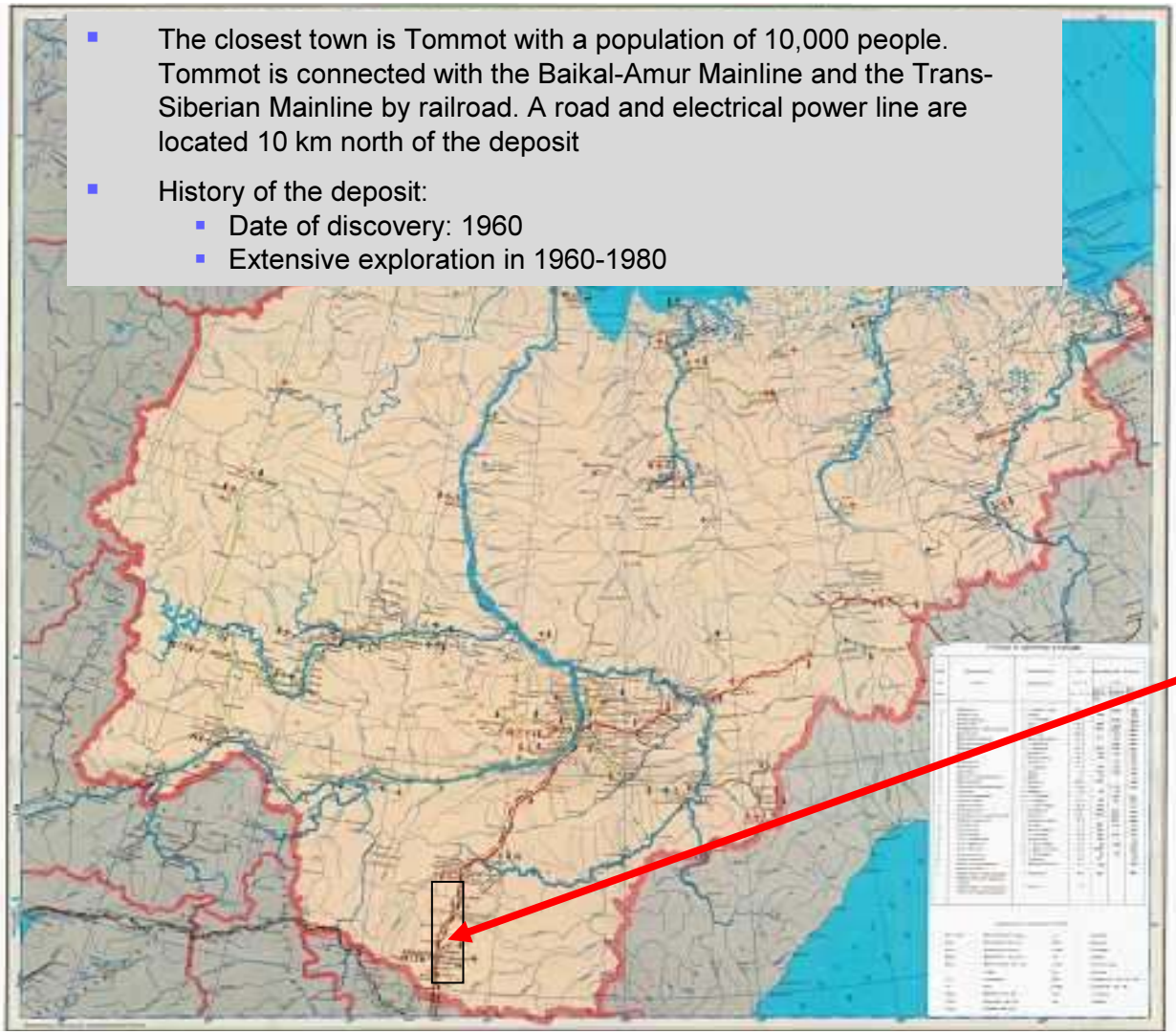
Elkon – A New World Class Russian Uranium Mine

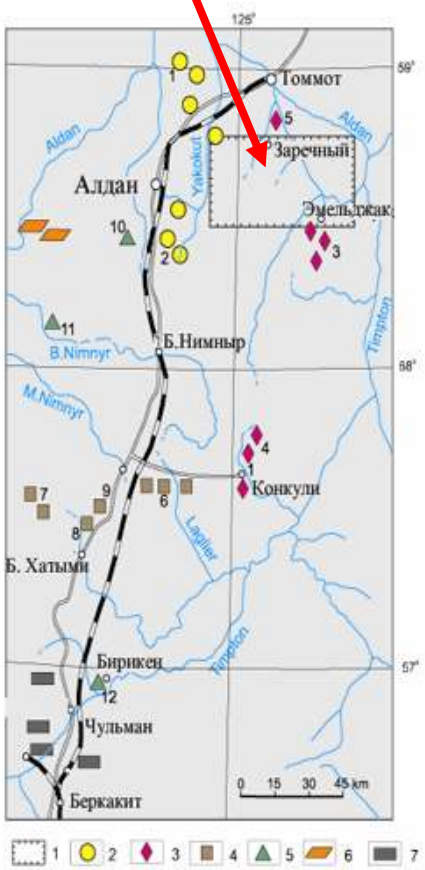
ARMZ Uranium Holding Co., Russia
Alexander Boytsov, Deputy Director General

Elkon Location

- The closest town is Tommot with a population of 10,000 people. Tommot is connected with the Baikal-Amur Mainline and the Trans-Siberian Mainline by railroad. A road and electrical power line are located 10 km north of the deposit
- History of the deposit:
  - Date of discovery: 1960
  - Extensive exploration in 1960-1980



