

# COPPER IOCG CASE STUDY

AI-driven modelling identified and validated 7.7 kt of in-situ mineralization in areas previously classified as waste through short-program drilling.



STRATUM AI

# CASE OVERVIEW

## CONTEXT & CHALLENGE

- High grade underground copper deposit of Manto and Breccia mineralization.
- Has over ~120,000m drillhole assays, ~180,000m un-assayed drillholes, ~80,000m RC drillholes for grade control
- High cutoff of 0.5% reflects the selective nature of the operation.

## AI APPROACH

Deep learning model trained on historical drilling data, including ~180,000 m of previously un-assayed drillholes excluded from resource models and assigned arbitrary values. Instead of assuming 0% Cu, the model leverages full data context to recover low-grade and hidden mineralization signals.

## VALUE DELIVERED

Identified 3 new mineralized zones (~7.7 kt Cu, Measured), with 12/12 holes above cutoff, enabling ~2,000 m expansion and ~\$64M in-situ value, while reducing drilling costs by ~25% through optimized targeting and pad placement.

## DEPOSIT UNDERGROUND

Large iron oxide copper gold in northern Chile.



**+\$64M\***

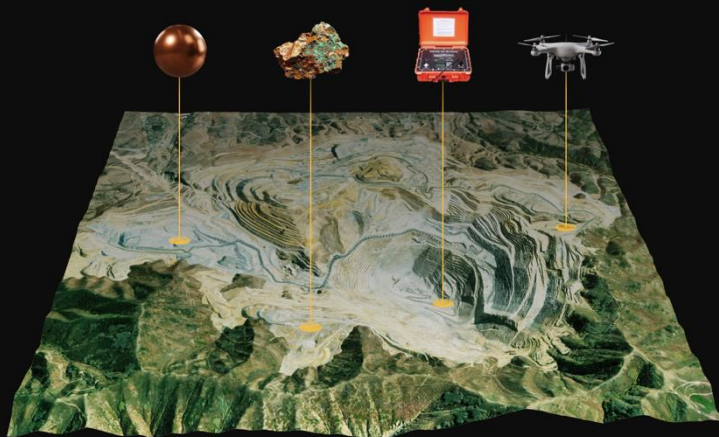
**IRON OXIDE  
COPPER GOLD  
(IOCG)**

\*AI-driven modelling enabled the discovery of 7.7kT (\$64M) of new mineralization, verified (measured) with 2 km of drilling

# APPLIED METHODOLOGY

## 1 INPUT Existing data

Historical, multichannel, and other unstructured data



*We leverage all available data —such as metallurgy, geochemistry, geophysics, and sensor data— together with the full historical dataset of the mine*

## 2 PROCESSING Saige Deep Learning

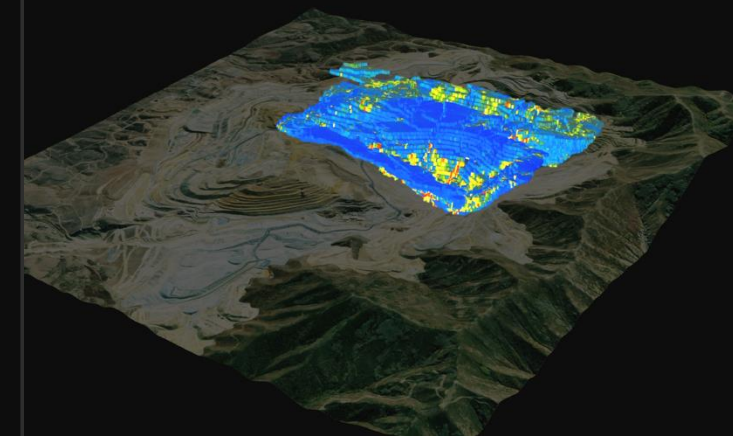
AI-driven analysis and integration of complex patterns



*Our AI model learns geological patterns from historical data, using a neural network trained on high-density datasets to model multivariate relationships in lower-density environments.*

## 3 OUTPUT AI predictive model

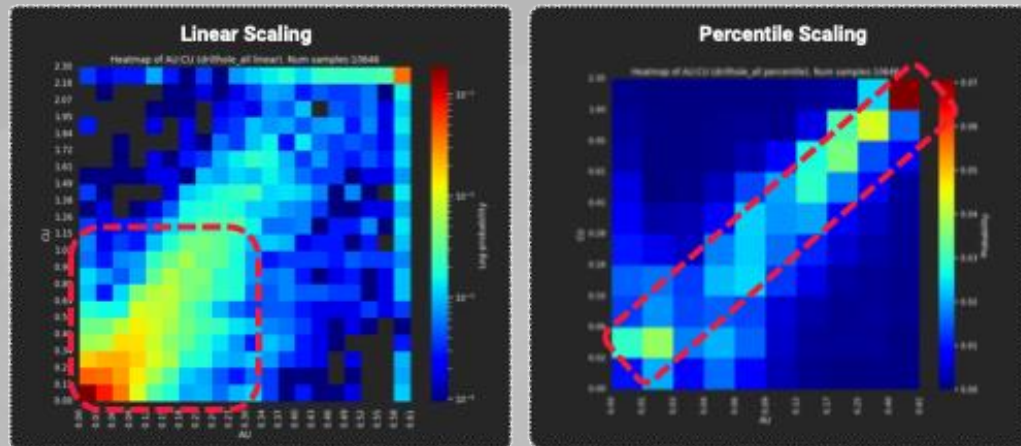
More accurate and comprehensive identification of mineral deposits



*Identifies previously unrecognized mineralized areas, improves definition in zones with low data density, and enables continuously updated resource models that guide companies toward the most profitable locations for mineral extraction.*

# DATA ANALYSIS & TRANSFORMATION

## DATA ANALYSIS



There is a primarily linear trend between Gold (Au) and Copper (Cu), suggesting Gold may not provide additional information for Copper prediction.

