

# Technical Presentation

August 2021

*Developing Polymetallic Mines on the Korean peninsula*





# Summary

1



# Management Team



## Exploring in Korea as a Team for 25 years since 1995



**Christopher Sennitt** *MSc Economic Geology, BSc Applied Geology, FAIG, SEG*

- **38 years experience in Multi-Commodity Mineral Exploration & Mining throughout Asia & Australia**
- **Senior Corporate Management Roles:** *Indochina Goldfields, Oriental Minerals, Silk Road Resources, Metallica Minerals*
- **Specialist Project Generator & Vendor:**
  - *Lamboo Resources, Stonehenge Metals, International Gold/Southern Gold*
  - *Wandoo Gold, Mantle Mining, Calcifer Industrial Minerals*
- **Track Record of Definition of Major Mineral Resources in Korea:**
  - *Geumam graphite 5.5Mt @ 5.4% Cg; Sangdong W-Mo 61Mt @ 0.46% WO<sub>3</sub>; Chubu U-V 46.8Mt @ 0.034% U<sub>3</sub>O<sub>8</sub> & 0.3% V<sub>2</sub>O<sub>5</sub>*
- **Track Record of Mineral Discoveries:**
  - Queensland: Mt Dromedary graphite 9.1Mt @ 12.5% Cg, Lighthouse 0.7Mt Hi-Purity Quartz* **China:** *Bulagou Au-Ag*
  - Indonesia: Seruyung 3.9Mt @ 2.8g/t Au (currently being mined), Lerokis 5.1Mt @ 4.2g/t Au, 125g/t Ag, 50% Ba (mined 1990-98)*



**Kim Wan Joong** *BSc Geology, KGS*

- **26 years experience in Mineral Exploration, Company Management & Deal Negotiation in Korea**
- **Country Manager, Representative Director & Geologist Roles:**
  - *Oriental Minerals, Stonehenge Metals, Lamboo Resources, Indochina Goldfields*
- **Comprehensive knowledge of Korean Mining Act, Govt Regulations & Processes (inc “Permit to Mine”)**
- **Track Record in Mineral Discoveries, Development & Mine Permitting in Korea:**
  - *Geumam graphite; Sangdong W-Mo-Bi (under development); Chubu U-V; Gasado Au-Ag & Eunsan-Moisan Au-Ag (mined)*



# Why South Korea ?



## Strategic Location – North Asia Region



- ❖ Proximity to Major Markets
- ❖ Global Leader in Technology & Innovation
- ❖ Modern Liberal Democracy
- ❖ Legal System - based on European Civil Law & US System
- ❖ OECD country & G12 Group member
- ❖ Developed, High-Income Country with Skilled workforce
- ❖ GDP per Capita – US\$32,000
- ❖ Free Trade Agreements – Australia, Canada & USA
- ❖ Low Sovereign Risk (*Veririsk Maplecroft, 2019*)
- ❖ Low Credit Risk – Ranked AA (*Standard & Poors, 2019*)
- ❖ Low Business Risk – Ranked 5<sup>th</sup> (*World Bank, 2018*)

### Taxation Regime:

- Corporate Tax Rate - Progressive from 10-22%
- No Royalties on Minerals
- VAT 10%
- Losses carried forward for up to 10 years
- Depreciation of Assets (based on Useful Life)

### Foreign Investment Promotion Act (“FIPA”)

- First 3-5 Years of Income is Tax Free
- Next 2 Years is 50% Exempt
- Tax Credits on Job Creation
- Guaranteed Repatriation of approved Capital