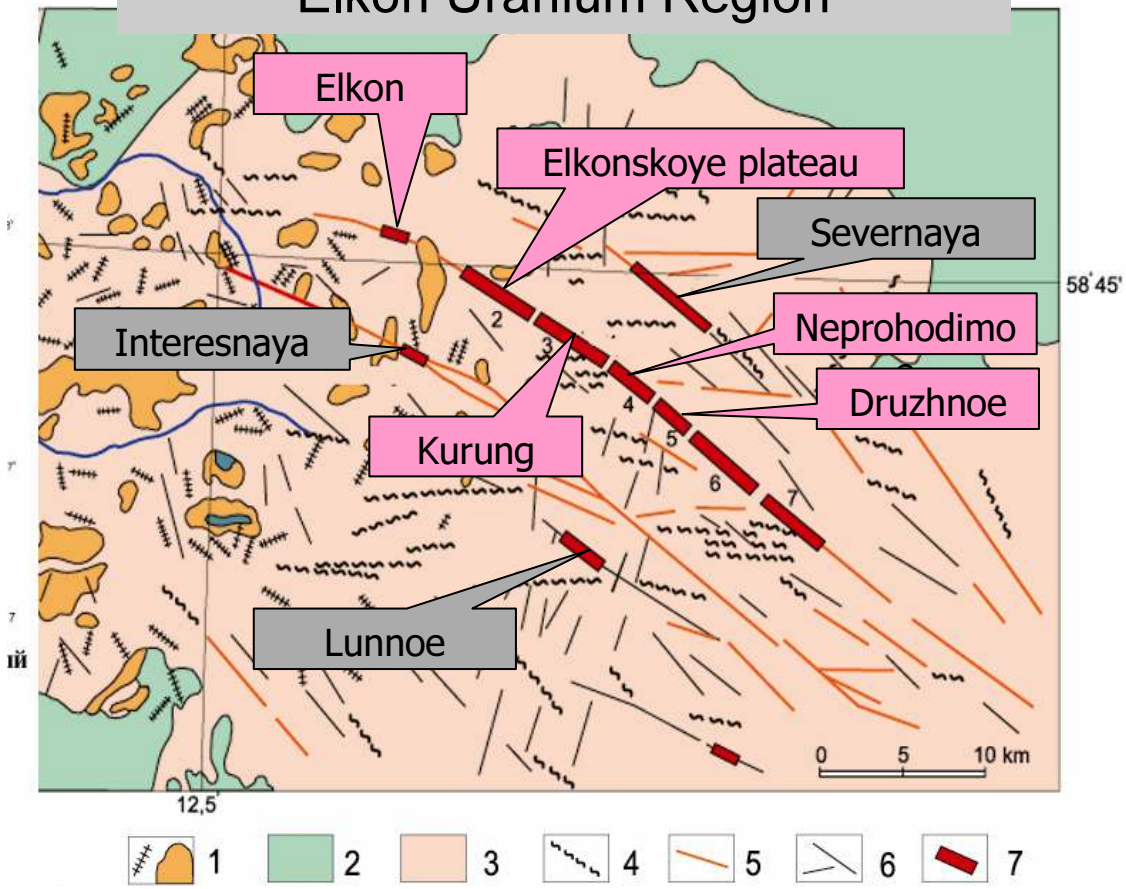
Elkon Uranium region



1 – Elkon uranium region ;
2- 7 deposits:
2-gold; 3 - phlogopite;
4 - iron; 5 - apatite;
6 – quartz; 7- coal

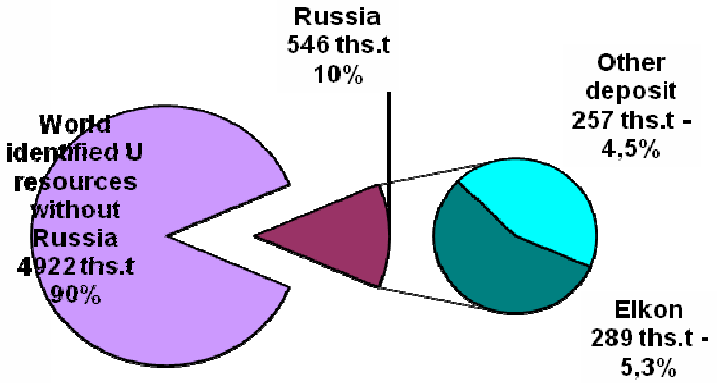
Elkon resources and regional geological setting

Elkon Uranium Region



1 - Mesozoic intrusions; 2 - Cambrian platform carbonate formations; 3 - Pre-Cambrian metamorphites and granitoids; 4 – Blastomylonites 5 - Revived old fractures; 6 - Mesozoic tectonic zones; 7 - Uranium Deposits

Recoverable uranium resources in Elkon amount to 5.3% of world uranium resources, which makes it second biggest U deposit

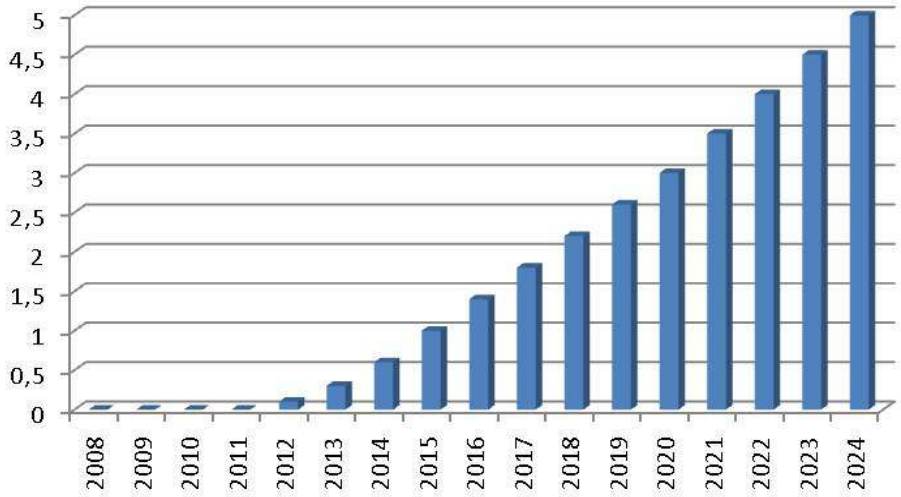


Elkon district	
In-Situ U resources	344 ths.t
Au Resources, t	170
Ore grade	0,146% U 0,84 g/t Au
Mining Method	Underground

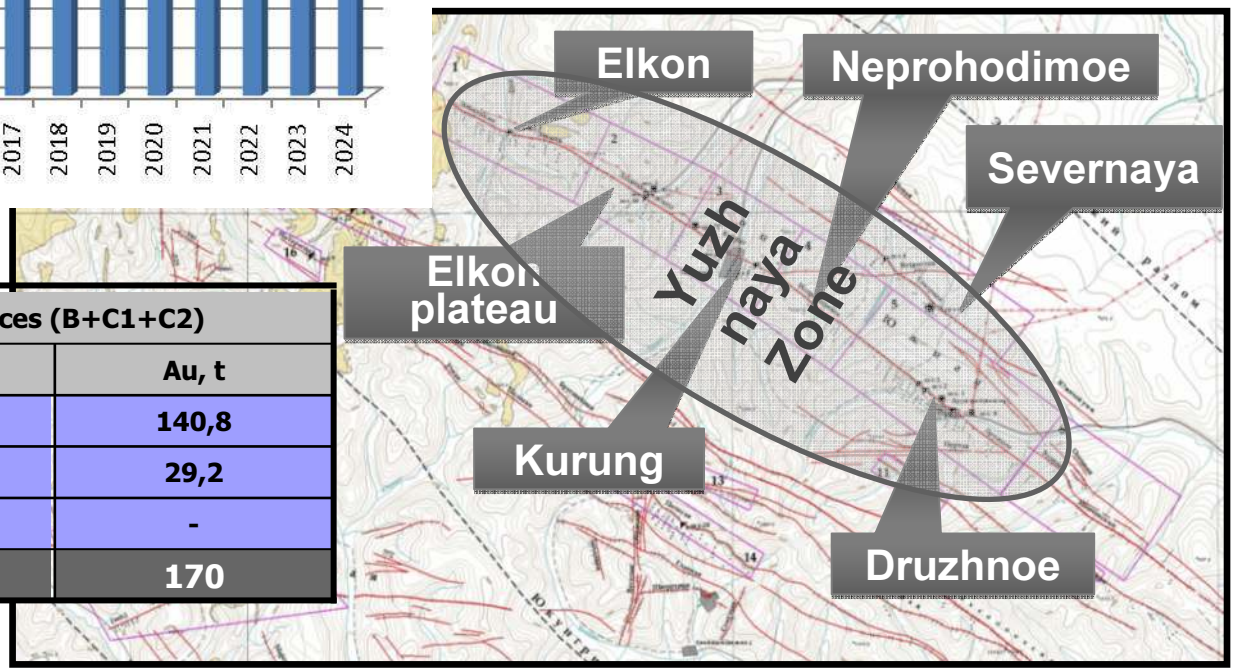
In situ known U resources 344 ths.t at 0,158% (recoverable 289 ths.t)