## DATA TRANSFORMATION



- ❑ ~180,000 m of unassayed diamond drilling, previously excluded from resource estimates, were incorporated into the model
- ❑ Unassayed intervals historically assigned arbitrary values (e.g., -99.99) were reinterpreted within a structured modeling framework
- ❑ The model accounts for the fact that visually sterile core does not imply **0% Cu**, as low-grade mineralization (e.g., 0.03–0.26% Cu) may be present
- ❑ During training, unassayed intervals are treated as 0% Cu while preserving a **dedicated indicator channel**, allowing the model to distinguish between true assayed zeros and unassayed core

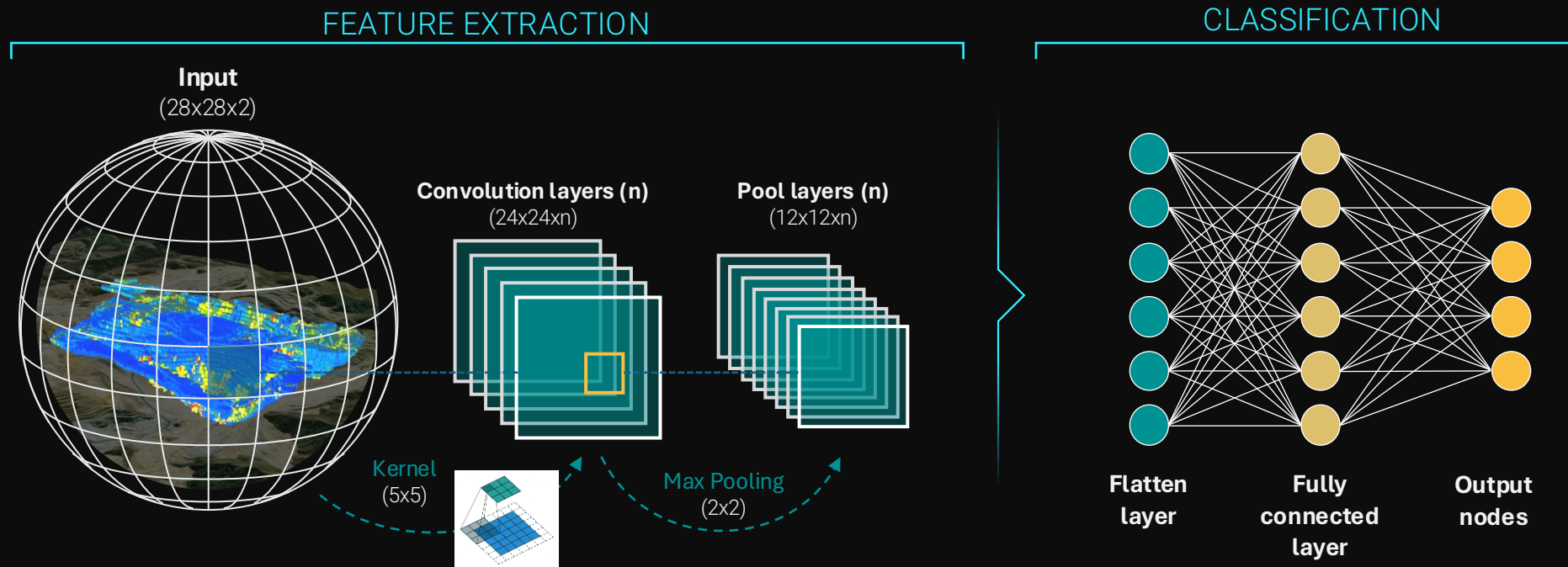
# CORE ARCHITECTURE

## SAIGE

Stratum AI  
Geospatial Estimator

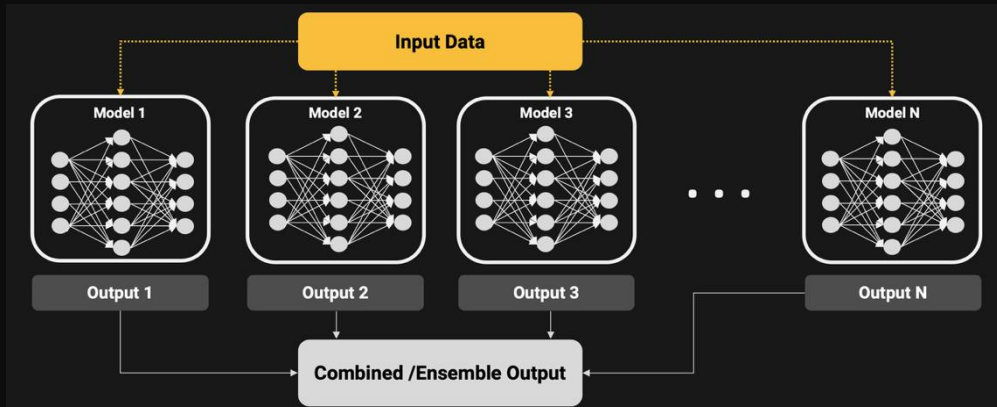
## CONVOLUTIONAL NEURAL NETWORK

Deep learning algorithm that successfully captures spatial dependencies in an image through the application of relevant filters. Stratum AI model is based on this architecture, adapting it to the unique challenges of mining data.



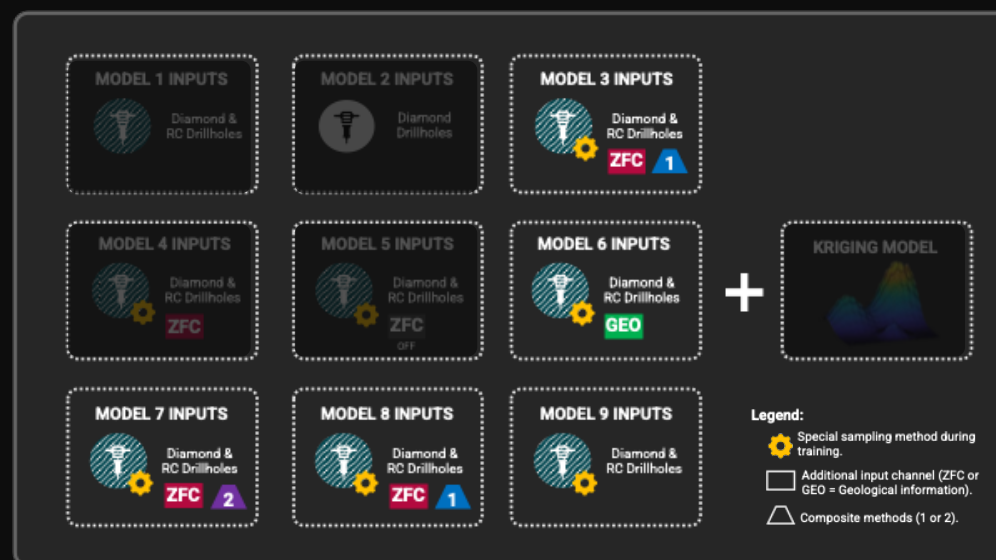
# COMBINATION OF MODELS

## ENSEMBLE NETWORKS



Combining the outputs of multiple AI models generally creates more accurate models. We create separate models from different data inputs and then combine them through an Ensemble Network. In this analysis, the Kriging model output can be included as well.

