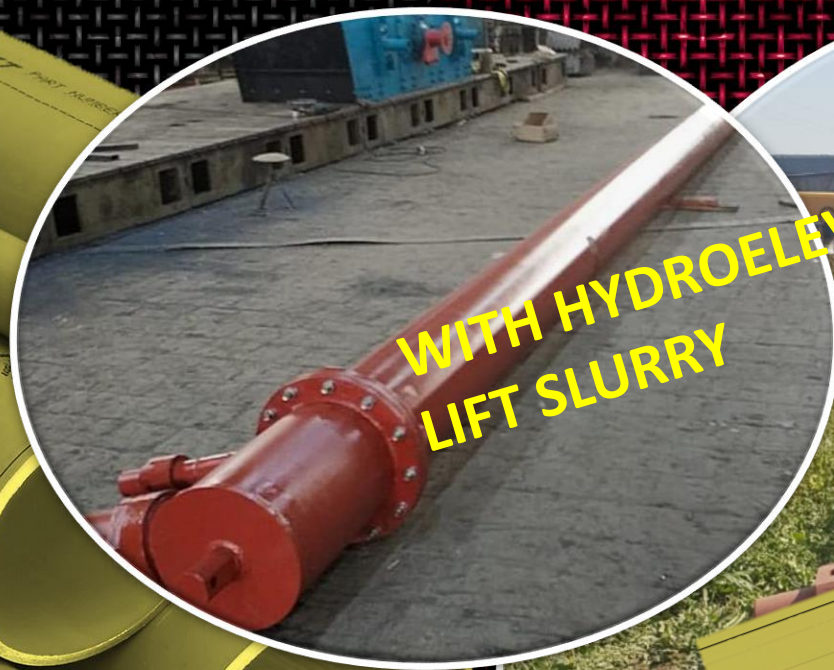
TRAILER  
DHM EQUIPMENT

Depth of the development – 1, 2, 3  
Service – 2 people.



A man in a black tuxedo with a white shirt and black bow tie stands on the left side of the image. Behind him is a large pile of yellow pipes. The background is a dark, textured surface with a red and black diamond plate pattern.