Elkon Mining Company 100% subsidiary of ARMZ

Elkon uranium mining company was established by ARMZ in November 2007.

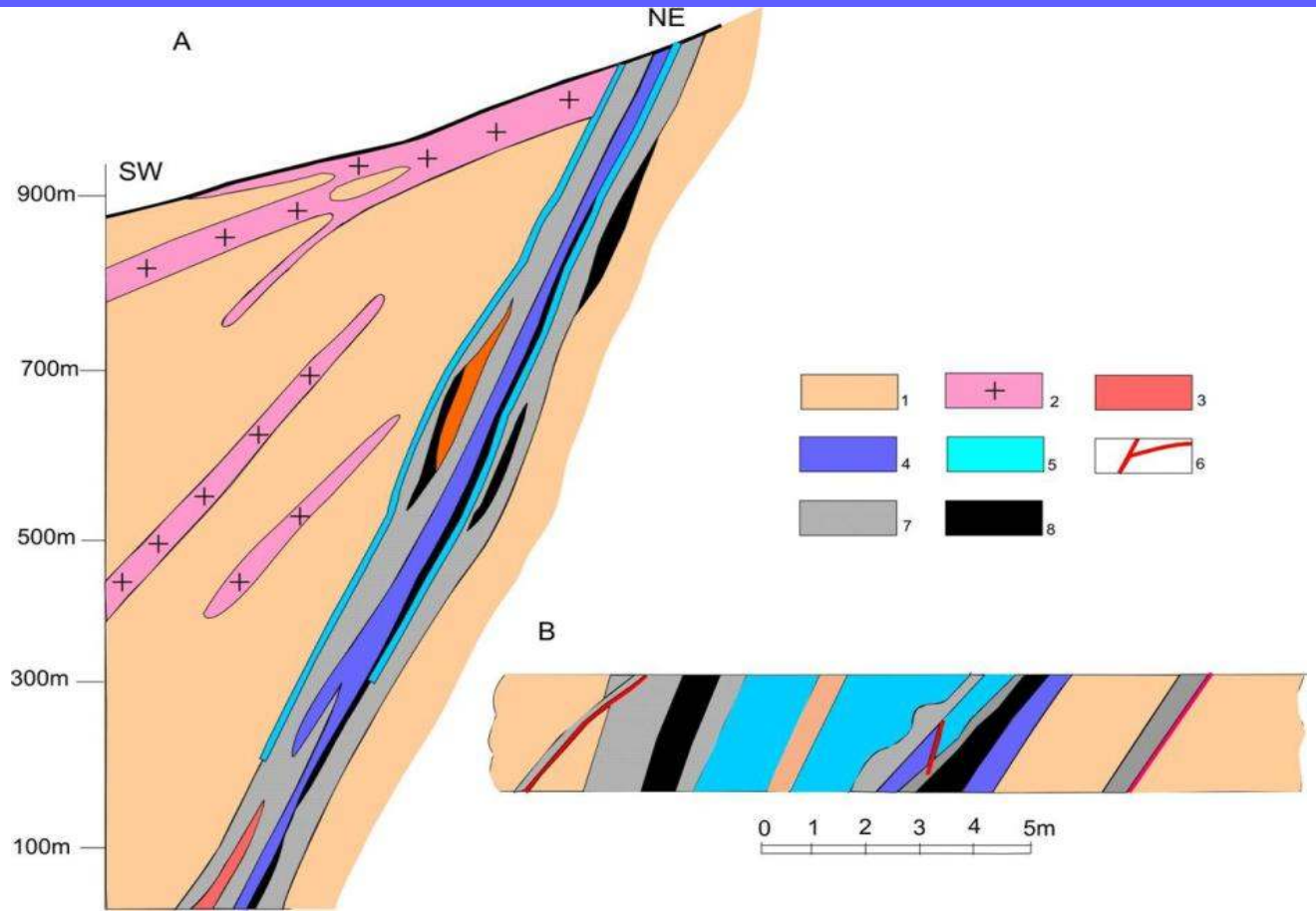


Planned production capacity 5000 mtU/year to 2025



Zones	Resources (B+C1+C2)	
	U, ths.t	Au, t
Yuzhnaya	257,8	140,8
Severnaya	58,6	29,2
Interesnaya	2,8	-
Total	319,2	170