## Model used for target identification: ENSEMBLE NETWORKS – AI ONLY



We choose the best-performing AI models and combine them into an Ensemble

# SAIGE MODEL RESULTS

"UNIQUE MINERALIZATION" refers to areas where AI predicted copper above the cutoff threshold while traditional methods did not

AI model identify places of unique mineralization that are at least 10 meters away from known mineralization

TARGET OBJECTIVE  
(INITIAL PLAN)

**0.24**  
kT Cu

**2**  
US\$M

DRILL PROGRAM

**2.0**  
km

**12**  
holes

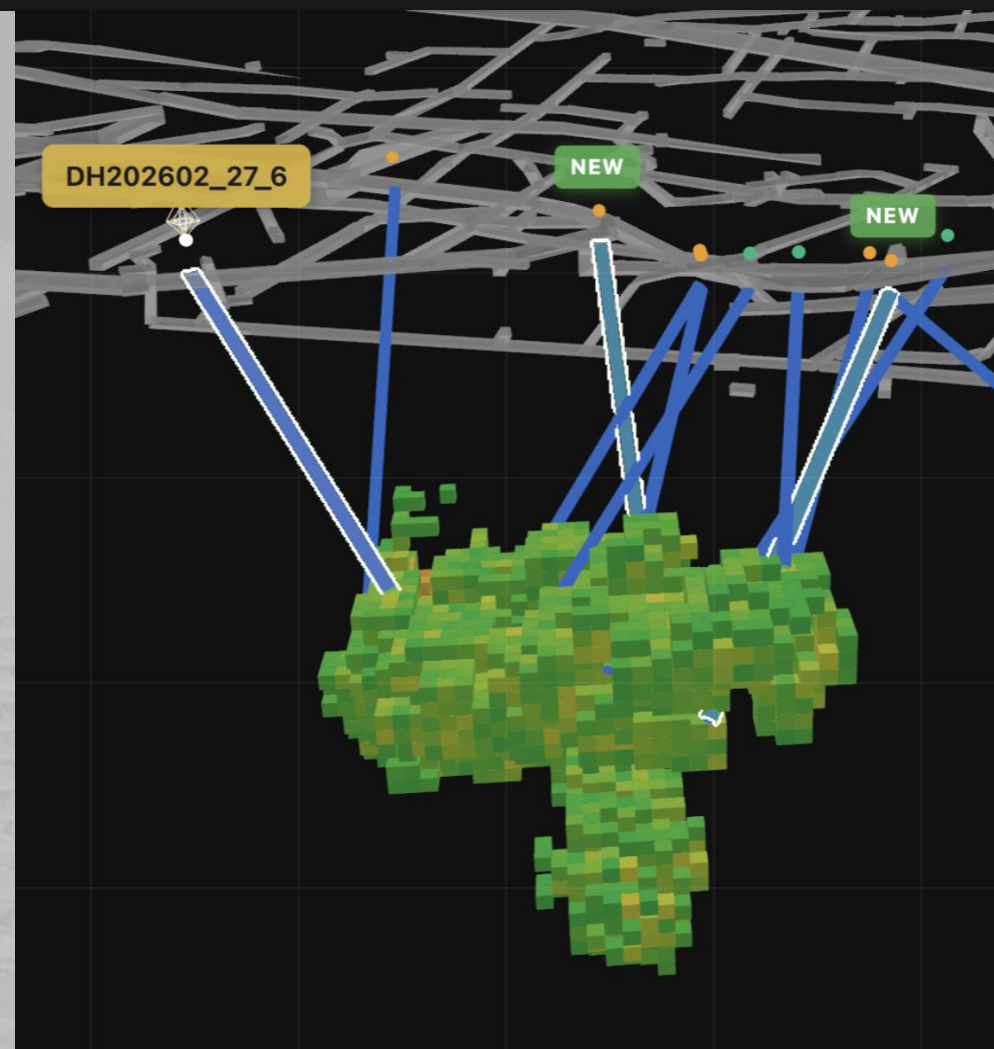
AI MODEL  
Unique mineralization areas



# DRILLHOLE EVALUATION CRITERIA

AI-guided drilling performance is evaluated based on three key criteria:

- 1. DRILLHOLE HIT RATE:** A drillhole is considered a “hit” when it intersects mineralization above the economic cutoff (0.5% Cu). This metric reflects targeting accuracy and consistency, with baseline performance averaging ~78% over the past two years.
- 2. PERCENT ECONOMIC MINERALIZATION:** Measures the proportion of drilled core above the **cutoff grade (0.5% Cu)** per 100 meters drilled, indicating how effectively drilling captures economically relevant material. Baseline drilling delivers 6.8 m per 100 m above cutoff.
- 3. RESOURCE VERIFIED:** Overall success is measured through verified mineralization, defined as the total copper (kt Cu) confirmed with measured classification confidence as a result of the drilling program.



