The Outlook on Potential Uranium ISL Mining at Nyota Deposit (Tanzania)

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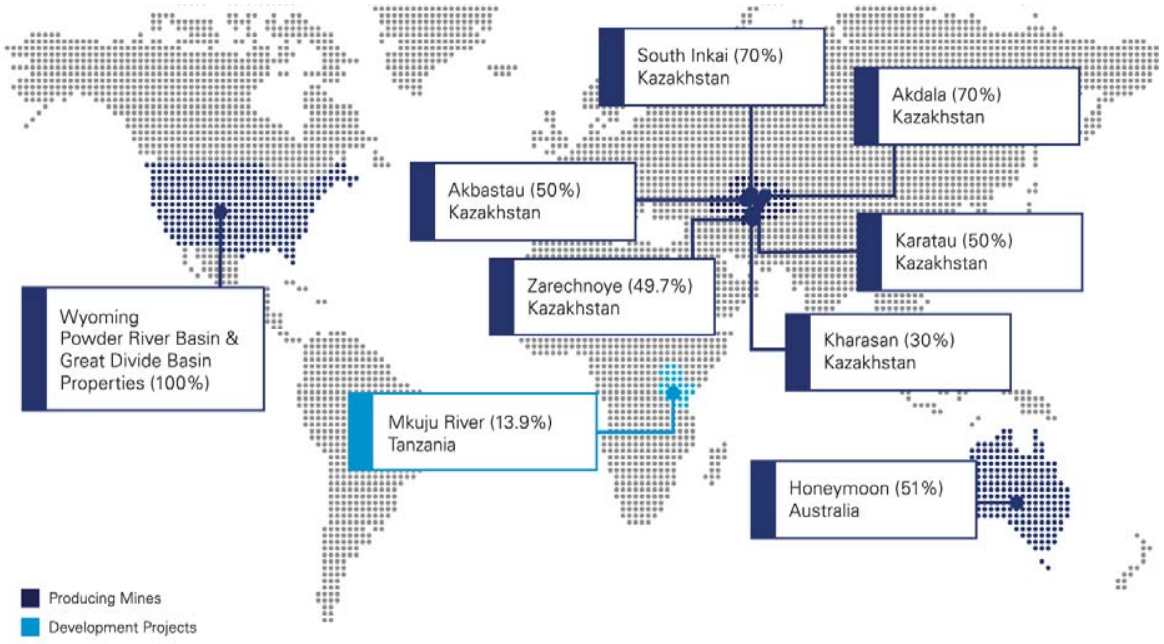
Outline of Presentation

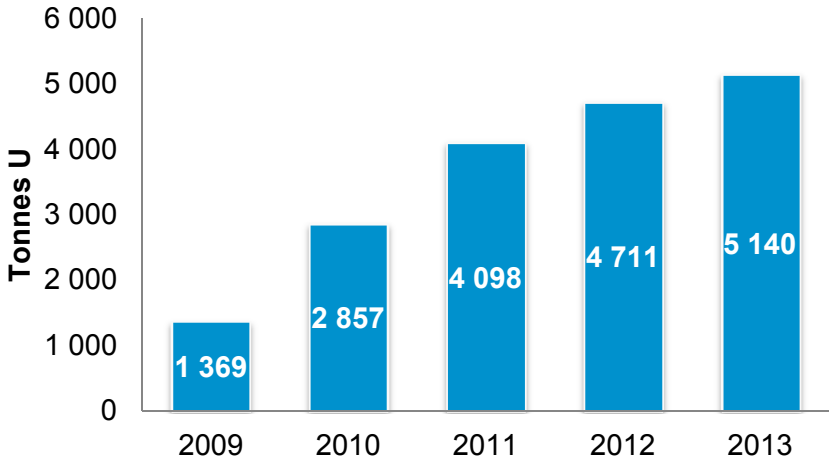
1. Uranium One – Introduction & Operational Overview
2. The Mkuju River Project - History & Status
3. Geology and Mineral Resources of the Nyota Deposit
4. The Key Motivation for Investigating ISL
5. Work Completed and Results to Date
6. Future Test Work Planned
7. Key Challenges: Commercial, Technical & SHEQ
8. Conclusion

Uranium One – Introduction & Operational Overview

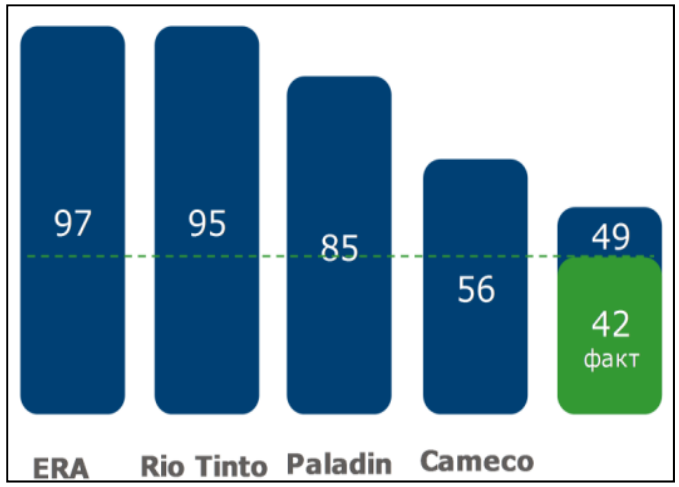
Global Footprint



Uranium One Historical Uranium production

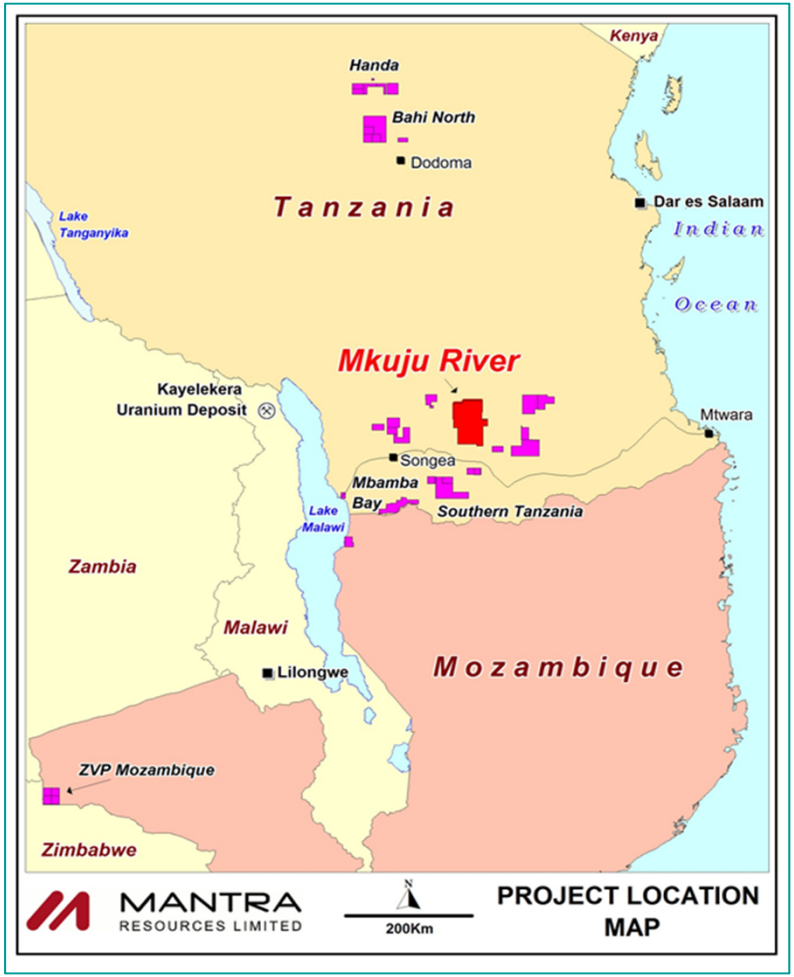


2013 analytics production cost estimations (USD/kgU)



- **Uranium One Inc. is a Canadian-based company and a wholly owned subsidiary of Rosatom.**
- **It has a globally diverse portfolio of assets located in Kazakhstan, USA, Australia and Tanzania.**
- **Uranium attributable production growth of 3,8 times within 5 years.**
- **2013 attributable production 5,140 tons U – a top five U producer.**
- **All U is produced via ISL method.**
- **2013 average production cost was $42/kgU**