Elkon. Schematic cross cut through Yuzhnaya zone

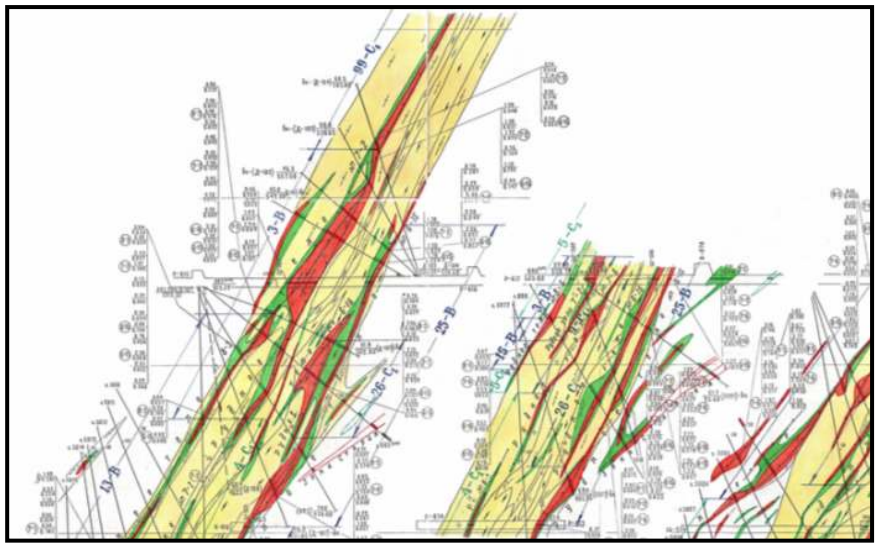


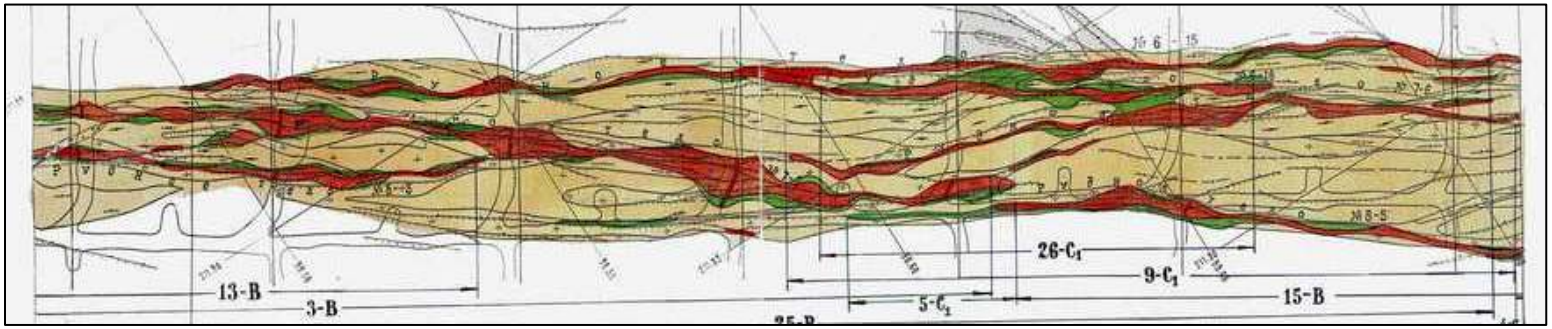
1- gneiss, 2- granite, 3- orthotectite, 4- metamorphosed ancient diorite dikes (orthogneiss), 5- blastomilonites and cataclasites, 6- faults, 7- metasomatites, 8- ore bodies

Elkon Geology

About 20 ore bodies located in 3 ore zones within the Yuzhnaya fault zone

- Ore bodies have complex morphological structure with significant variations in thickness over short intervals as ore-bodies bulge and narrow.
- Ore zone includes areas with closely-adjacent and parallel veins, making selective mining difficult. Bulk mining will add more dilution requiring radiometric sorting.
- Length of ore bodies along strike: 50 to 400m, up to 700m;
- Length of ore bodies down dip: 100 to 200m.
- Thickness varies from 0.9 to 4m, average about 1.3m





Elkon Uranium mineralization

At the Elkon deposit uranium mineralization occurs largely as

brannerite $(U^{4+},Ca)(Ti,Fe^{3+})_2O_6$

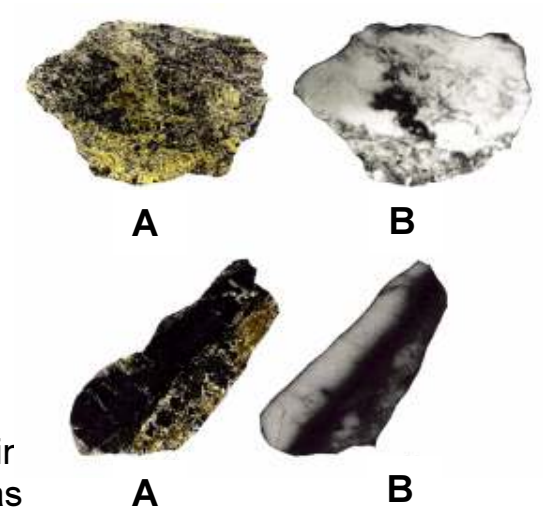
The mineral is a refractory ore of uranium. In addition other uranium minerals are present in lower amounts such as:

coffinite $(U,Th)[(OH)_{4x}|(SiO_4)_{1-x}]$

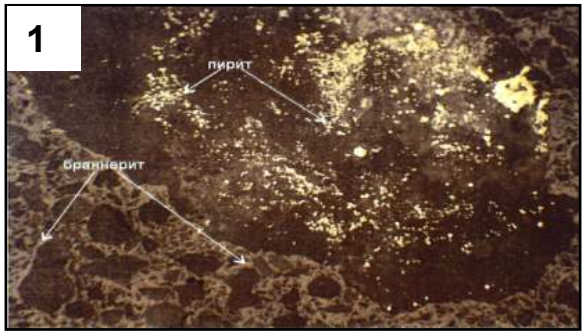
and **urannite** UO_2

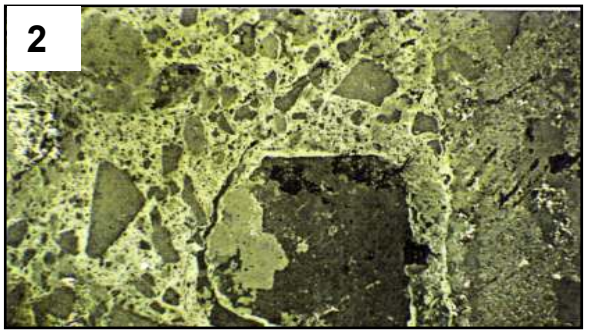
The uranium minerals occur in breccia fragments in the calcite-fluorite veins.

Gold occurs as sub-micron grains or micron sized inclusions ir pyrite and galena. The sulphides occur in quartz and calcite as inclusions and in fractures and on grain surfaces.