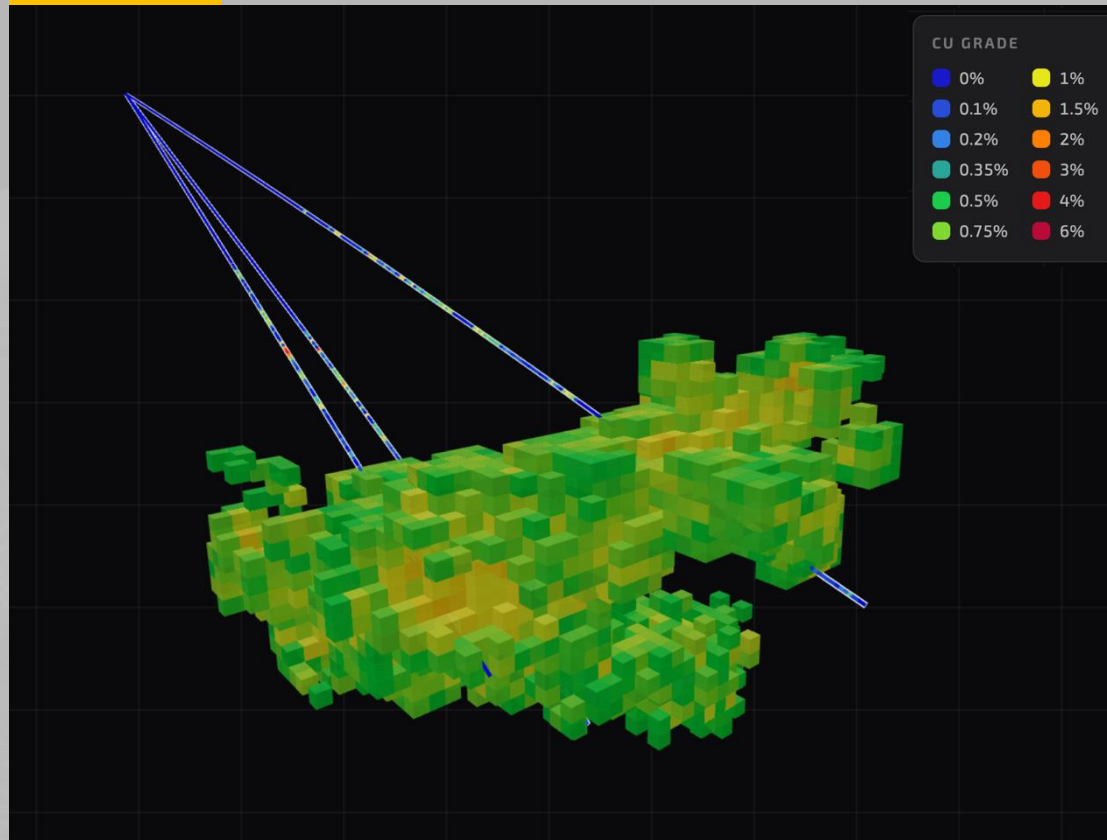
# SAIGE MODEL RESULTS

	AI MODEL	SITE'S BASELINE (2019-2020)
<b>DRILLHOLE HIT RATE</b>	12/12 intersections with mineralization; longest average HG (High Grade) intersection of 59 m	28/36 intersections with mineralization; longest average HG intersection of 36m
<b>PERCENTAGE OF ECONOMIC MINERALIZATION</b>	15.7m in a 100m core are above 0.5% Cu	6.8m in a 100m core are above 0.5% Cu
<b>PERCENTAGE OF HG MINERALIZATION</b>	4.6m in a 100m core are above 1.5% Cu	1.8m in a 100m core are above 1.5% Cu
<b>VERIFIED RESOURCES</b>	7.7kT Cu verified as Measured resources in 3 clusters	

- ❑ The geological logging record (visual estimation) is useful as a complementary channel to generate models with DL (Deep Learning), converting them into binary codes for unanalyzed samples.
- ❑ Results indicate that DL models with geological records as input are more accurate than models based only on geochemical data or Kriging.

# CLUSTER 6

## CLUSTER 6



## DRILL PLAN INFORMATION

Drillhole	Length in Target	DEPTH Where Target Begins	DEPTH Where Target Ends
<b>PrSLSW2-AI-1</b>	<b>59m</b>	<b>193m</b>	<b>252m</b>
<b>PrSLSW2-AI-2</b>	<b>83m</b>	<b>187m</b>	<b>270m</b>
<b>PrSLSW2-AI-3</b>	<b>64m</b>	<b>232m</b>	<b>296m</b>

### OVERVIEW

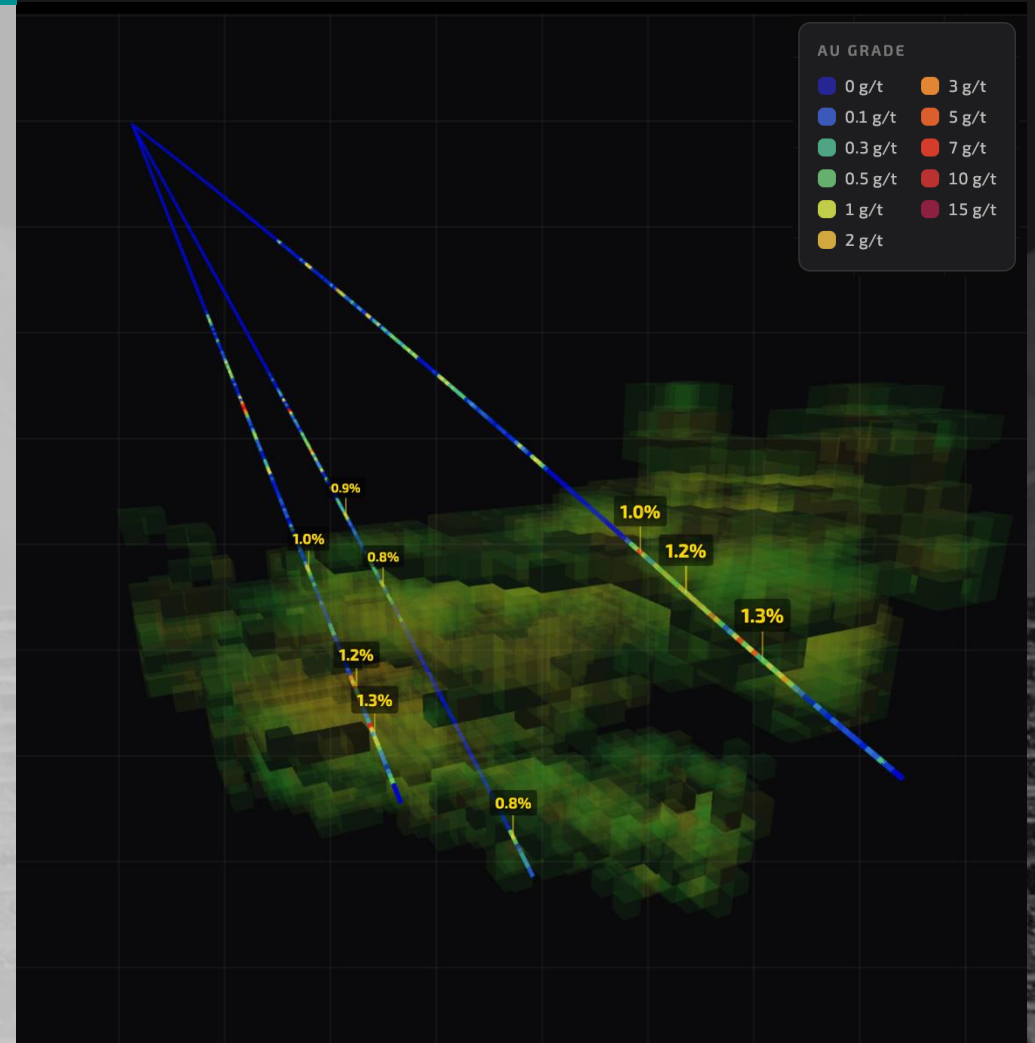
51.8% of target drilled to partially measured or measured spacing (1+ drillholes within 15 meters).