# Polymetallic Mine Strategy



*Mining Rights owned 100% via Korean subsidiary*

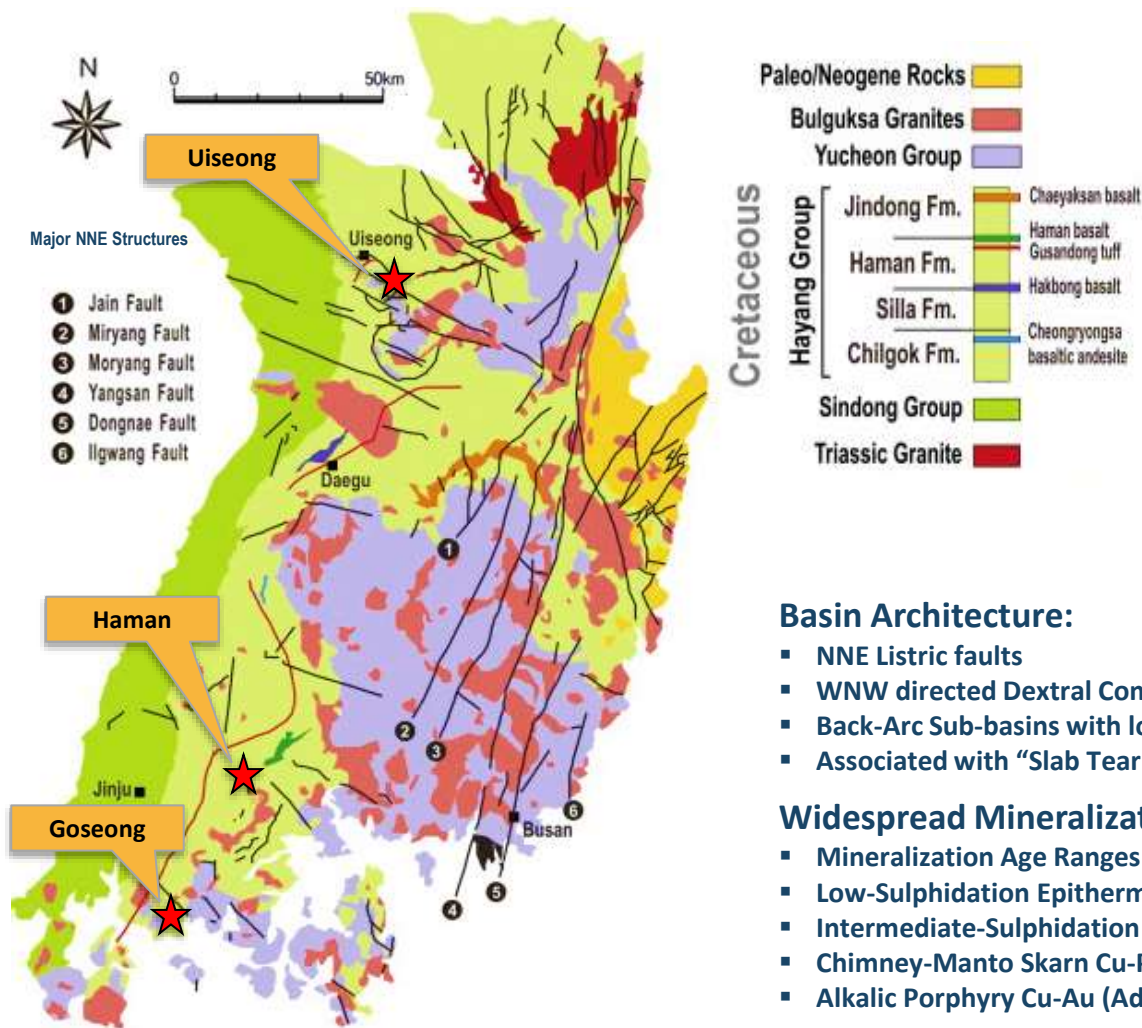


- ❖ **KME - Private Australian Company**
  - 100%-owned Korean subsidiary holds Mining Rights
- ❖ **Established Polymetallic Project Portfolio:**
  - Uiseong - Au-Cu-Zn-Pb-Ag ± Bi-In-W
  - Haman - Cu-Ag-Au ± Co-W
  - Goseong - Cu-Ag-Au ± Ge-Se-Bi
  - Jangheung - Cu-Ag-Pb-Zn
- ❖ **Historical Drilled Resources = ~4.5Moz AuEq**
  - “Drill-Ready” Resource Targets - Low Exploration Risk
  - High Grade Zones – Low Development Risk
  - Multiple Metals – Natural Risk Hedge
  - High Value Critical Metal By-products: Bi, In, W, Co
- ❖ **Base Metal Refineries – Onsan & Seokpo**
  - No Shipping Costs – major cost saving
  - Potential “Offtakers” of Concentrates
- ❖ **South Korea**
  - OECD & G12 Country – Low Sovereign Risk
  - Excellent Infrastructure
  - Proximity to North Asia Region Markets
  - Low Business Risk
  - Leader in Technology & Innovation
  - Embracing “Green Energy” Technologies & Economy



# Gyeongsang Basin - Overview

## KME holds “Regional Foothold” & Key Assets



### Back-Arc Volcano-Sedimentary Basin:

#### Cycle 1 – Sindong Group

- Basin fault fanglomerate, floodplain & channel sediments
- “Red beds” – humid climate

#### Cycle 2 – Hayang Group

- Alluvial plain and channel sediments
- Minor basalt and fanglomerates
- “Red beds”, calcretes, evaporite facies – arid climate

#### Cycle 3 – Yuchon Group

- Sub-basins formed & infilled with lacustrine sediments
- Volcanic Arc related to I-type igneous intrusions
- Early Andesite lavas and tuffs
- Late Rhyolite “surge” pyroclastics (diatremes & domes)

