The Gornostaevskoe cobalt nickel deposit

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is located in the East Kazakhstan. 110 km west of Semey city and 30 km east of Kurchatov city. The Irtysh River divides the deposit into two sections: Left bank field and Right bank field. The license covers an area of 49.42 km2

CSA Global
JORC, 2019
inside tenements

- **Ni** *content* - **0.59%**
- **Co** *content* – **0.04%**
- **Ni** *MRE* – **627,6 ths. tons***
- **Co** *MRE* – **42,2 ths. tons***

CSA Global
JORC, 2019
Full Deposit

- **Ni** *MRE*- **1 000,8 ths. tons***
- **Co** *MRE* – **65,81 ths. tons***

Kaznickel has priority right to obtain a contract for areas adjacent to the main project. The Exploration Target potential for the Right River Side is 100–200 Mt @ 0.5–0.7% Ni

* Including Indicated and Inferred

Chronology

1960

- Start of the geological work at the deposit. According to the work done, the “Left-bank” part of the field turned out to be the most attractive for the industrial development. There were 21 ore bodies found.

1968

- The “Right-bank” part of the deposit was studied by drilling a rare network of wells. Nevertheless, ore bodies of considerable thickness (up to 40 m) with a nickel content of up to 3.64% (on average 1.55%), have been identified in this part of the deposit.

1998

- A report on preliminary exploration of the Gornostaevsky cobalt-nickel deposit with the calculation of cobalt and nickel reserves was compiled.
- The report was reviewed and adopted by the State Commission on Mineral Reserves of the Republic of Kazakhstan

2011

- Wardell Armstrong International has prepared a report on a Development project of the Gornostaevskoe deposit. According to the said report Gornostaevskoe is estimated to contain 406 tonnes of nickel. (“proved" - 289 thousand tonnes and “additionally estimated" - 117 tons)

2018 - 2019

- New JORC report is prepared by CSA Global
- CSA Global is involved as a Technical Due Diligence
- **A pilot mine was launched and the first finished product was received**





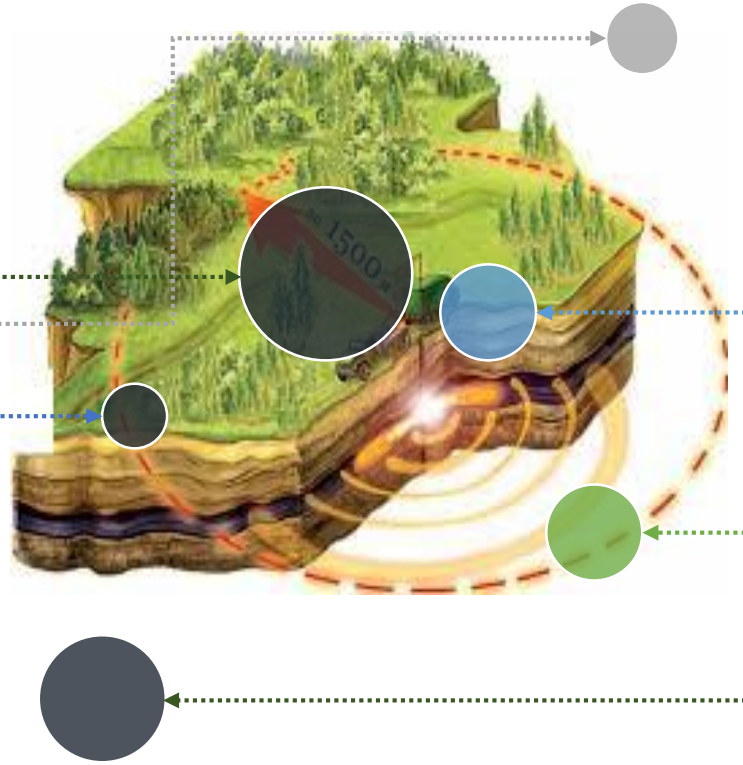
Field infrastructure

The field has all the necessary infrastructure

Installed high-voltage power line on the site

The republican highway passes near the deposit

10 kilometers near train station



The climate of the region is sharply continental, with dry, hot summers and cold winters

The area is sparsely populated

30 kilometers near urban infrastructure (Kurchatov)

In-situ leaching method

What is in situ leaching?

In situ leaching (ISL) or in situ recovery (ISR), use solutions that are pumped through the mineralized body in situ (underground) to recover metals by leaching .