# CLUSTER 6

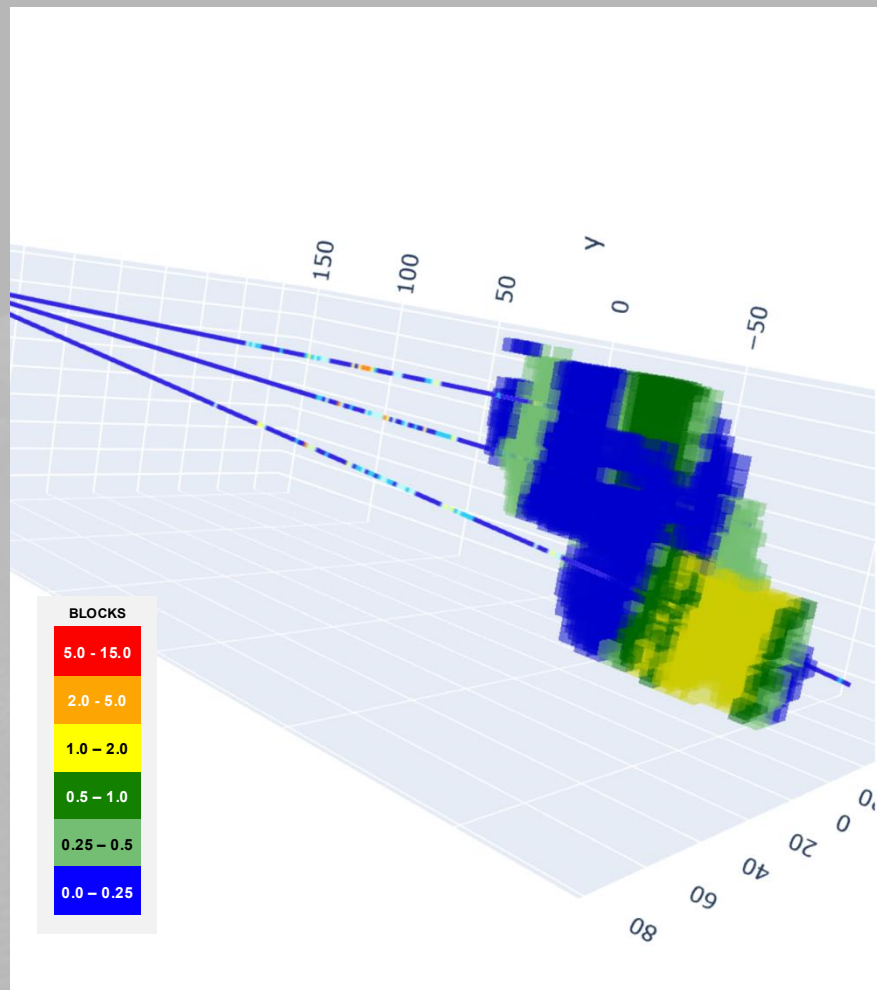
## CLUSTER 6

## KEY INTERCEPTS BY DRILLHOLE

Hole ID	From (m)	To (m)	Interval (m)	Avg Cu (%)	Remarks
PrSLSW2-AI-1	109	112	3	0.5	
PrSLSW2-AI-1	129	136	7	0.7	
PrSLSW2-AI-1	143	150	7	2.2	Including 2.0 m @ 3.76% Cu
PrSLSW2-AI-1	156	159	3	0.7	
PrSLSW2-AI-1	168	171	3	0.8	
PrSLSW2-AI-1	199	202	3	1	
PrSLSW2-AI-1	228	235	7	1.2	Including 2.0 m @ 2.41% Cu
PrSLSW2-AI-1	239	245	6	1.3	Including 1.0 m @ 3.92% Cu
PrSLSW2-AI-2	140	143	3	1.7	Including 1.0 m 4.04% Cu
PrSLSW2-AI-2	149	159	10	0.8	Including 2.0 m 1.76% Cu
PrSLSW2-AI-2	176	179	3	0.9	Including 1.0 m 1.54% Cu
PrSLSW2-AI-2	198	201	3	0.8	Including 1.0 m 1.47% Cu
PrSLSW2-AI-2	262	265	3	0.8	Including 1.0 m 1.05% Cu
PrSLSW2-AI-3	127	130	3	1.2	
PrSLSW2-AI-3	143	147	4	1.2	
PrSLSW2-AI-3	127	130	3	0.8	
PrSLSW2-AI-3	127	130	3	0.5	
PrSLSW2-AI-3	173	179	6	0.6	
PrSLSW2-AI-3	173	179	6	0.7	Including 2.0 m @ 1.12% Cu
PrSLSW2-AI-3	219	223	4	0.8	Including 1.0 m @ 1.08% Cu
PrSLSW2-AI-3	248	251	3	1	Including 1.0 m @ 3.62% Cu
PrSLSW2-AI-3	253	268	15	1.2	Including 9.0 m @ 1.54% Cu
PrSLSW2-AI-3	271	283	12	1.3	Including 9.0 m @ 1.54% Cu



# CLUSTER 6



## IN-SITU VALUE ESTIMATION VALIDATED AS MEASURED RESOURCE

An inverse distance estimation was applied to the AI volume for a simple unbiased estimation after drilling, assuming 0.0% Cu in the the unassayed core.

### STATISTICS OF THE MATERIAL RECENTLY CLASSIFIED AS MEASURED (1+ new DDH within 15 m.)

**Kriging estimate before drilling:** **0.00kT**

**Percentage of HG Volume (>0.5%):** **33.2%**

**Average HG Grade:** **0.94%**

**Total HG kT (>0.5%)** **1.32kT**

**Approximate Value \$\$:** **\$10.8M**

51.8% of total volume is partially measured or measured

# CLUSTER 16

## CLUSTER 6



## DRILL PLAN INFORMATION

Drillhole	Length in Target	DEPTH Where Target Begins	DEPTH Where Target Ends
<b>AcPrKS1-1</b>	<b>51m</b>	<b>85m</b>	<b>136m</b>
<b>AcPrKS1-4</b>	<b>72m</b>	<b>109m</b>	<b>181m</b>
<b>AcPrKS1-5</b>	<b>67m</b>	<b>103m</b>	<b>170m</b>
<b>AcPrKS1-6</b>	<b>45m</b>	<b>118m</b>	<b>163m</b>