### Basin Architecture:

- NNE Listric faults
- WNW directed Dextral Compression then WNW Transfer faults (Sinistral Extension)
- Back-Arc Sub-basins with local Volcanic Centers
- Associated with “Slab Tear & Trench Retreat” Migration of Japan-Kamchatka from Eurasia

### Widespread Mineralization associated with Yuchon Group Volcanism:

- Mineralization Age Ranges 85 – 60 Ma
- Low-Sulphidation Epithermal Au-Ag (dome-related “Hishikari” style)
- Intermediate-Sulphidation Epithermal Au-Ag-Cu-Pb-Zn (dome-related)
- Chimney-Manto Skarn Cu-Pb-Zn-Ag (dome-related)
- Alkalic Porphyry Cu-Au (Adakite & Monzonite “pencil” porphyry)



# “Drill Ready” Resource Targets



*“Forgotten Resources” based on Historical Drilling of 1970-80s*  
**Low-Cost & Low-Risk Exploration ... KME just Re-Drills these Deposits**

Mine / Deposit	Tonnes (t)	Grade AuEq (g/t)	Grade Au (g/t)	Grade Ag (g/t)	Grade Cu (%)	Grade Pb (%)	Grade Zn (%)
Dongil	9,234,500	4.65	1.19	44	0.96	1.05	1.05
Ogsan	3,006,300	10.61	1.32	61	3.24	3.95	1.50
Kyungwha	4,802,215	3.53	0.25	42	0.66	1.69	0.98
Jeonheung	2,470,655	4.06	1.90	39	0.46	0.66	0.73
Kumdongchilbo	1,320,770	4.03	0.88	33	0.00	2.05	1.73
<b>TOTALS</b>	<b>20,834,440</b>	<b>5.13</b>	<b>1.06</b>	<b>44</b>	<b>1.10</b>	<b>1.63</b>	<b>1.12</b>

## Uiseong Project - Copper-Gold-Zinc-Silver-Lead

- Byproducts: Bismuth-Cadmium-Indium-Tungsten
- Historical Mining: Jeonheung, Ogsan, Goroseoksan mines
- **Historical Drilling: 1968-1983; 93 drill holes (14,500 metres)**
- **4 deposits within 6km of Dongil**

Mine / Deposit	Tonnes (t)	Grade AuEq (g/t)	Grade Au (g/t)	Grade Ag (g/t)	Grade Cu (%)
Gunbuk	2,996,675	7.73	1.89	59	3.27
Ogok	436,535	15.29	7.59	20	4.77
Gilgok	620,194	2.73	0.86	10	1.12
Bukgok	1,027,381	0.95	0.25	7	0.39
Dundok	243,787	N/A	N/A	N/A	N/A
M Vein	949,781	0.77	N/A	N/A	0.49
Manse	404,250	11.13	N/A	577	2.26
Ebisu-Haman	868,003	2.20	0.24	11	1.17
<b>TOTALS</b>	<b>7,546,556</b>	<b>5.27</b>	<b>1.32</b>	<b>58</b>	<b>2.04</b>

## Haman Project - Copper-Gold-Silver

- Byproducts: Cobalt, Tungsten & Magnetite
- Historical Mining: 1915-1945 Haman, Gunbuk, Chaedung; 1963-1975 Jaeilgunbuk
- **Historical Drilling: 1963-1980; 93 drill holes (20,076 metres)**
- **All deposits within 4km radius**

Mine / Deposit	Tonnes (t)	Grade AuEq (g/t)	Grade Au (g/t)	Grade Ag (g/t)	Grade Cu (%)
Jinheung	345,000	22.26	2.30	546	8.18
SamsanJaeil	110,000	4.98	-	77	2.54
Samsan	45,500	6.04	-	194	2.23
Sambong	38,075	6.34	0.94	186	1.89
<b>TOTALS</b>	<b>538,575</b>	<b>16.23</b>	<b>1.54</b>	<b>395</b>	<b>6.08</b>

## Goseong Project - Copper-Gold-Silver

- Historical Mining: 1919-1945 Goseong; 1970-1992 Samsanjaeil, Sambong, Jinheung
- Historical Resources: KMPC Resource Estimates (see Table)
- **Historical Drilling: 1968-1980; 58 drill holes (6,282 metres)**



# Investment Thesis



## *Developing Polymetallic Mines on the Korean peninsula*



- ❖ KME is a Private Company - with 100% owned Korean subsidiary
- ❖ Management Team - Worked together for 25 years in South Korea
- ❖ Project Pipeline - Held 100% under granted Mining Rights
- ❖ Low Risk - Resource Targets Identified & Drill Ready
- ❖ Low Cost & Safe Mining - *"Sustainable Mining by Drilling"*
- ❖ Low Cost & Eco-Friendly Processing - *"Continuous Vat Leach"*
- ❖ Proposed Staged Development Program