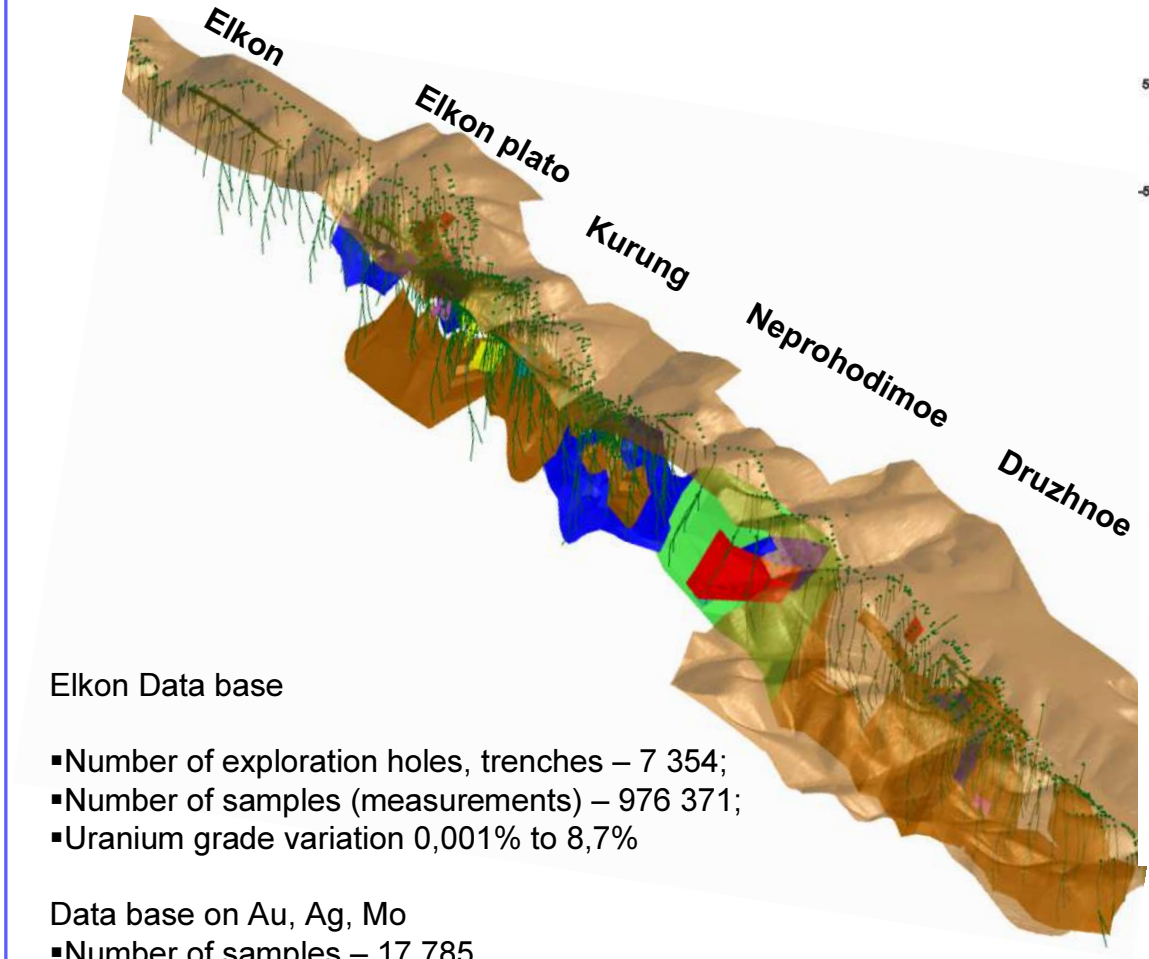
A – Samples texture
B – Radiography
(7 days exposition)

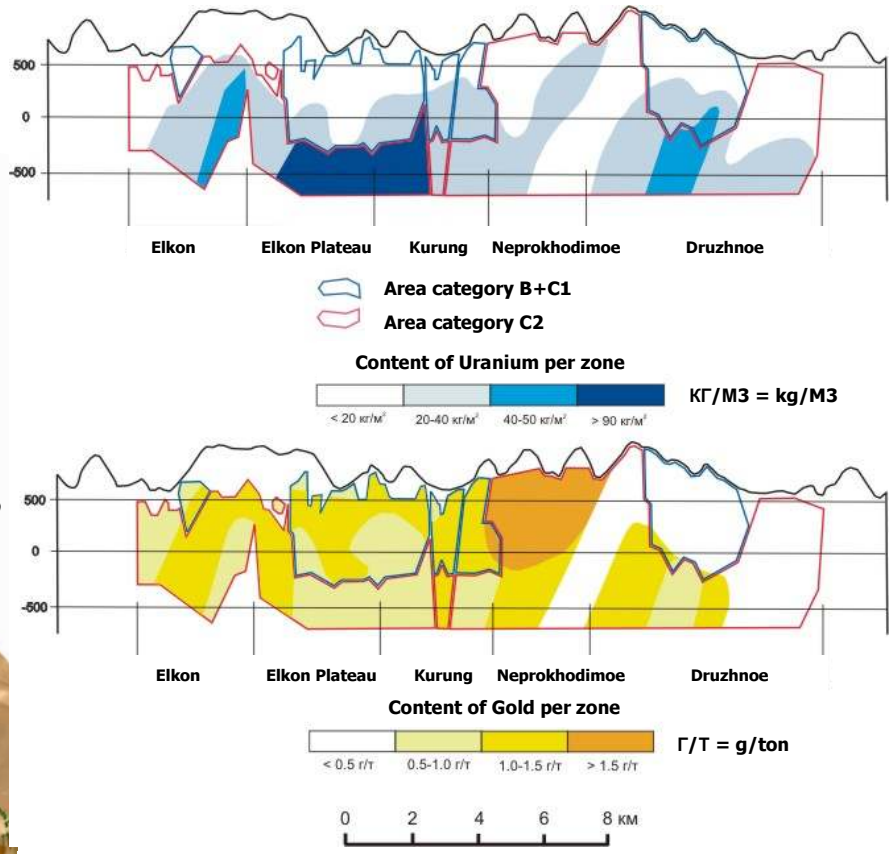




Microphoto:
1- Fragments of rock and pyrite cemented by brannerite (x 400)
2 – Microbreccia with brannerite- coffinite-pyrite cement (x 100)