### OVERVIEW

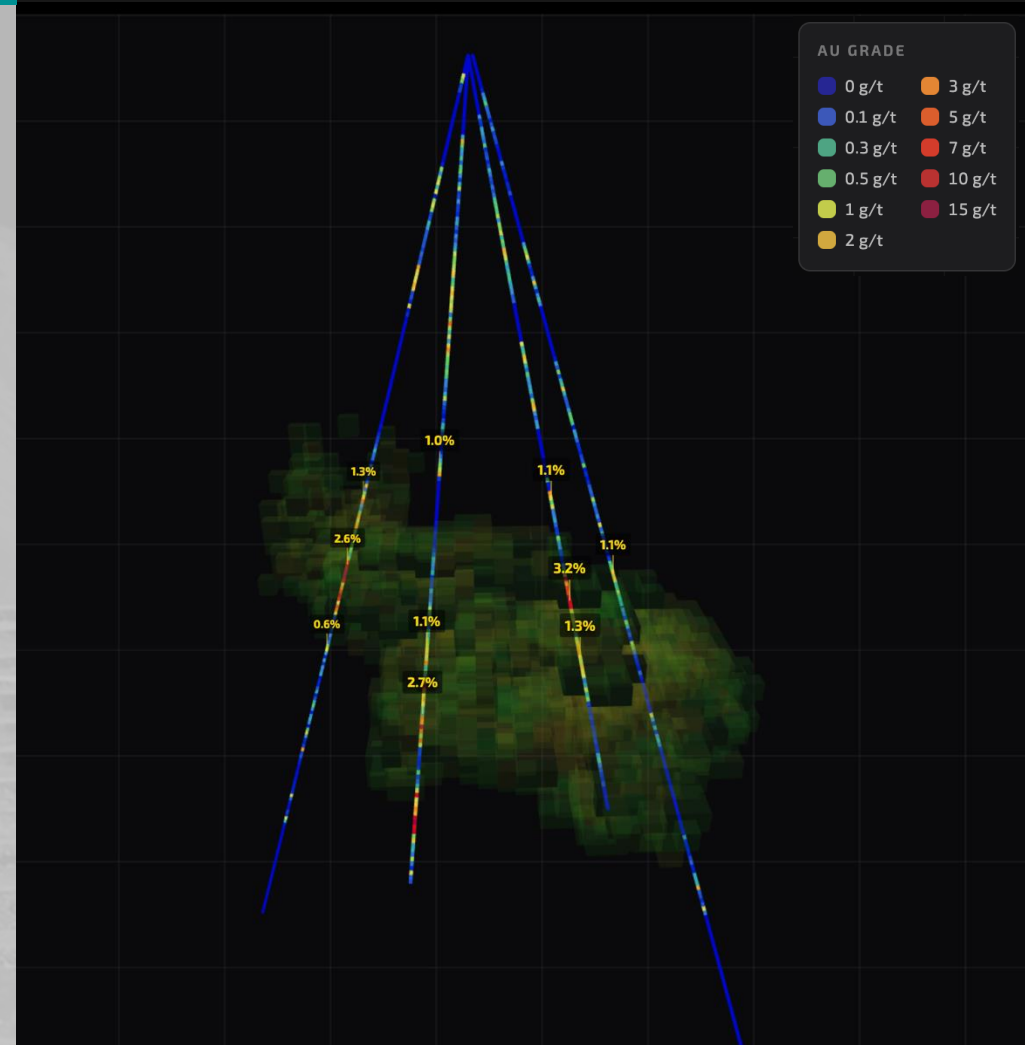
80.4% of target drilled to partially measured or measured spacing (1+ drillholes within 15 meters).

# CLUSTER 16

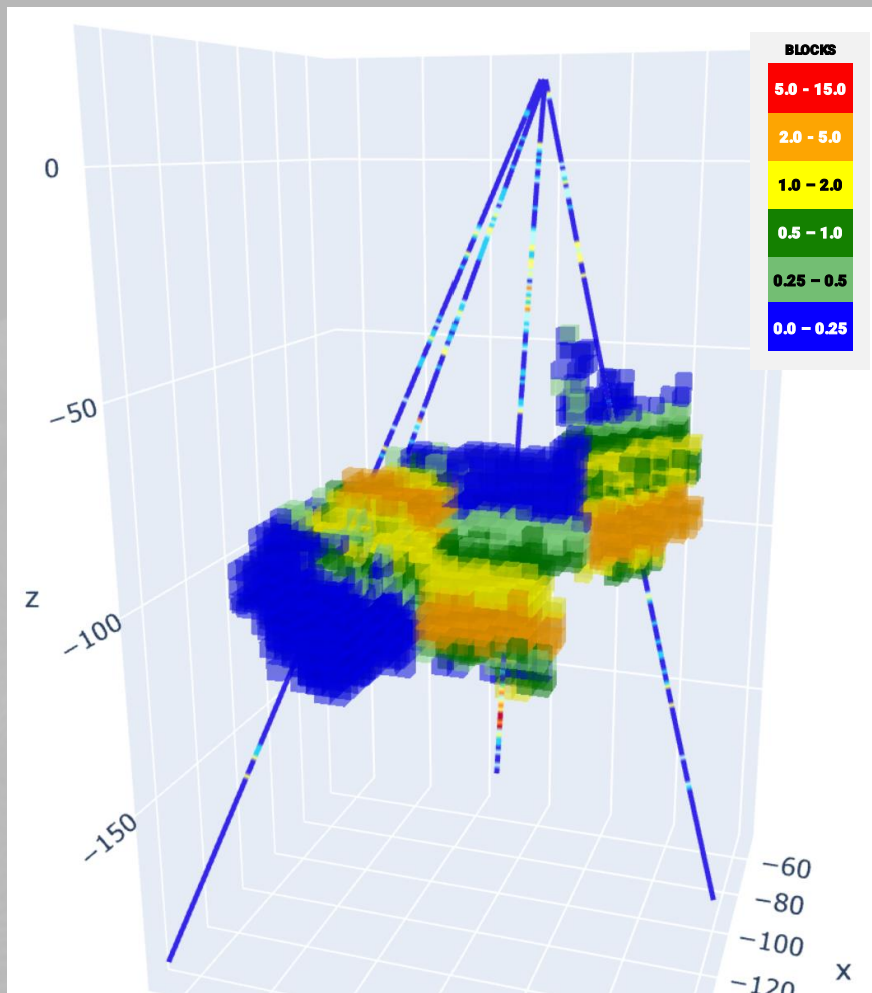
## CLUSTER 16

## KEY INTERCEPTS BY DRILLHOLE

Hole ID	From (m)	To (m)	Interval (m)	Avg Cu (%)	Remarks
AcPrKS1-1	4	7	3	0.6	Including 1.0 m @ 1.04% Cu
AcPrKS1-1	24	34	10	0.6	Including 1.0 m @ 1.03% Cu
AcPrKS1-1	46	52	6	1.4	
AcPrKS1-1	101	104	3	1.3	
AcPrKS1-1	106	134	28	2.6	Including 3.0 m @ 7.39% Cu
AcPrKS1-1	142	145	3	0.6	Including 1.0 m @ 1.01% Cu
AcPrKS1-4	19	21	2	0.9	
AcPrKS1-4	46	52	6	0.9	Including 2.0 m @ 1.22% Cu
AcPrKS1-4	54	74	20	0.9	Including 8.0 m @ 1.58% Cu
AcPrKS1-4	94	97	3	1	Including 1.0 m @ 1.81% Cu
AcPrKS1-4	133	139	6	1.1	Including 1.0 m @ 2.32% Cu
AcPrKS1-4	142	157	15	2.7	Including 1.0 m 5.04% Cu & 1.0 m @ 15.51% Cu
AcPrKS1-4	166	178	12	3.2	Including 4.0 m @ 6.20% Cu
AcPrKS1-5	39	50	11	0.8	Including 3.0 m @ 1.47% Cu
AcPrKS1-5	71	74	3	1	Including 1.0 m 1.61% Cu
AcPrKS1-5	82	85	3	1.3	
AcPrKS1-5	103	107	4	1.1	Including 1.0 m @ 2.14% Cu
AcPrKS1-5	121	133	12	3.2	Including 2.0 m @ 7.47% Cu
AcPrKS1-5	135	144	9	1.3	Including 1.0 m @ 2.16% Cu
AcPrKS1-5	146	149	3	0.6	
AcPrKS1-6	45	48	3	0.7	
AcPrKS1-6	120	124	4	1.1	



# CLUSTER 16



## IN-SITU VALUE ESTIMATION VALIDATED AS MEASURED RESOURCE

An inverse distance estimation was applied to the AI volume for a simple unbiased estimation after drilling, assuming 0.0% Cu in the the unassayed core.