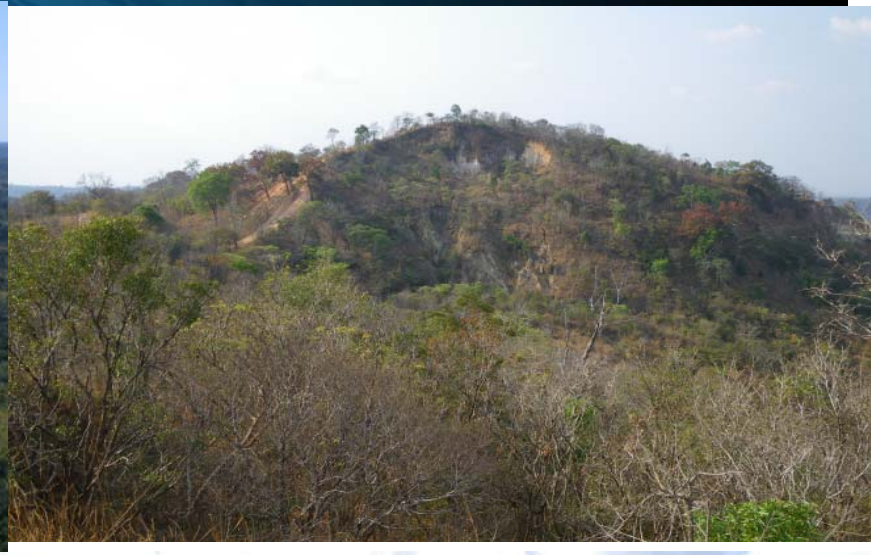
The Mkuju River Project - History & Status



- ✓ **Mkuju River is a uranium development project located in southern Tanzania, ~ 470 km southwest of Dar es Salaam. It is owned by Mantra Tanzania Ltd.**
- ✓ **Uranium One is the operator of the Mkuju River Project**
- ✓ **Mantra portfolio consists of 103 tenements. Mkuju River is the core project containing the large Nyota deposit**
- ✓ **A definitive feasibility study is being prepared and current activity is focused on licensing and permitting, with a Special Mining License having been secured.**
- ✓ **The UNESCO World Heritage Committee approved an application by the Tanzanian Government for a minor adjustment to the boundary in order to exclude the project from the Selous Game Reserve.**

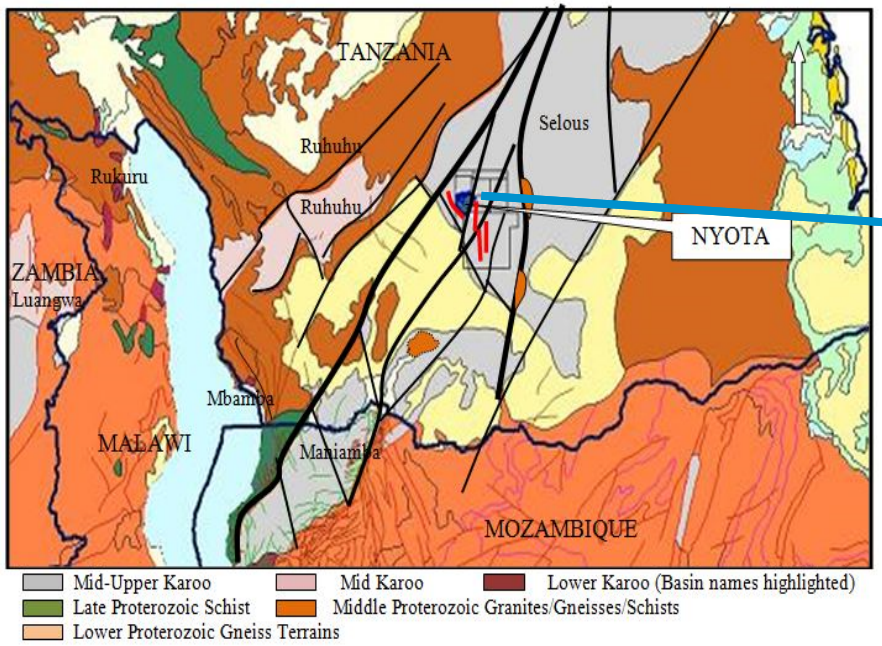
Geology and Mineral Resources of the Nyota Deposit