Elkon 3-D carcass model





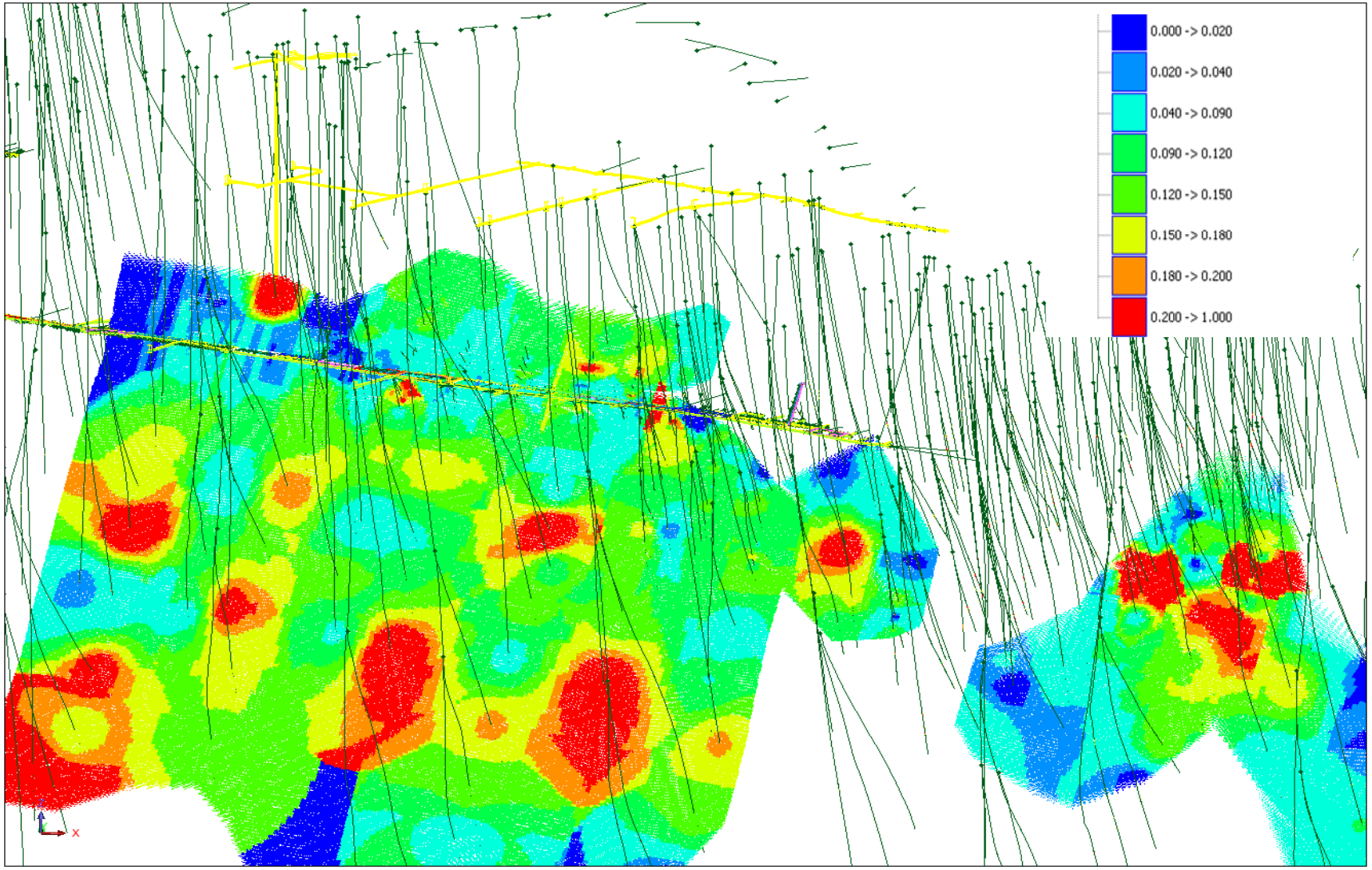
Elkon Data base

- Number of exploration holes, trenches – 7 354;
- Number of samples (measurements) – 976 371;
- Uranium grade variation 0,001% to 8,7%