# DOWNHOLE HYDRO-MINING TOOL







COMPRESSOR

TRANSPORT-  
DELIVERY  
AND LOADING  
VEHICLE

PULP LIFTING  
AND CASING PIPES

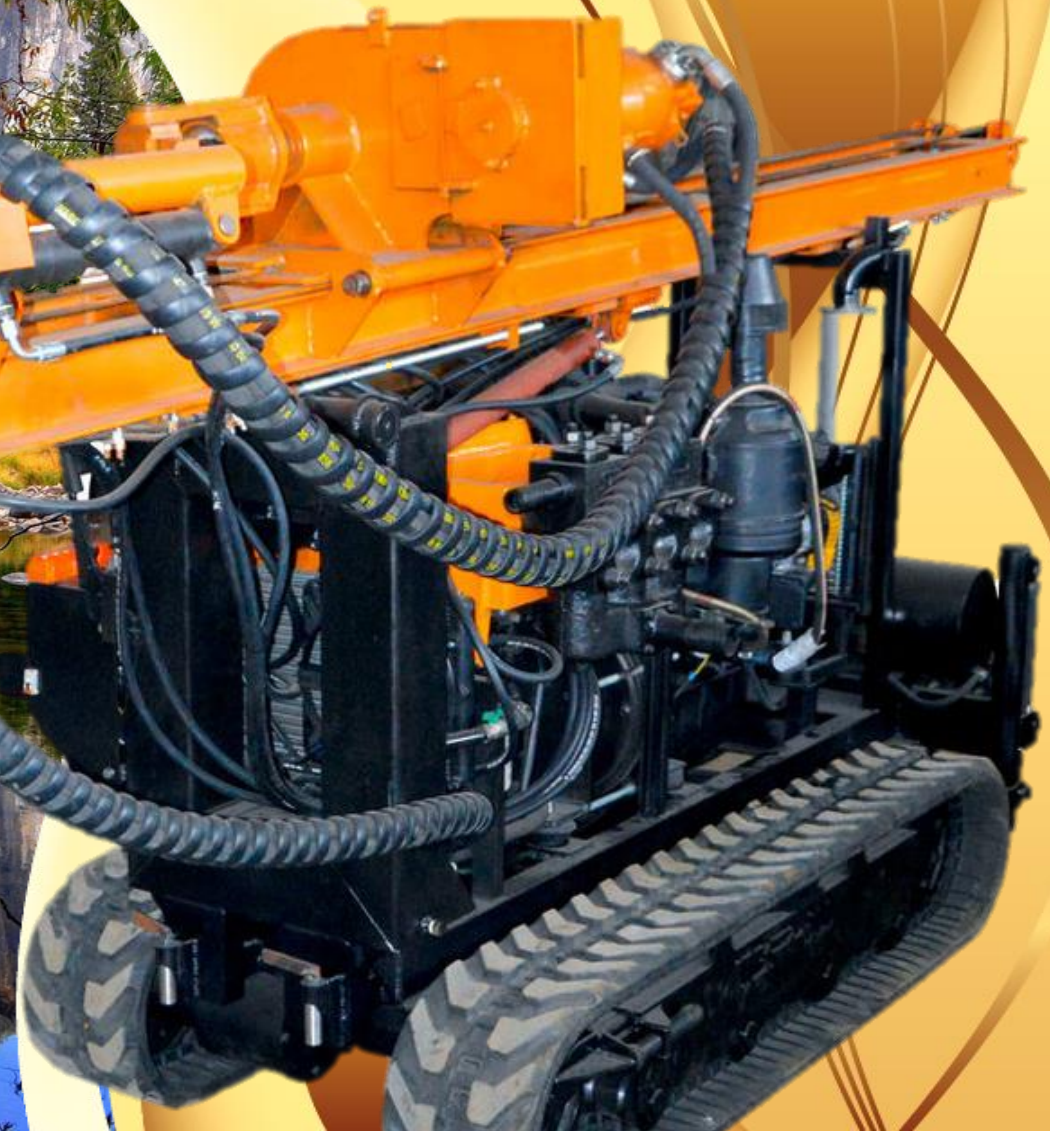
ELECTRIC GENERATOR

HIGH-PRESSURE WATER  
PUMP

FOR PRESSURE WATER  
AND AIR HOSES

AUXILIARY  
EQUIPMENT AND  
MATERIALS  
MINICOMPLEX DHM





Terms of preparation of a technical project - up to 2.5 months.  
Terms of manufacture and delivery of equipment - up to 2 months.



PROSPECTING AND EVALUATION OF  
PRODUCTIVE BOTTOM SILT, PEAT AND  
SAPROPEL DEPOSITS, DESIGN AND  
SUPPLY OF EQUIPMENT COMPLEXES  
FOR THEIR EXTRACTION AND  
PROCESSING INTO FERTILIZERS, SOIL-  
FORMERS, COSMETIC AND  
THERAPEUTIC MUD





# PRODUCTIVE BOTTOM SILTS. SAPROPEL

Sapropel – bottom silts of reservoirs and swamps of organic origin, formed at least 5-20 thousand years ago without access to oxygen. Promising areas for prospecting for evaluation are areas of the lake Rweru etc.

From these raw materials we produce organic natural fertilizers, soil mixtures and soil-formers, potassium and sodium humates, recultivants in liquid, loose, granular, tablet form, as well as therapeutic mud and cosmetics.







ПОИСКОВО-ОЦЕНОЧНЫЕ РАБОТЫ САПРОПЕЛЯ  
МЕСТОРОЖДЕНИЕ "ЕЛЕСИНСКОЕ"

2012  
К ОТЧЕТУ

ОЦЕНОЧНЫЕ РАБОТЫ САПРОПЕЛЯ  
МЕСТОРОЖДЕНИЯ "2 ДОРОЖНОЕ" И "ТАГАРЬЕ"

КНИГА 232

ЦЕНТР ПО САПРОПЕЛЮ  
Астрахань, ул. Ульянова, 67  
(8512) 762220, факс (8512) 592888

2012

We carry out search and evaluation and geological exploration, calculate the raw material reserves of bottom productive silts, sapropel and peat, and give an opinion on the suitability for the production of one or another product. We develop technologies for the extraction and processing of silt to produce various types of goods.