Regional Terrain

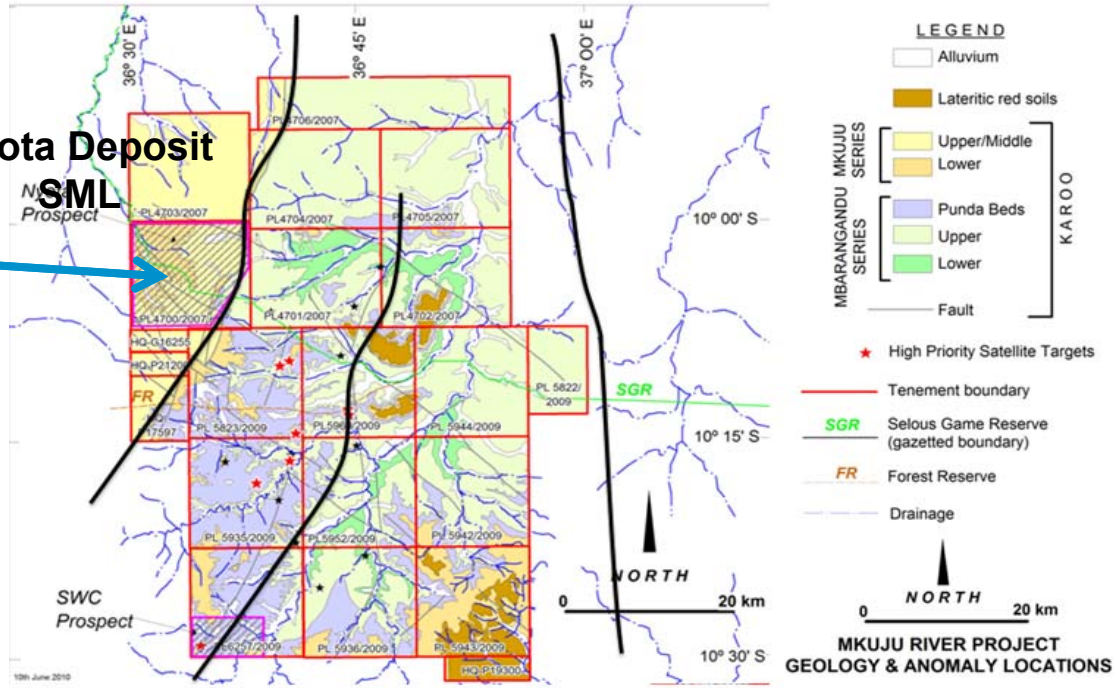


Geology and Mineral Resources of the Nyota Deposit

Geological Setting



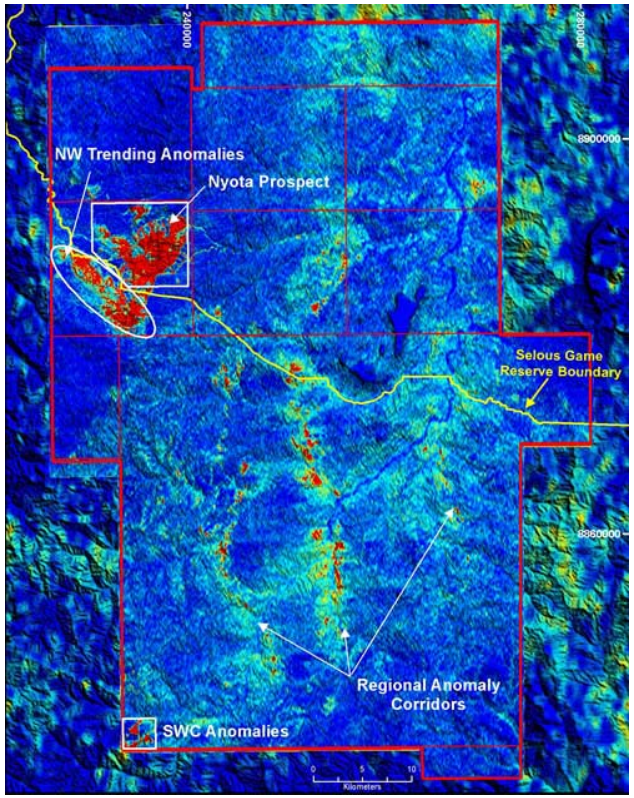
Nyota Deposit
SML

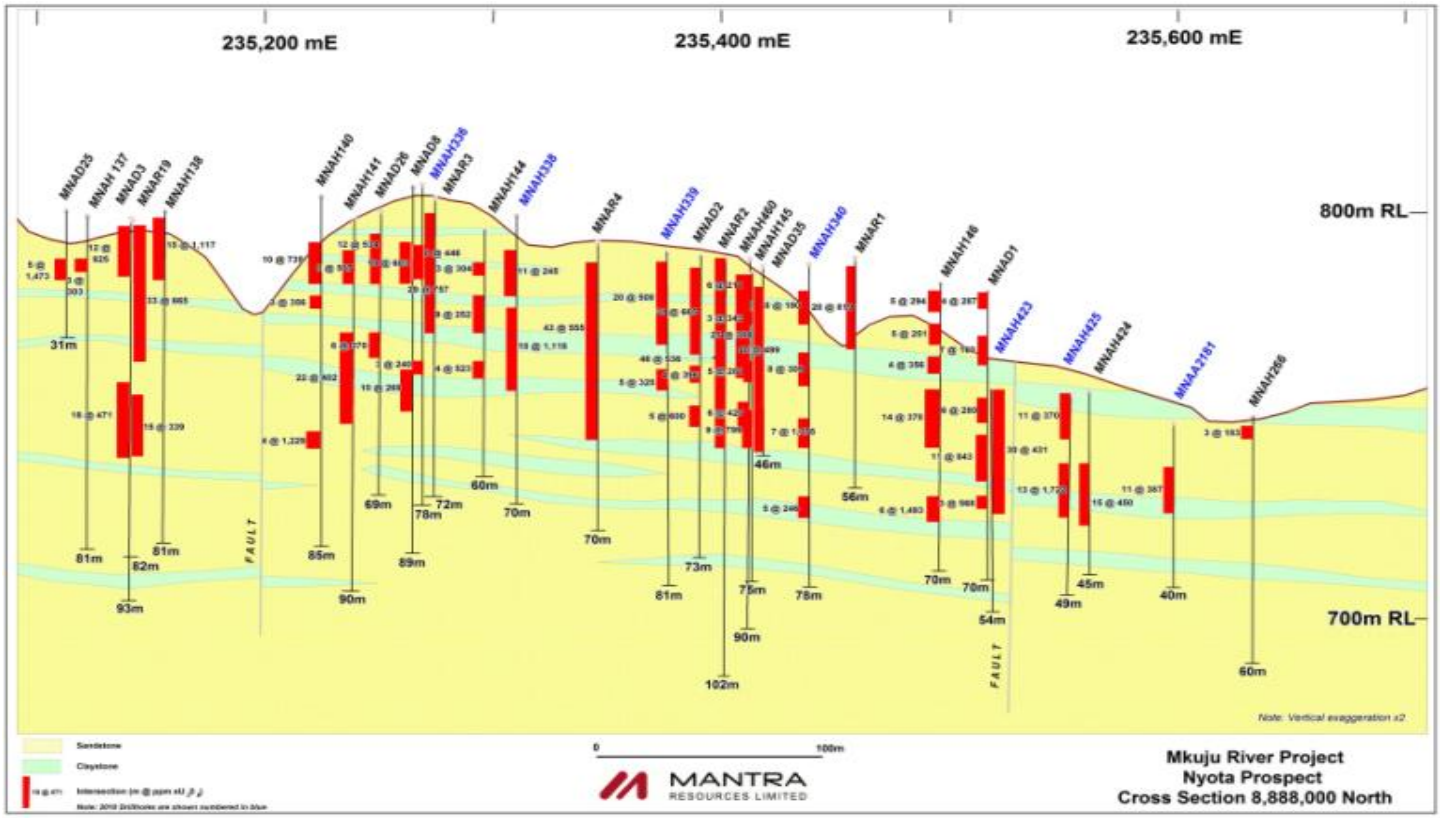


- ✓ The Mkuju River project is located within the Selous Sedimentary Basin, part of the greater Karoo Basin.
- ✓ The Nyota deposit, which is the key asset, occurs in the Triassic Mkuju Series
- ✓ Major lithologies: feldspathic sandstones, arkose sands and gritstone
- ✓ It is located to the NW of a major NE-SW trending fault, and is subject to a Special Mining License.

Geology and Mineral Resources of the Nyota Deposit

Gamma Survey Map and Cross Section View



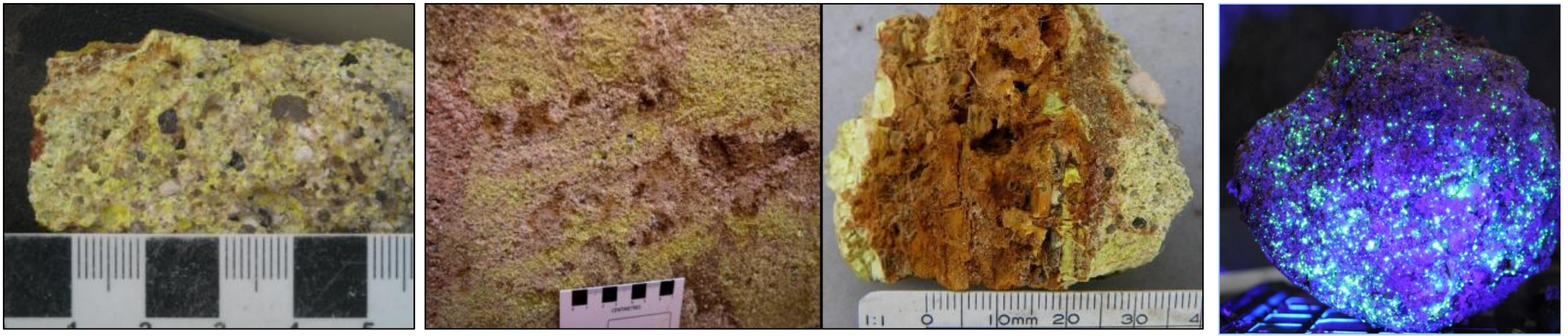


- The Nyota deposit is a near surface deposit, located via the large surface radiometric anomaly.
- The Mkuju River project holds a number of lesser, but equally prospective satellite anomalies
- Typical Nyota section demonstrates shallow depth of mineralization and lateral continuity of horizons
- Note inter-bedded shale and mudstone horizons

Geology and Mineral Resources of the Nyota Deposit

Rock types and Mineralization

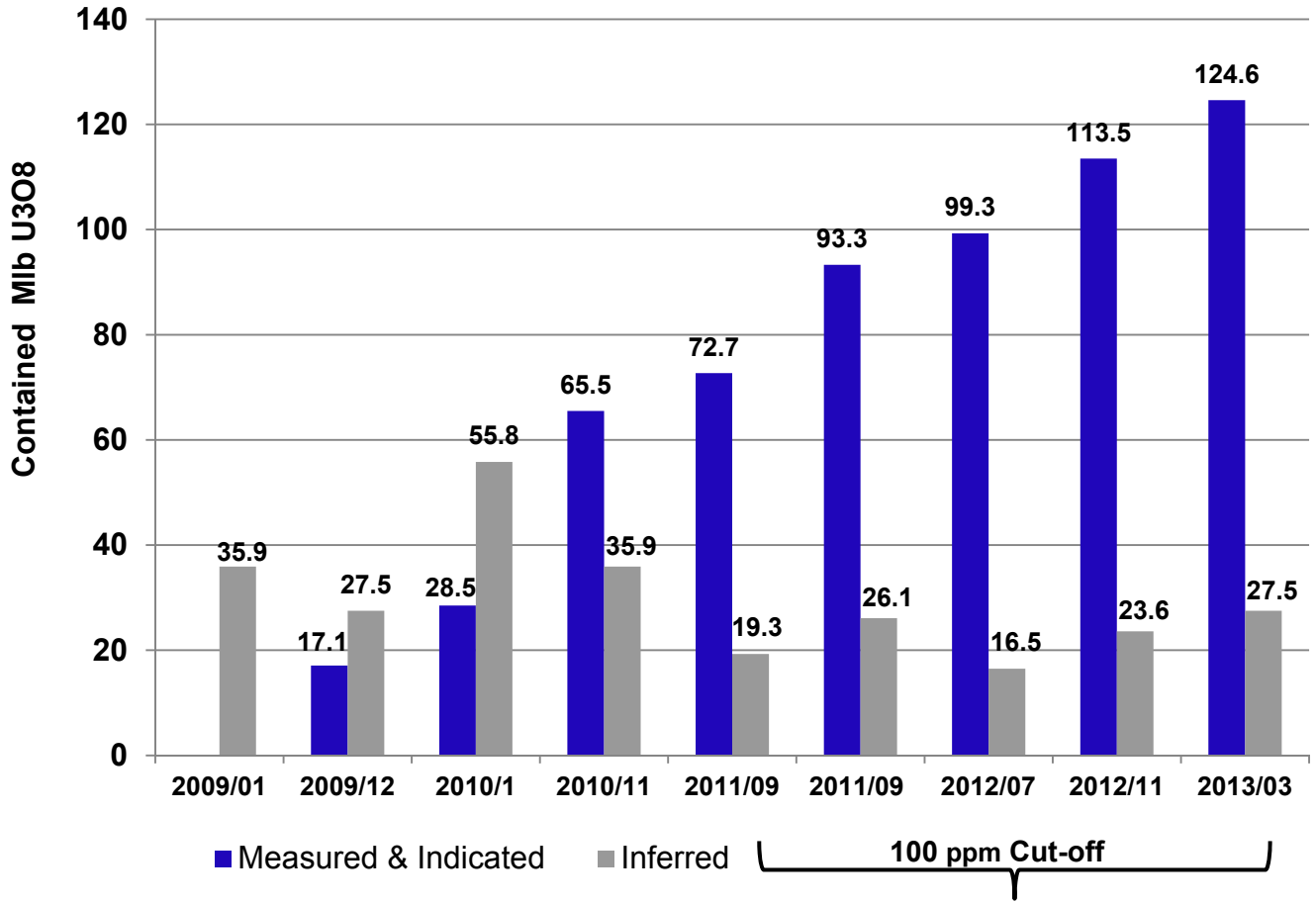
- The host rocks are braided fluviatile sediments consisting of grits, sandstones and siltstones.
- The sediments are soft, barely consolidated and sub- horizontal.