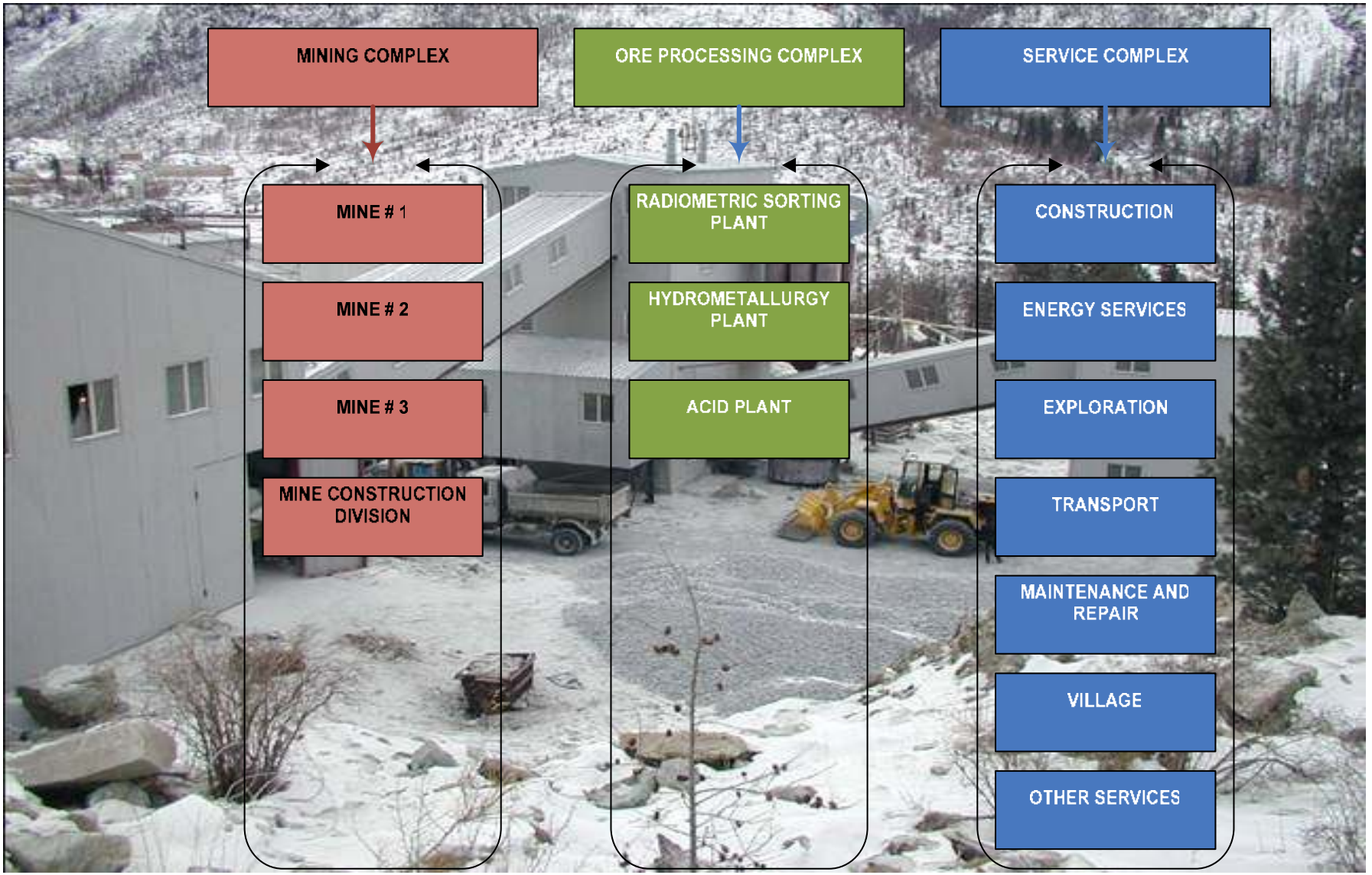
Data base on Au, Ag, Mo

- Number of samples – 17 785

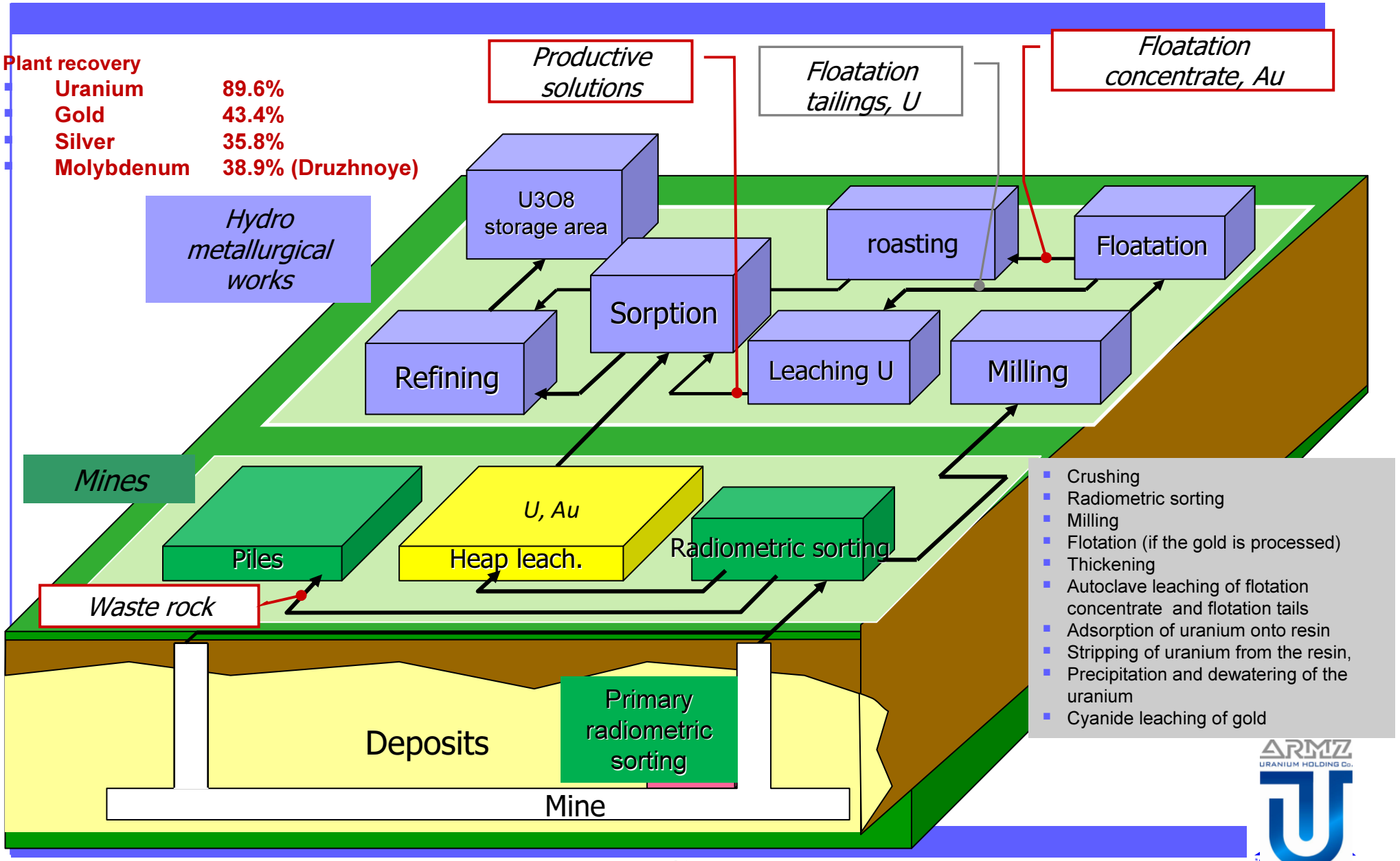
Block model for one of the ore bodies of Kurung deposit