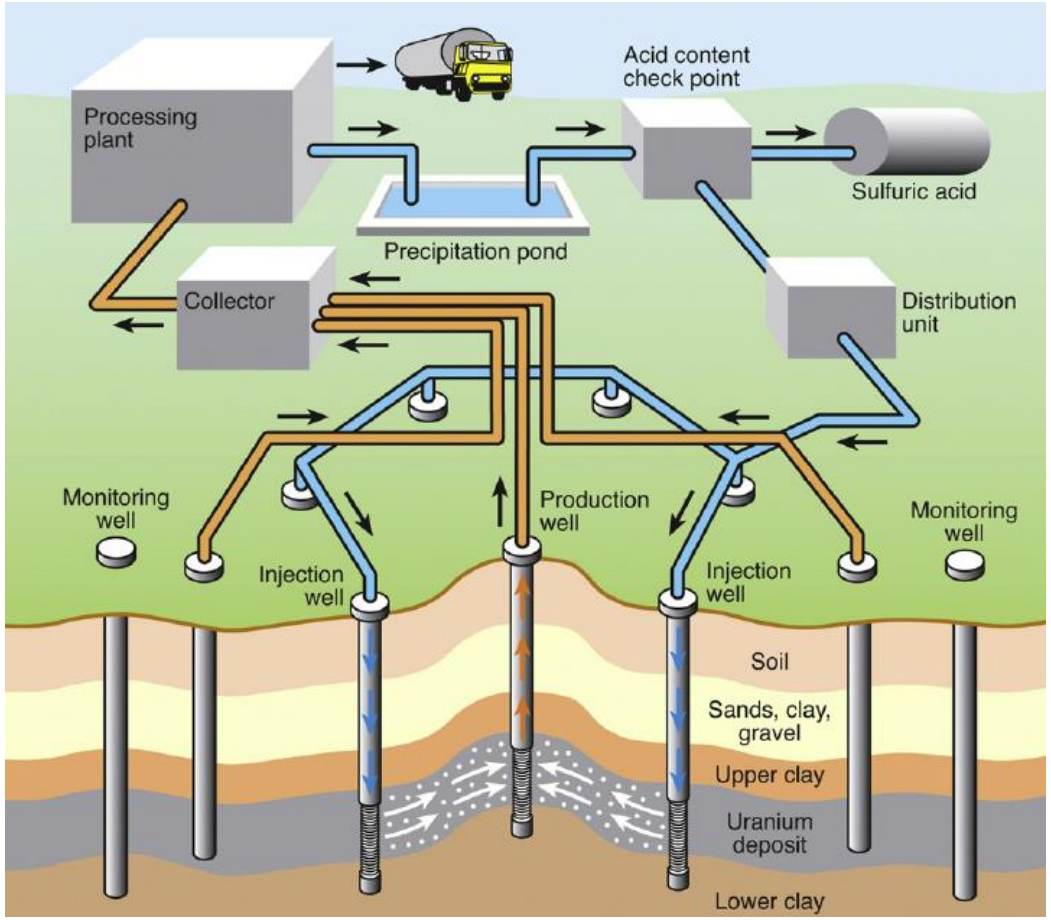
Environmental aspect of ISL

- No open pits
- No rock dumps and tailing storages
- No dewatering of aquifers

Economic benefits of ISL

- ISR is the one of the most effective methods to address the cost of mining
- Capital investments (CapEx) for ISL mines are significantly less costly than CapEx for conventional open pit or underground mines
- The use of ISL in uranium mining has proven its economic efficiency for 15 years of use

ISL process



Source: 2016 Elsevier B.V. (M. Seredkin/Ore geology Reviews)