- Only Secondary U minerals are recognised to date, ppredominantly uranyl phosphates - phosphuranylite and meta – autinite, occurring interstitial to sediments grains.

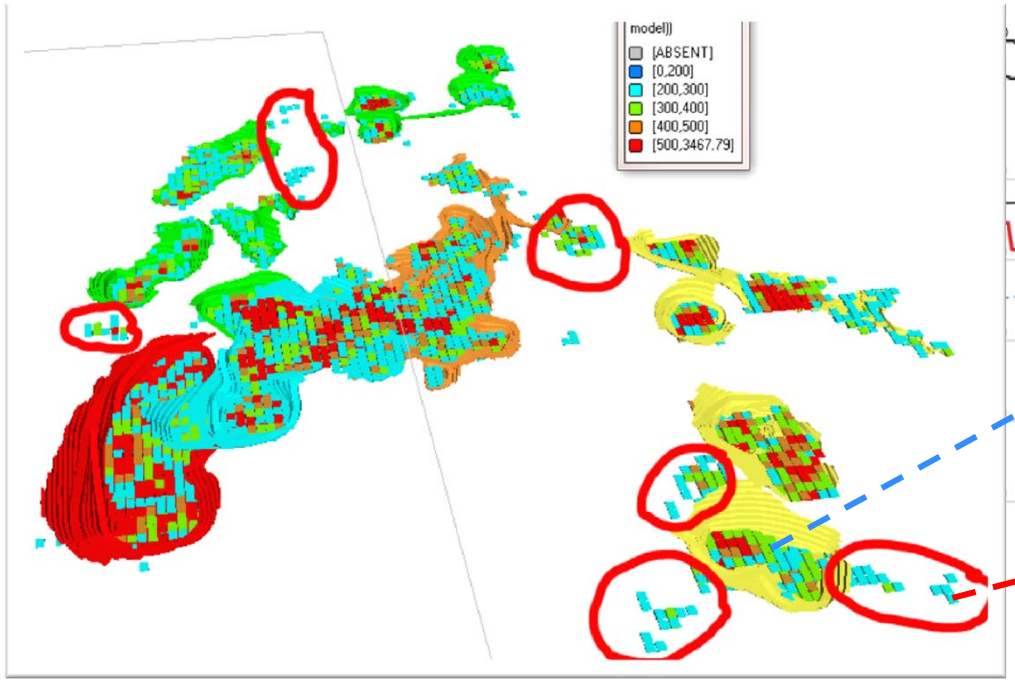
Geology and Mineral Resources of the Nyota Deposit

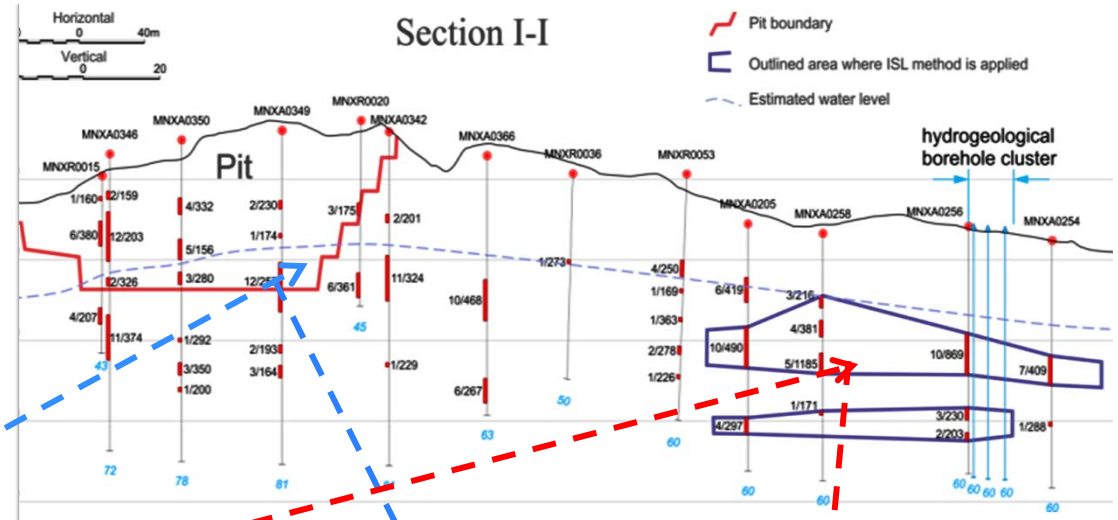
CIM compliant Mineral Resources



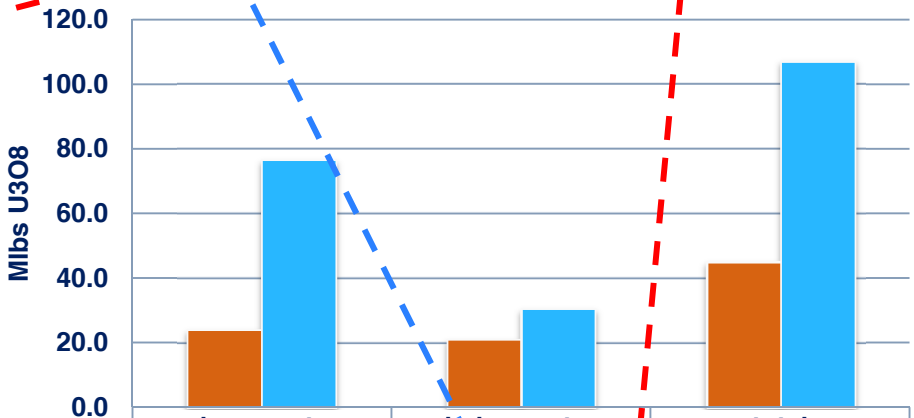
- **Current resources 152.1 Mlbs U_3O_8 (58.5tU), including 124.6Mlbs (48tU) of Measured and Indicated resources**
- **Since 2009**
  - 4.2x increase in total and 7.3x increase in the M+I
- **Since September 2011**
  - 28% growth in total resource
  - 33% growth in M+I resources
- Significant exploration potential

The Key Motivation for Investigating ISL





- ✓ DFS - Multiple open pits
- ✓ 30% of resources out of designed pit shells
- ✓ 3D groundwater surface model developed
- ✓ One third of resources occur below the water table, 40% of of which are out of designed pit
- ✓ ISL advantages versus conventional mining:
  - Lower CAPEX and OPEX
  - Lower surface environmental impact



	above water	below water	total
outside pit	24.1	21.0	45.1
inside pit	76.5	30.5	107.0

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Work Completed and Results to Date

Preliminary Hydro-geological Investigation

Factors affecting ISL process	Favorable parameters*	Obtained parameters	Factor
Hydraulic conductivity (permeability factor)	1-5 m/day.	1.8 - 5.1 m/day.	+
Transmissivity of ore horizon	10-100 m^2/day	18.7-34.3 m^2/day	+
Depth of mineralization	<200	26 - 56 m	++
Carbonate content (CO_2)	1-2 %	0.7 %	++
Mineral composition of ore	Disseminated uranium oxides	Secondary uranium mineralization	+
Ore productivity	1-5 kg/m^2	1.2 – 18 kg/m^2	+
Water confining beds in the aquifer top, bottom	Stable water confining beds	Local clay beds 0.4m to 3.5m thick	+ -
Depth of underground water	10-100m	21.8 -24m	+
Ground waters mineralization TDS	<1 g/dm^3	<1.0 g/dm^3	++
Water abundance (specific yield)	0.1-0.5 l/sec	0,1 l/sec	+ -
Thickness of productive aquifer	10-30	Over 30m, local to 1.5m thick confining beds	- +
Mineralization location in aquifer	In the middle and bottom parts	In the upper and middle part	+ -
Temperature of ground waters	10-30°	26°	+

A selected mineralised area, below the water table, outside the pit designs was tested.