Elkon operations principal structure

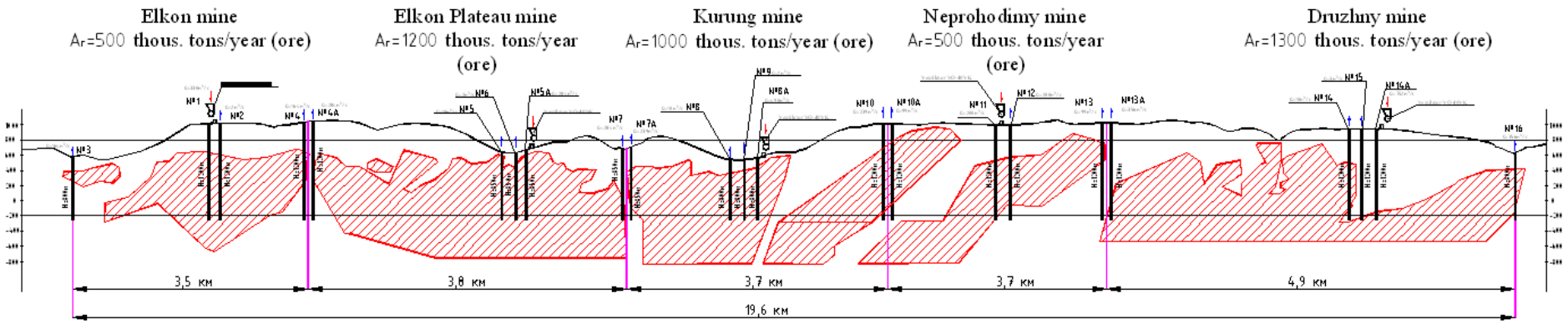


Elkon schematic mining and processing flowsheet

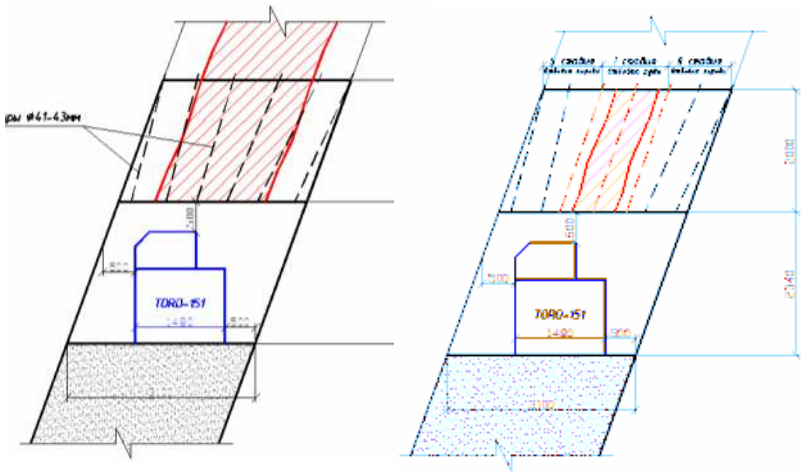


Elkon Principal Mining Scheme

Long section



Cross sectional view mining method

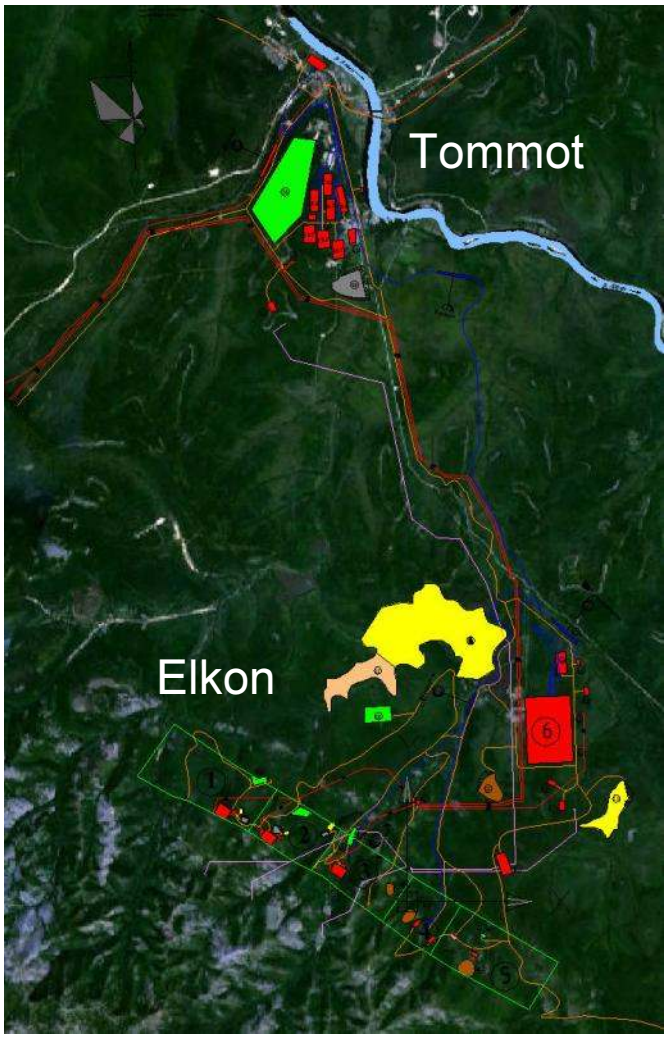


- Production method: mechanized cut and fill mining using unconsolidated backfill, selectivity allowing for the variability in ore body thickness
- Modifying factors: losses 5% and dilution 34%
- Potential to consider bulk mining method if radiometric sorting is effective
- Iinitially 2.2 Mtpa, processing ore from Elkon Plateau and Kurung,
- Potential to expand to 4.5 Mtpa to process the ore from all 5 mines

Elkon project Infrastructure

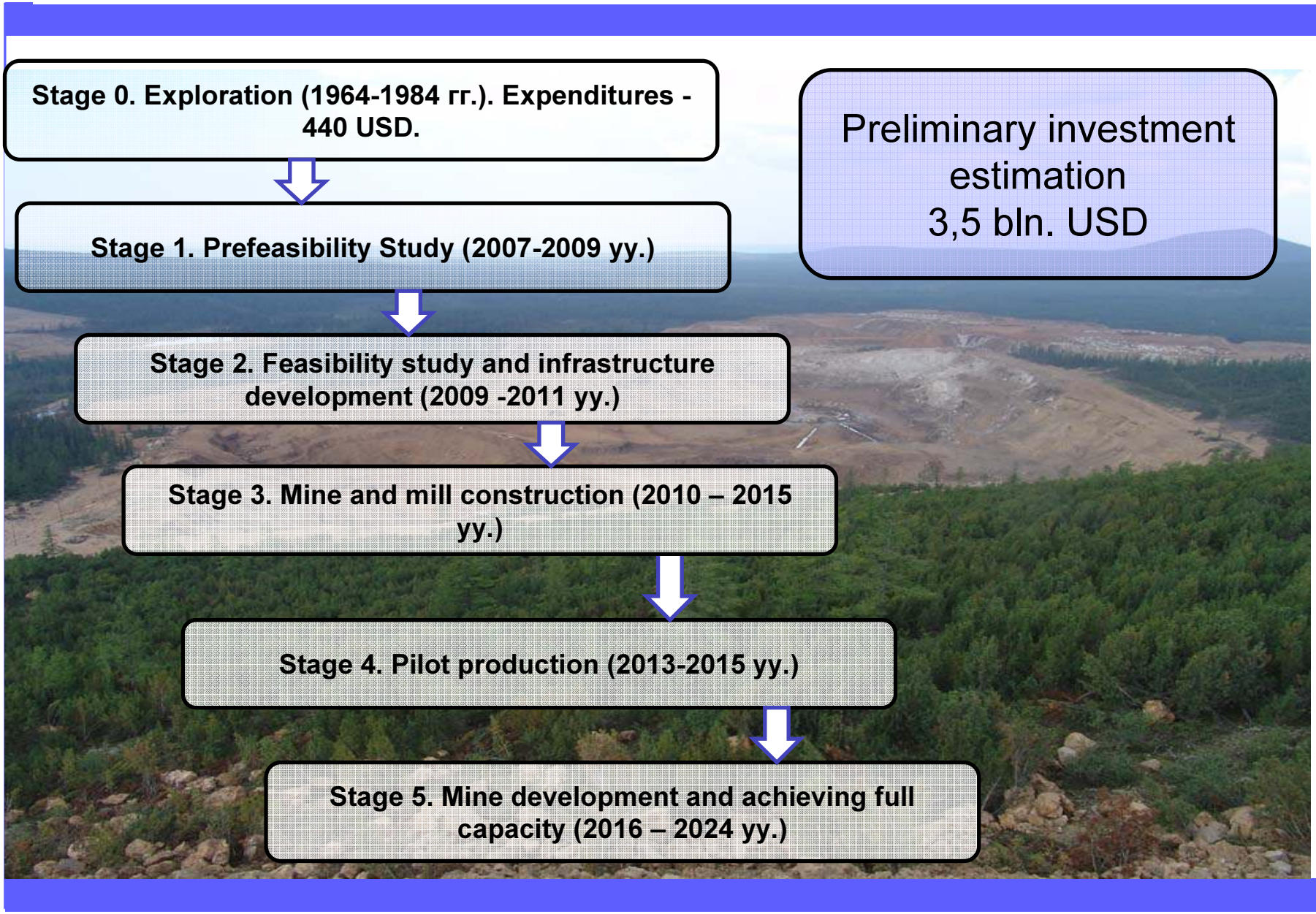
- Elkon is realizes in the framework of state-private partnership «Complex development of South Yakutia» to allocate state financing for development of the Elkon infrastructure.
- The following infrastructure construction will be financed by government:
  - Railroad connecting Elkon deposit with Tommot (53km)
  - Road connecting the deposit with Tommot (10 km)
  - High voltage electric line connecting Elkon with Aldan including substations

Schematic layout infrastructure Elkon project



Courtesy NASA/JPL-Caltech

Stages of Elkon development



Basic principals for Elkon feasibility study

- ✓ *Technical expertise of international engineering companies*
- ✓ *Resources classification according to JORC*
- ✓ *3D modeling*
- ✓ *DCF modeling*

Setting up favorable conditions to attract investments