In-situ leaching method

Comparison of different mining operation

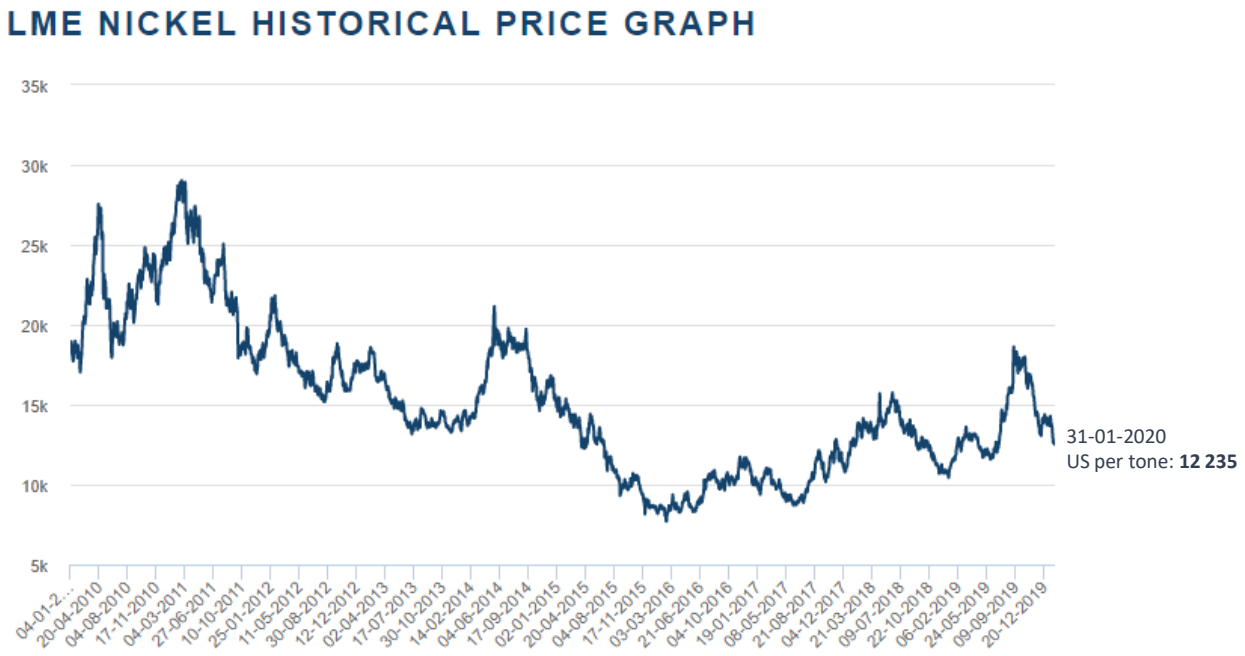
Parameters	Underground	Open Pit	Open pit with heap leaching	ISL
Exploration	+	+	+	+
Removing overburden		+	+	
Developing pit		+	+	
Shaft	+			
Ventilation	+	+	+	
Mining equipment	+	+	+	
Mining complex on surface	+	+	+	
Electricity	+	+	+	+
Dump	+	+	+	
Operational wells				+
Pumps				+
Pipelines				+
Mining of ore	+	+	+	
Dewatering	+	+	+	
Reagents				+
Acidification				+
Pumping				+
Leaching				+
Processing plant	+	+	+	+
Crushing plant	+	+	+	
Separation	+	+		
Sorption, desorption			+	+
Precipitation	+	+	+	+
Tails	+	+		
Reclamation	+	+	+	+

Source: 2016 Elsevier B.V. (M. Seredkin/Ore geology Reviews)

The economic advantages of ISL include:

- Smaller costs on the mine development including processing plant construction and infrastructure creation in comparison with conventional open pit and underground mines
- The ability to start production at low capital costs, following it with increase in production volume. This method utilizes production of a metal containing concentrate and uses profitable cash flow for the mine development instead of a permanent reliance on borrowed funds
- Flexibility of production capacity: reducing capacity during lower prices and increasing capacity during higher prices

Nickel prices



Long-term nickel price forecast

- Most reputable organizations in the field of metals research say that prices are still relatively low by historical standards
- Based on a review of market trends, industry sentiment, and consensus forecasts, CSA Global forecasts Nickel prices to rise to $15,700-17,800 in the period 2021-2025, and to $17,763-18,827 in the period 2028-2030

	2016-2020	2021-2025	2026-2030
World supply, thousand tons per year	2 697	3 287	3 782
World demand, thousand tons per year	2 718	3 322	3 916
World market nickel price, USD per tons	19 770	21 948	23 702

Conclusion

- The deposit has large reserves of more than 1 million tonnes of nickel
- Developed infrastructure of the field will significantly reduce initial capital investments
- In-situ leaching is one of the most effective methods available to reduce the cost of nickel production
- High profitability of the project, even in a situation of a price drop on nickel
- Professional team of technologists
- Possession of all necessary permits
- Favorable investment and tax environment