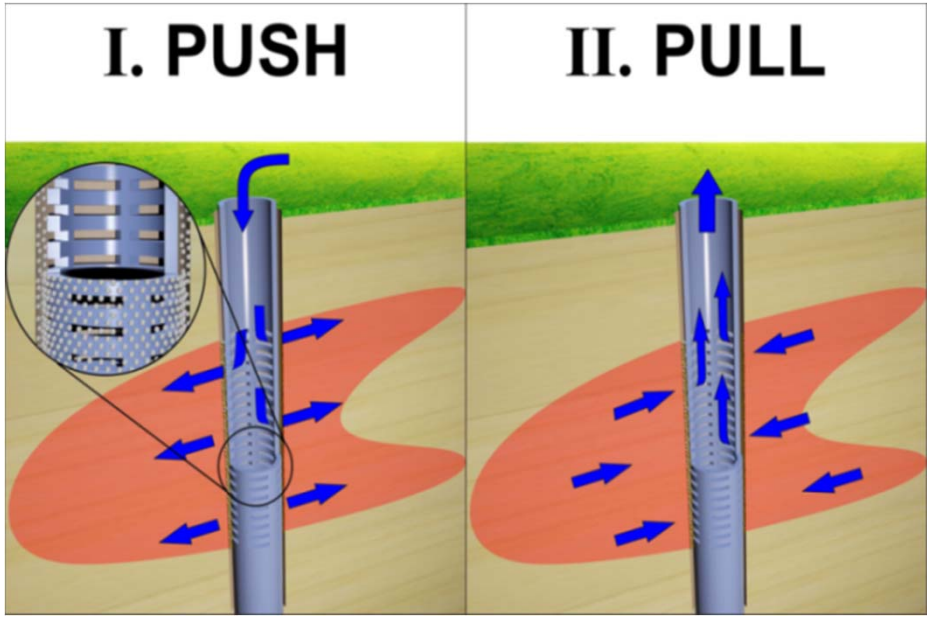
Work Completed and Results to Date

Push Pull Test - Objectives

- The success and positive indicators achieved with the preliminary hydrological test, led to the approval of the next testing program, which was a Push-Pull test.

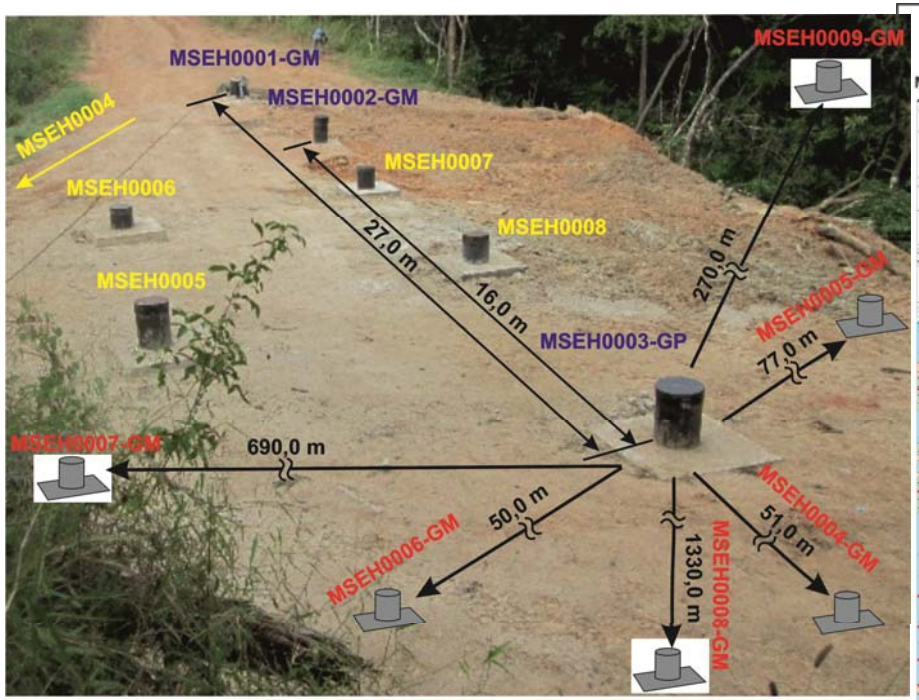
- The main objective of this test was to evaluate the principal amenability of the mineralization to ISL operations, with a specific focus on:
  - Effectiveness of various leaching solutions
  - Hydraulic conductivity, transmissivity and specific yield of the aquifer
  - Ore productivity of the well field

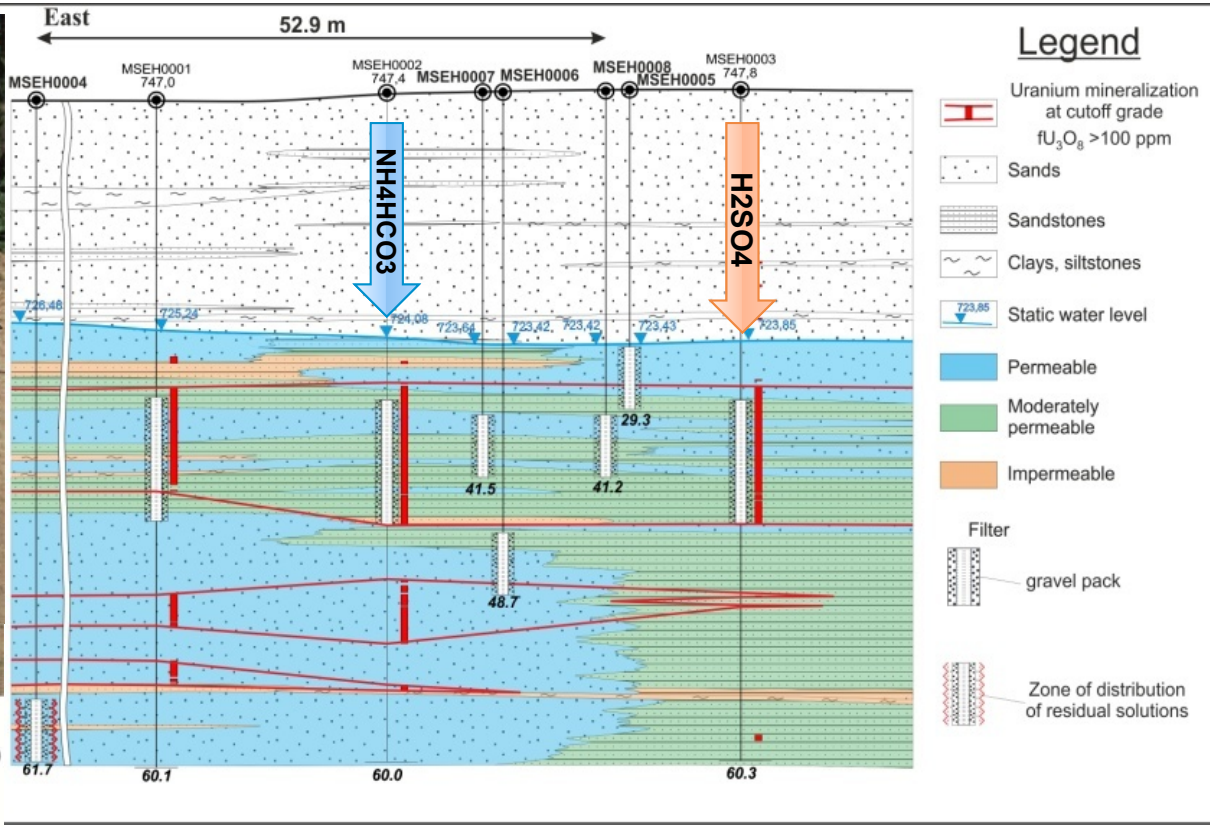
- The main reagents were:
  - Alkaline - bicarbonate, (with and without H_2O_2)
  - Sulphuric Acid