МАЛЫЙ БИЗНЕС  
**ТЕХНИЧЕСКИЙ  
ПРОЕКТ**

ЦЕНТР  
ПО САПРОПЕЛИЮ

2018

ОЗ. ДОБЫЧА И ПЕРЕРАБОТКА САПРОПЕЛЯ  
ЛЕМБОЛОВСКОЕ ЛЕНИНГРАДСКОЙ ОБЛАСТИ

Based on the reports of search and evaluation and geological exploration, we carry out Technical projects of an effective business for the extraction and processing of productive silt, peat and sapropel into marketable products

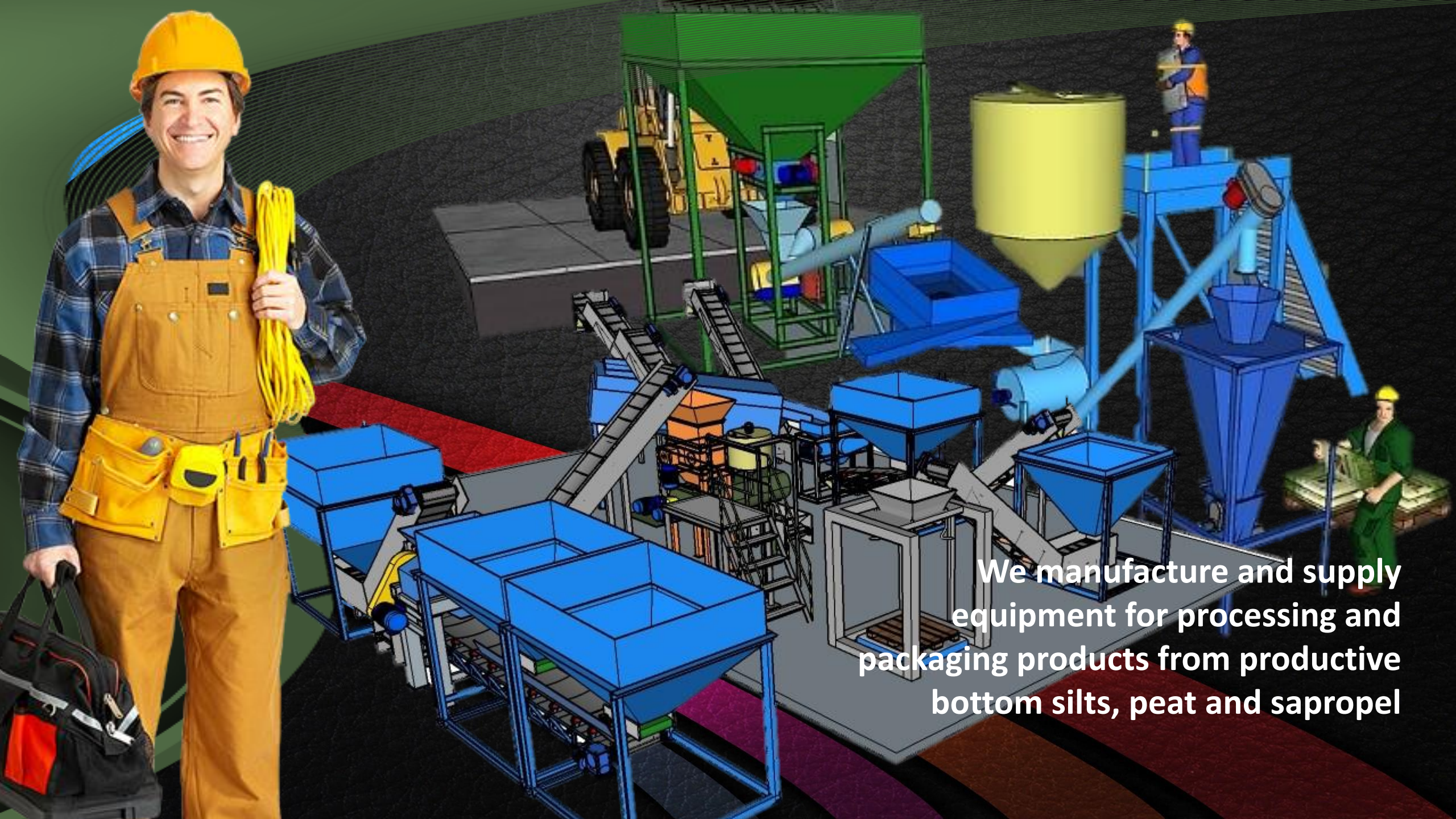






We produce and supply equipment  
for the extraction of productive  
bottom silt, peat and sapropel





**We manufacture and supply  
equipment for processing and  
packaging products from productive  
bottom silts, peat and sapropel**