### STATISTICS OF THE MATERIAL RECENTLY CLASSIFIED AS MEASURED (1+ new DDH within 15 m.)

**Kriging estimate before drilling:** **0.27kT**

**Percentage of HG Volume (>0.5%):** **50.2%**

**Average HG Grade:** **1.76%**

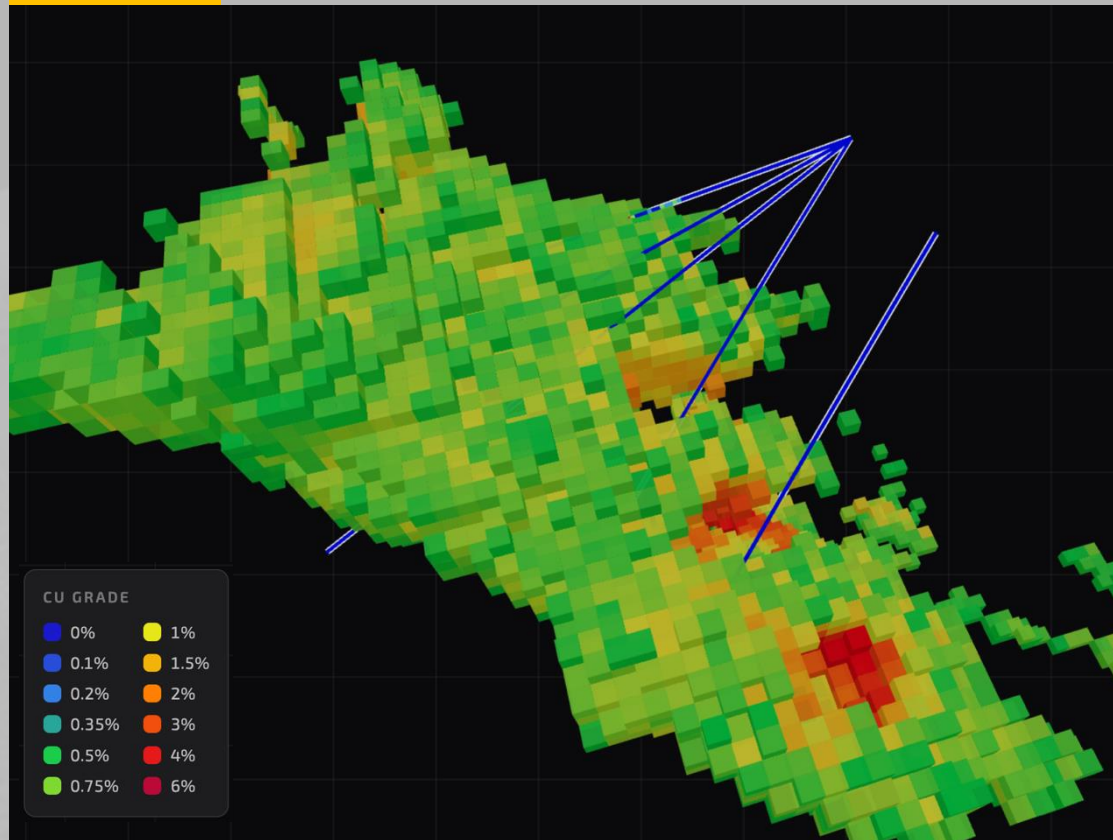
**Total HG kT (>0.5%)** **3.30kT**

**Approximate Value \$\$:** **\$26.9M**

80.4% of the total volume is in the Partially Measured or Measured category.

# CLUSTER 65

## CLUSTER 65



## DRILL PLAN INFORMATION

Drillhole	Length in Target	DEPTH Where Target Begins	DEPTH Where Target Ends
<b>AcPrBN8-1</b>	<b>88m</b>	<b>50m</b>	<b>138m</b>
<b>AcPrBN8-2</b>	<b>88m</b>	<b>53m</b>	<b>141m</b>
<b>AcPrBN8-3</b>	<b>85m</b>	<b>56m</b>	<b>141m</b>
<b>AcPrBN8-4</b>	<b>53m</b>	<b>68m</b>	<b>121m</b>
<b>AcPrBN8-6</b>	<b>28m</b>	<b>76m</b>	<b>104m</b>

### OVERVIEW

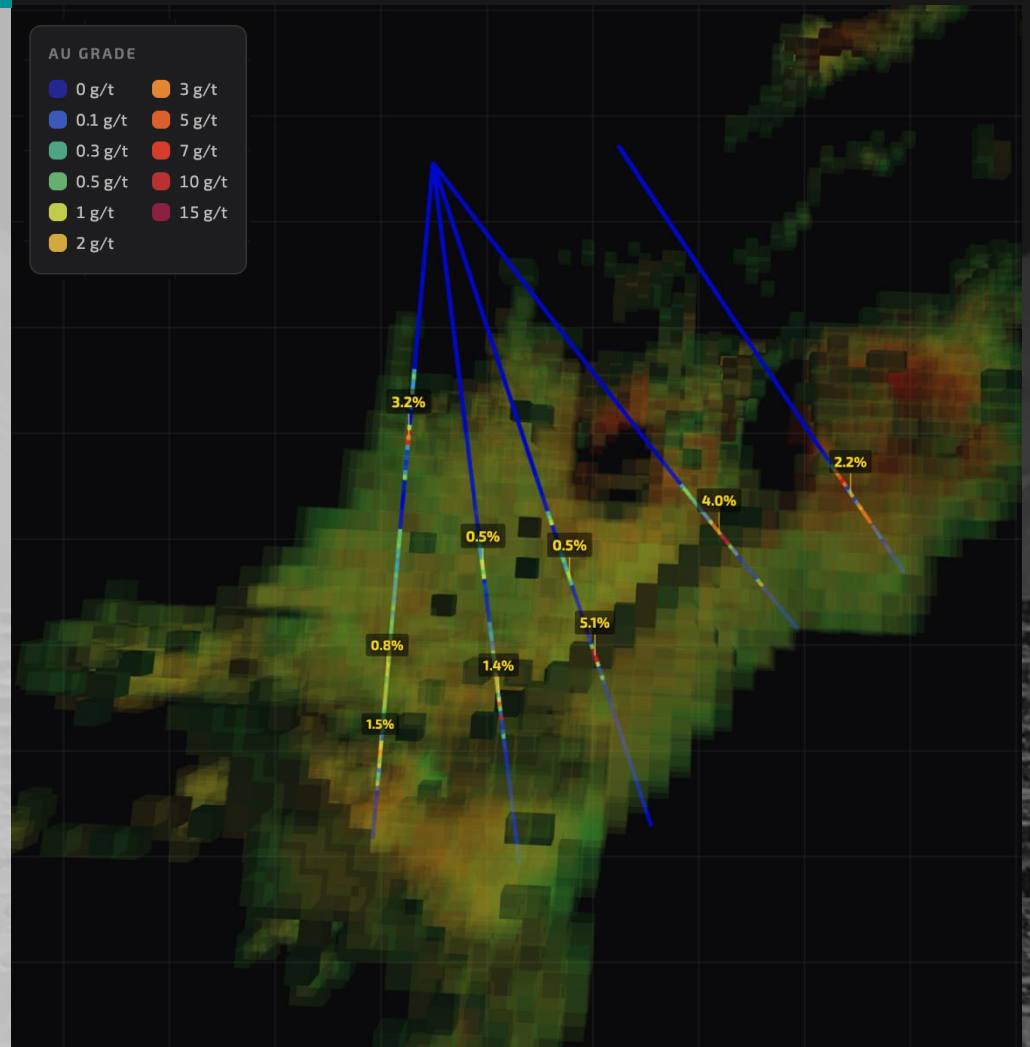
59.4% of target drilled to partially measured or measured spacing (1+ drillholes within 15 meters).