Work Completed and Results to Date

Push Pull Test – Plan View and Geological Section

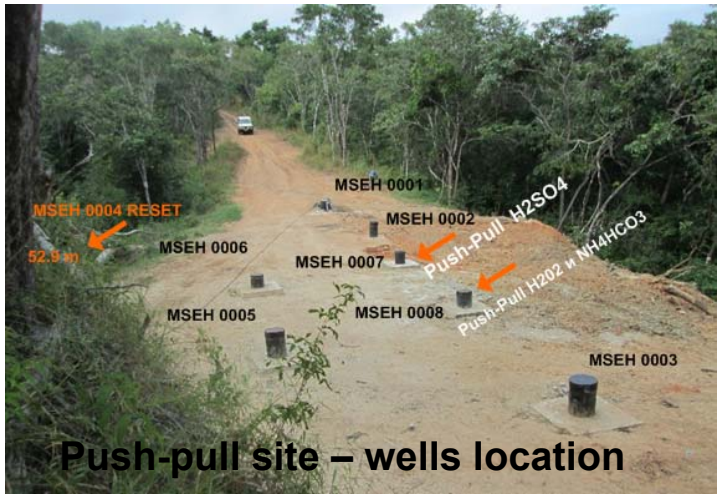




- The test was conducted in 2013 at the site of the preliminary hydrological investigation
- Two recovery wells, five monitoring wells and one disposal well were completed
- Necessary governmental approvals were obtained.
- The depth of mineralisation was only ~26m, the thickness ~8m, and the grade ~1000ppm U3O8
- The test was conducted by Rusburmash, with support from Mantra staff

Work Completed and Results to Date

Push Pull Test – Site Photo's

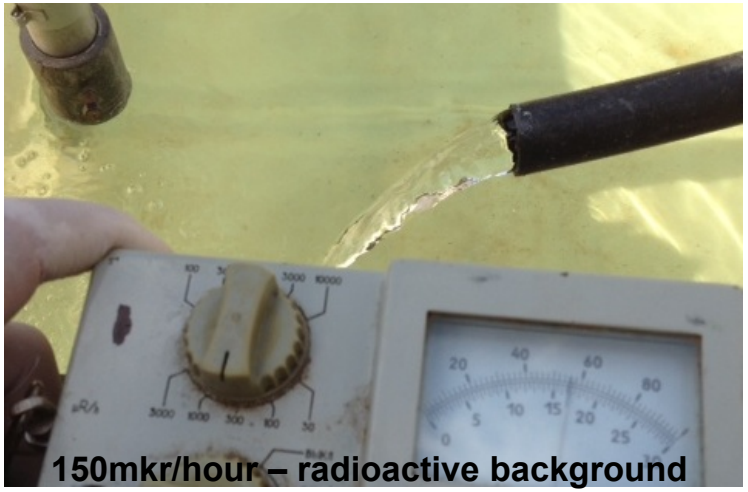


Push-pull site – wells location


Push-pull test site

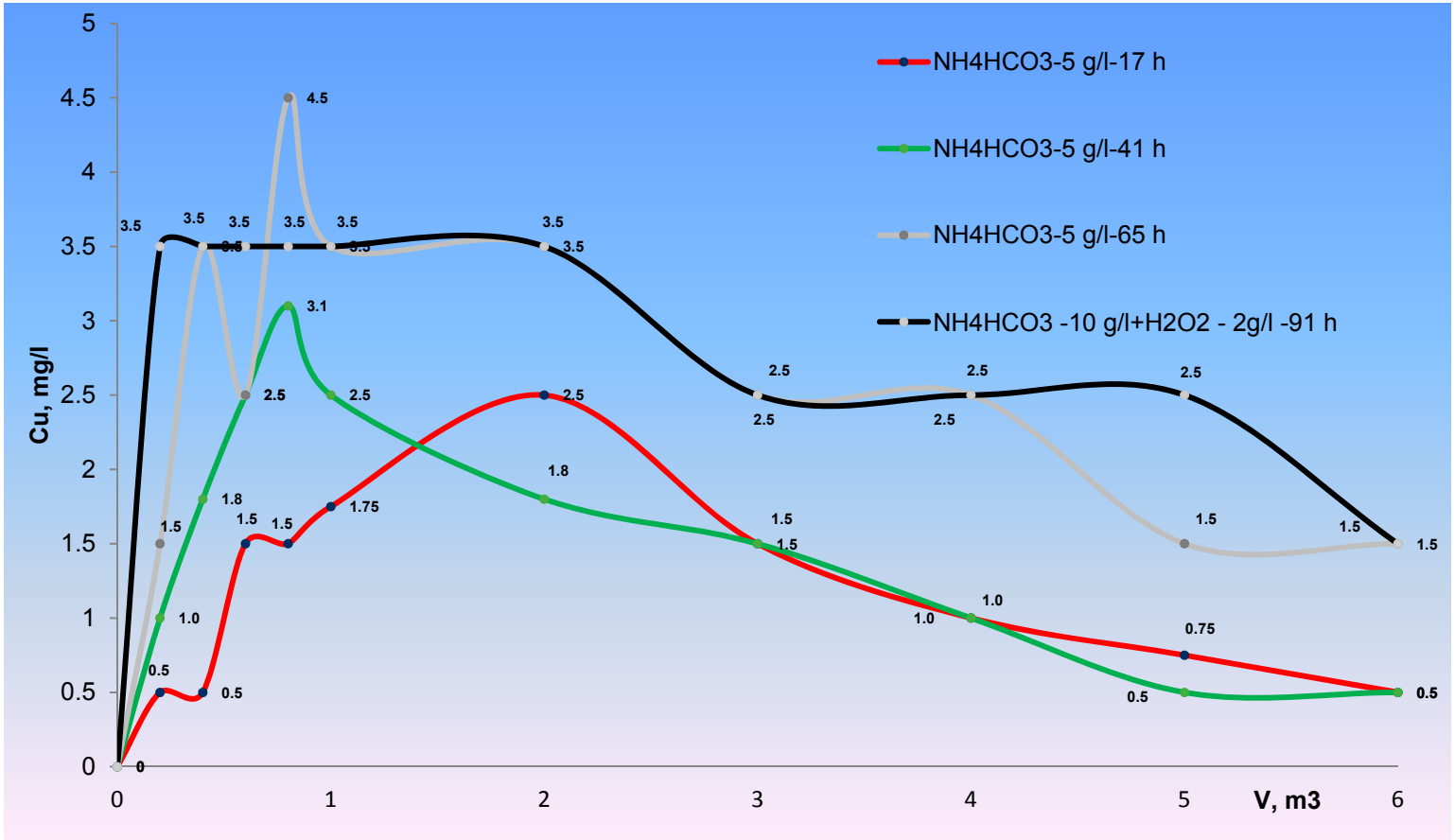

An on-site laboratory was erected and equipped


Pregnant solutions pumping


150mkr/hour – radioactive background

Work Completed and Results to Date

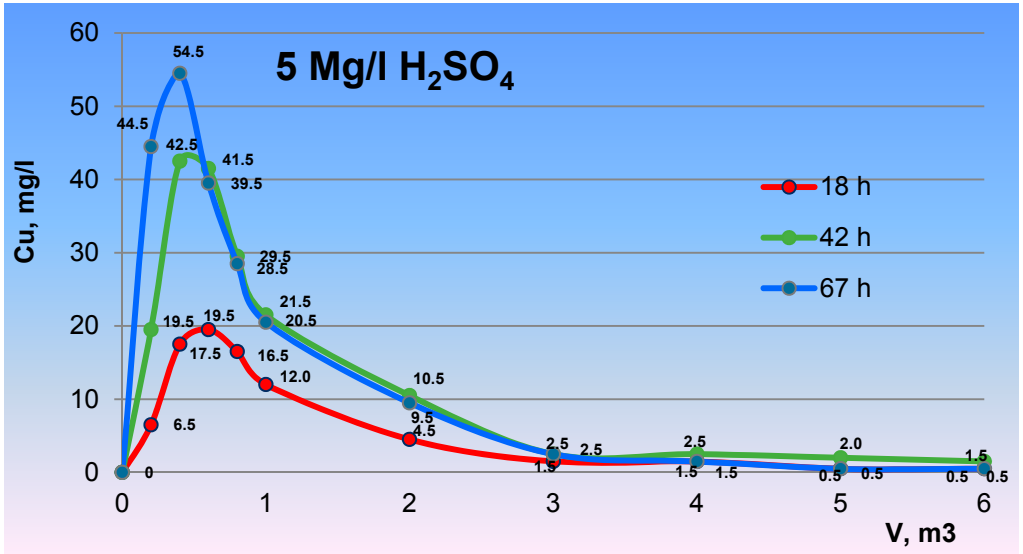
Push Pull Test – Alkaline leaching results

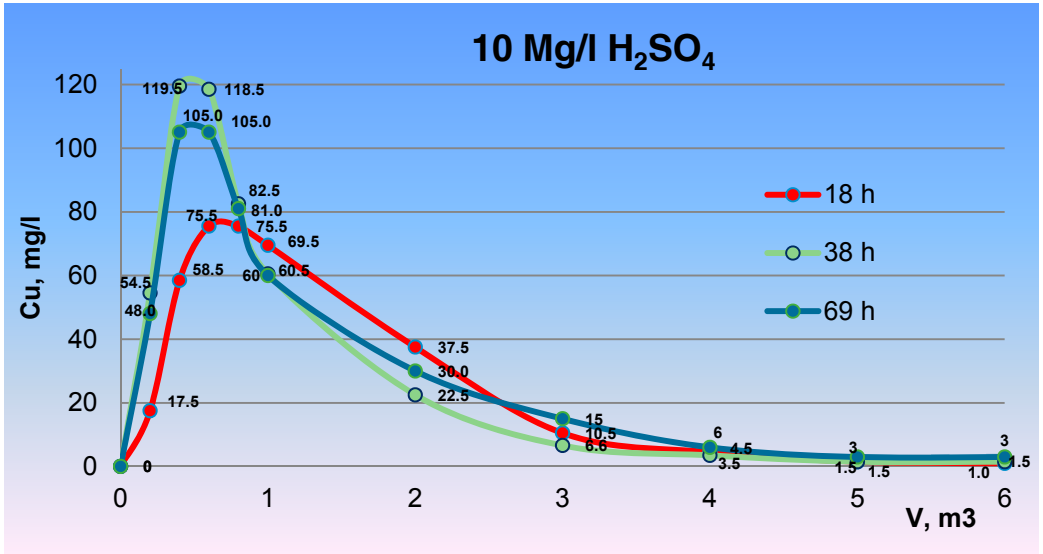


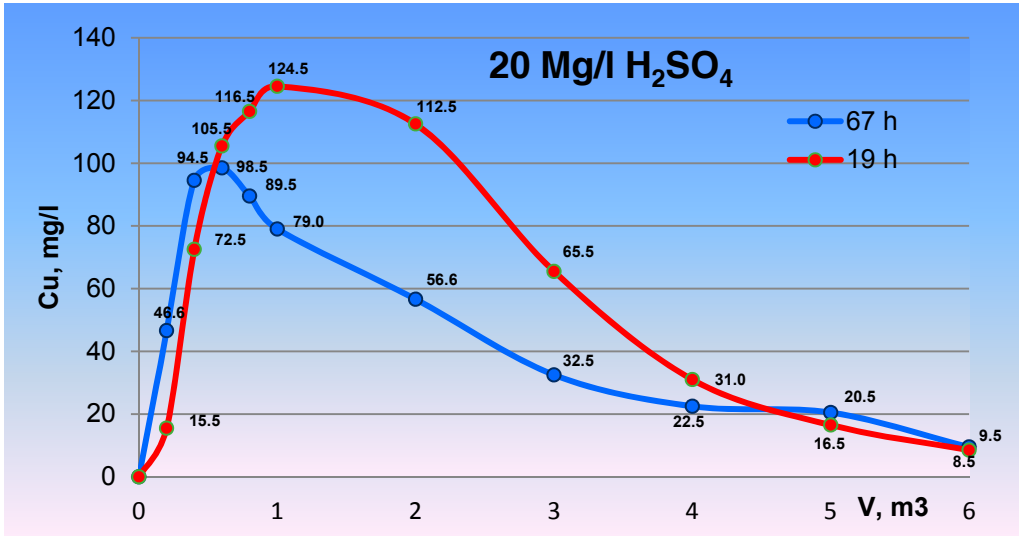
- The NH_4HCO_3 concentration varied between1, 5 and 10 g/l
- Bicarbonate reagent yielded disappointing results (below 4,5mg/l U)
- This was expected, as metallurgical test-work during the DFS indicated this.

Work Completed and Results to Date

Push Pull Test – Sulphuric Acid Results







- Acidic leaching solutions 5, 10 and 20 mg/l
- Leaching time 18 to 69 hours
- All the solutions managed to recover uranium into solutions in short timeframes
- Uranium concentration reached 125mg/l
- The 10mg/l solution proved to be the optimal economic reagent
- The acidic test results were very successful

Future Test Work Planned

Hydrological Studies	• To determine the direction and speed of groundwater flow; • The hydraulic connection between the ore bearing aquifers and the surface streams; • How solutions will spread through the strata, • The size of the groundwater depression cone • The probable impact on the surface stream flows.
Five Spot Field Test	• To determine main mineralization and ISL process parameters and to model ISL process dynamics. • The test duration is one year.
Demineralization Test	• To determine how the aquifer can be restored after ISL completion. • The set of works will enable to estimate data for the EIA
Geological model and resources update for ISL	• Geological model update and resources re-estimation based on ISL criteria (productivity, permeability, ground water level, etc.)

Five Spot Test must demonstrate the economic viability of the ISL mining

Key Challenges: Commercial, Technical & SHEQ

Commercial

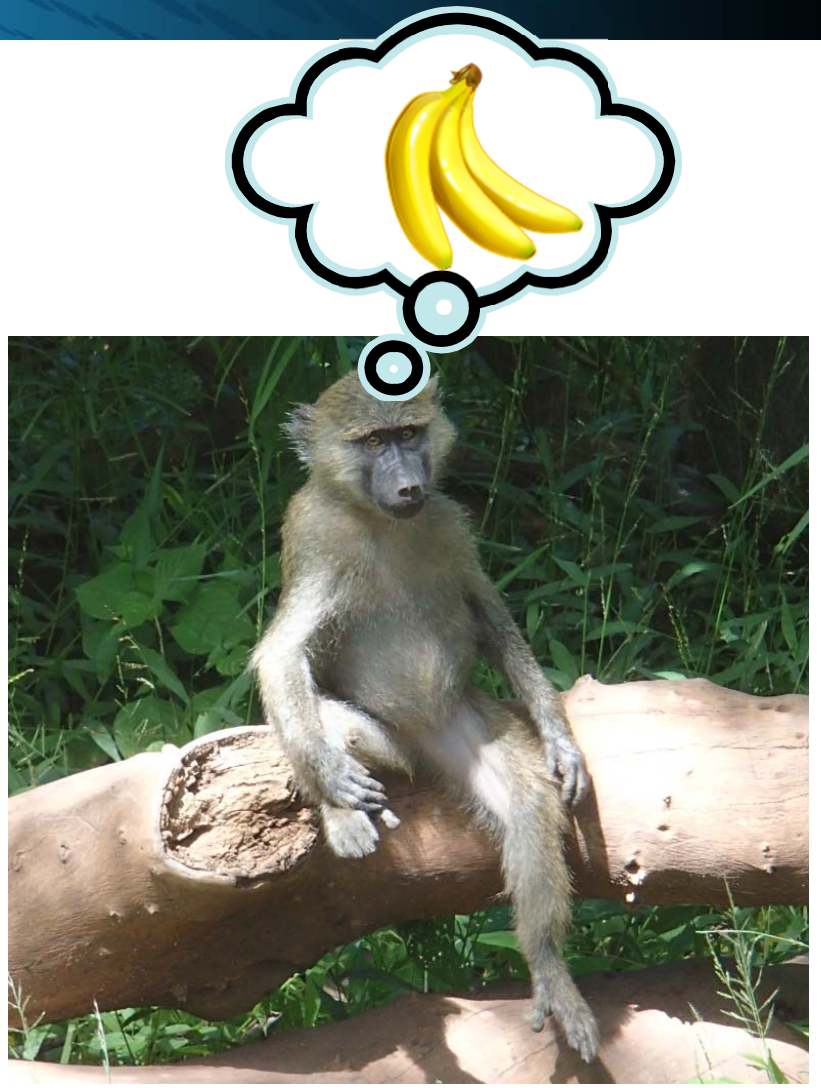
- Open Pit vs. ISL mining
- Lower grade ore available outside pits