# CLUSTER 65

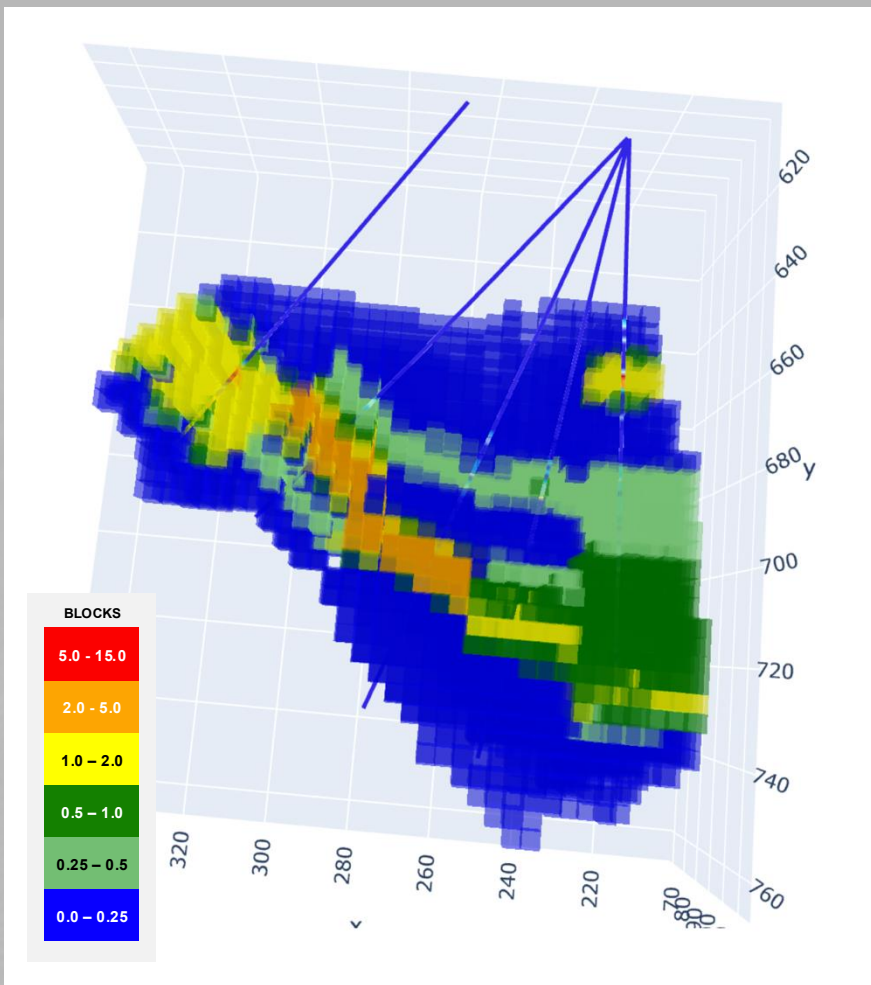
## CLUSTER 65

## KEY INTERCEPTS BY DRILLHOLE

Hole ID	From (m)	To (m)	Interval (m)	Avg Cu (%)	Remarks
AcPrBN8-1	50	54	4	3.2	Including 5.88% Cu @ 1.0 m
AcPrBN8-1	94	110	16	0.8	
AcPrBN8-1	116	122	6	1.5	
AcPrBN8-2	77	81	4	0.5	
AcPrBN8-2	101	111	10	1.4	Including 1.0 m @ 4.59% Cu
AcPrBN8-3	83	86	3	0.5	Included 1.0 m @ 0.3% Cu
AcPrBN8-3	99	104	5	5.1	Including 3.0 m @ 8% Cu
AcPrBN8-4	89	96	7	4	Including 1.0 m @ 8.59
AcPrBN8-6	77	93	16	2.2	Including 1.0 m @ 5.91% Cu



# CLUSTER 65



## IN-SITU VALUE ESTIMATION VALIDATED AS MEASURED RESOURCE

An inverse distance estimation was applied to the AI volume for a simple unbiased estimation after drilling, assuming 0.0% Cu in the the unassayed core.

### STATISTICS OF THE MATERIAL RECENTLY CLASSIFIED AS MEASURED (1+ new DDH within 15 m.)

**Kriging estimate before drilling:** **0.11kT**

**Percentage of HG Volume (>0.5%):** **36.2%**

**Average HG Grade:** **1.33%**

**Total HG kT (>0.5%)** **3.18kT**

**Approximate Value \$\$:** **\$26.0M**

80.4% of the total volume is in the Partially Measured or Measured category.

# SAIGE MODEL RESULTS

AI identifies unique mineralization sites located at least 10 meters away from known mineralization.

"UNIQUE MINERALIZATION" refers to areas where AI predicted copper above the cutoff threshold while traditional methods did not

TARGET OBJECTIVE (INITIAL PLAN)	<b>0.24</b> kT Cu	<b>2</b> US\$M
---------------------------------	-------------------	----------------

DRILL PROGRAM	<b>2.2</b> km	<b>12</b> Drillholes
---------------	---------------	----------------------

RESULTS OF THE AI DRILL PROGRAM	<b>7.7</b> kT Cu	<b>64</b> US\$M
---------------------------------	------------------	-----------------

NEW POTENTIAL MINERALIZATION IN THE ENTIRE DEPOSIT	<b>26</b> kT Cu	<b>212</b> US\$M
--	-----------------	------------------

## COPPER GRADE



**CLUSTER 65**  
**27** M USD



**CLUSTER 6**  
**11** M USD



**CLUSTER 16**  
**26** M USD

# COPPER IOCG CASE STUDY

AI-driven modelling identified and validated 7.7 kt of in-situ mineralization in areas previously classified as waste through short-program drilling.



STRATUM AI