Technical

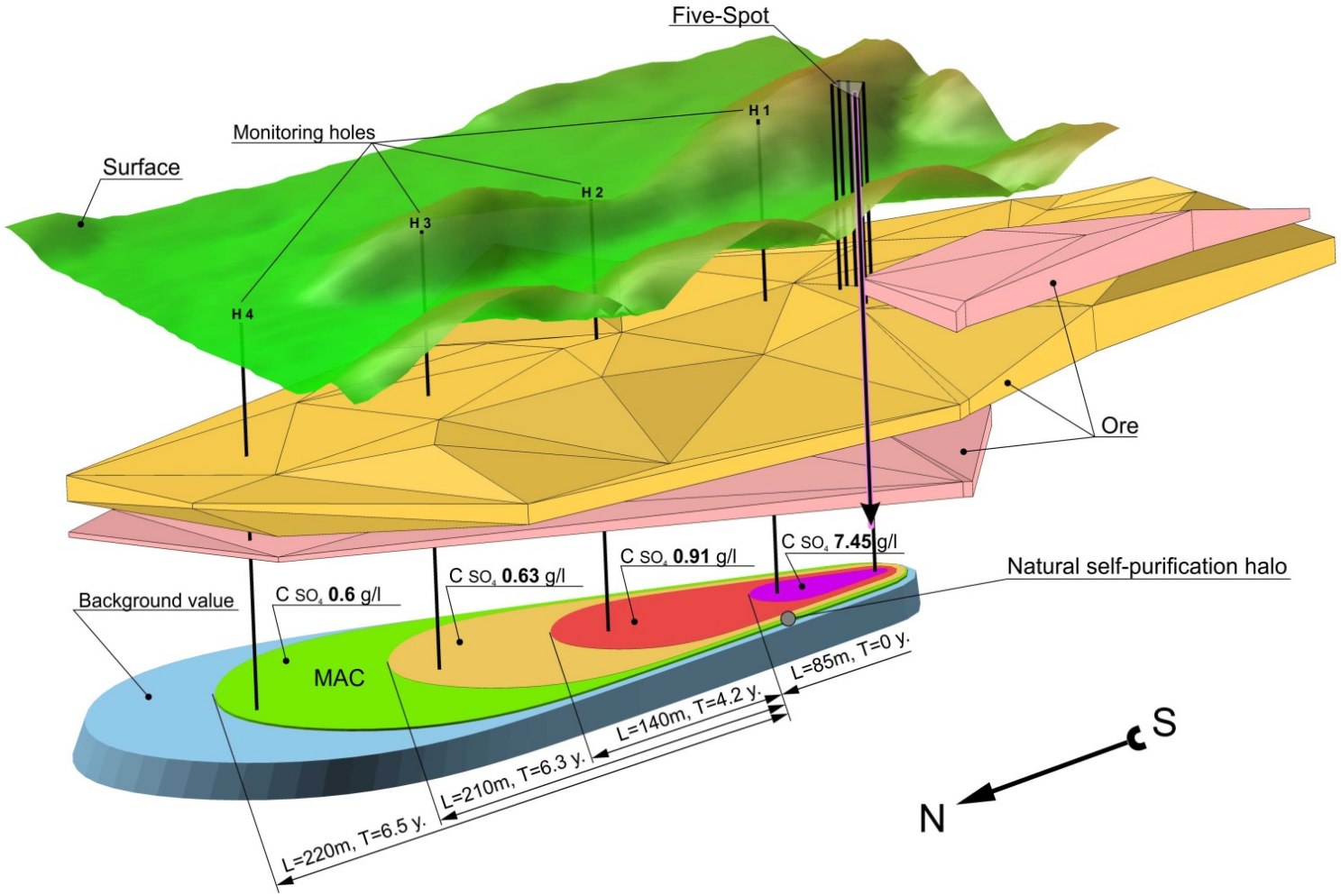
- R&D phase
- Water confinement (aquacludes)
- Water yield
- How to marry ISR with Open Pit mine
- Topography

SHEQ

- ISL never been used in Africa
- Water quality & use – pristine, animals
- Selous Game Reserve
- Environmental management

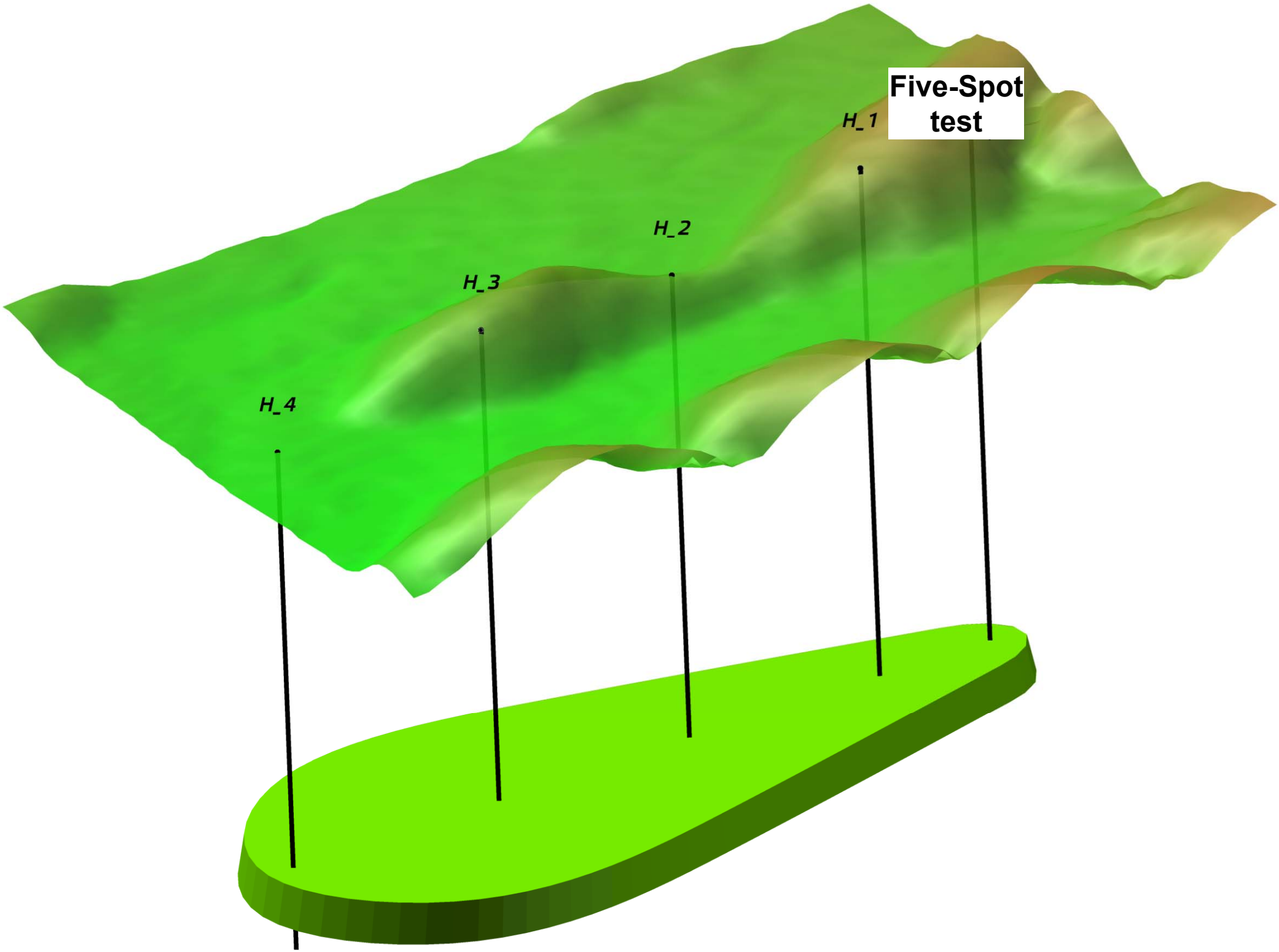


The model of Aquifer Natural Attenuation after five spot ISL test



Basic environmental requirements:

- **Keeping balance between injection and recovery volumes**
- **Using monitor wells**
- **Aquifer restoration through:**
  - **Natural attenuation**
  - **Forced demineralisation**
  - **Residual solution in situ neutralisation**


Five-Spot
test
H_1
H_2
H_3
H_4

Conclusion

- ✓ **The Nyota deposit is a world class deposit, which holds over 50Mlb which is potentially amenable to ISR.**
- ✓ **Significant resources upside potential.**
- ✓ **Initial ISL testing has yielded encouraging results, which should be followed up.**
- ✓ **The ISR project is currently at the R&D stage, and the next steps have been identified and planned.**
- ✓ **Technical, commercial and SHEQ challenges remains that must be overcome.**
- ✓ **Uranium One will continue to investigate the ISR potential via a responsible, toll gated approach.**
- ✓ **Successful testing could unlock a new ISL production region.**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ISL