1. Raise US\$10M via equity issue in KME
2. Confirmation & Infill Drilling of Historical Resource Targets
3. Independent JORC Mineral Resource Estimates
4. Complete Metallurgical Studies
5. Complete Engineering Studies
6. Preliminary Economic Assessment Report
7. Environmental & Social Impact Assessment Study (12-months)
8. Definitive Feasibility Study - Dongil
9. Permit to Mine - Dongil
10. Negotiate Offtake Agreement with Local Refineries
11. Construction of Mine Financing



# Uiseong Project

Au-Cu-Zn-Ag-Pb  $\pm$  Bi-Sb-In-Cd-W

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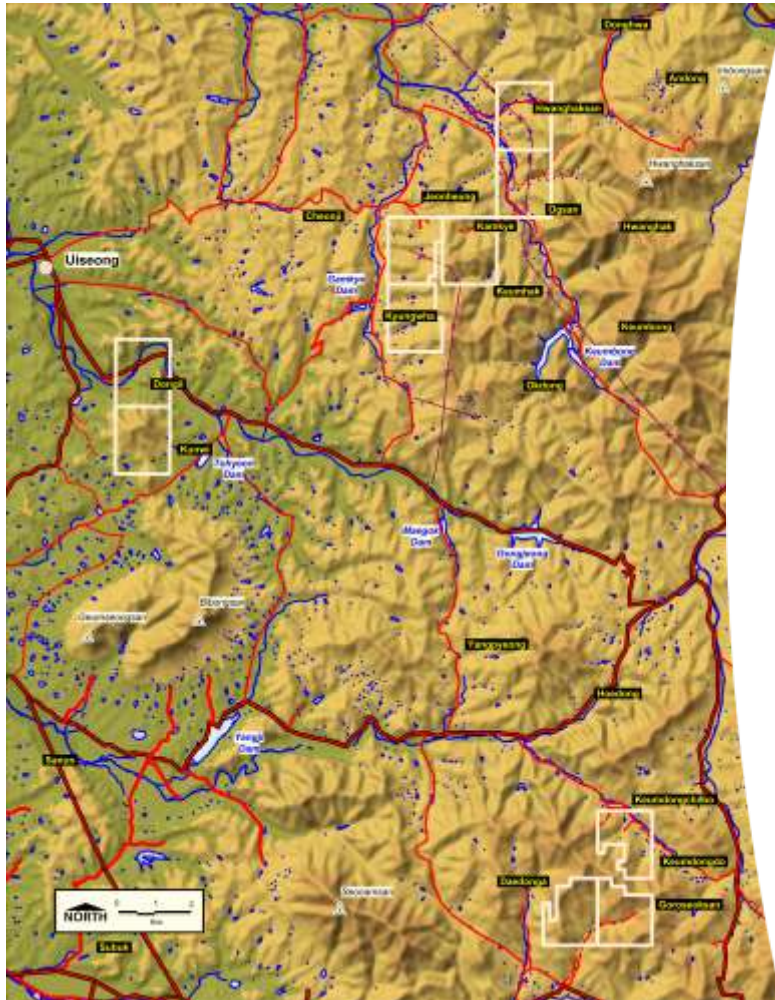




# Uiseong – Location & Infrastructure



## Location for Mining is Excellent



### Uiseong County:

- Rural setting; 19 % farmland, 81% vacant forest
- Local economy is mainly agriculture-based; garlic, fruit
- **Local population is ageing and declining**
- **Youth has moved to larger industrial cities for education & employment**
- Very good road network – excellent sealed road access
- Rail infrastructure (Jung-Angseon Railway Line)
- Numerous surface Water Storage Dams for agriculture/industry use
- Excellent “Baseload” Electrical Power Supply (Uljin Nuclear Power Station)
- Communications - excellent cell phone & internet
- **Local Government very supportive of new Developments for local economy**
- Base Metal Refineries - located only 60km from site
- **Significant opportunity for Mining Development**

### Uiseong Town:

- 4 hours drive from Seoul to Uiseong by Jung-Ang Expressway
- **Uiseong town population is 56,000 (2018), down from 200,000 (2000)**
- **Empty residences, shops, offices**
- Good hotel-motel style accommodation
- Hardware & engineering workshops for servicing agriculture sector

### Uiseong Tenure:

- 10 Granted Mining Rights covering 2,692ha held 100% by *Shin Han Mines Inc*



# Uiseong – Dongil

## Geology & Mineralization

Rhyodacite Dome; High-Sulphidation alteration



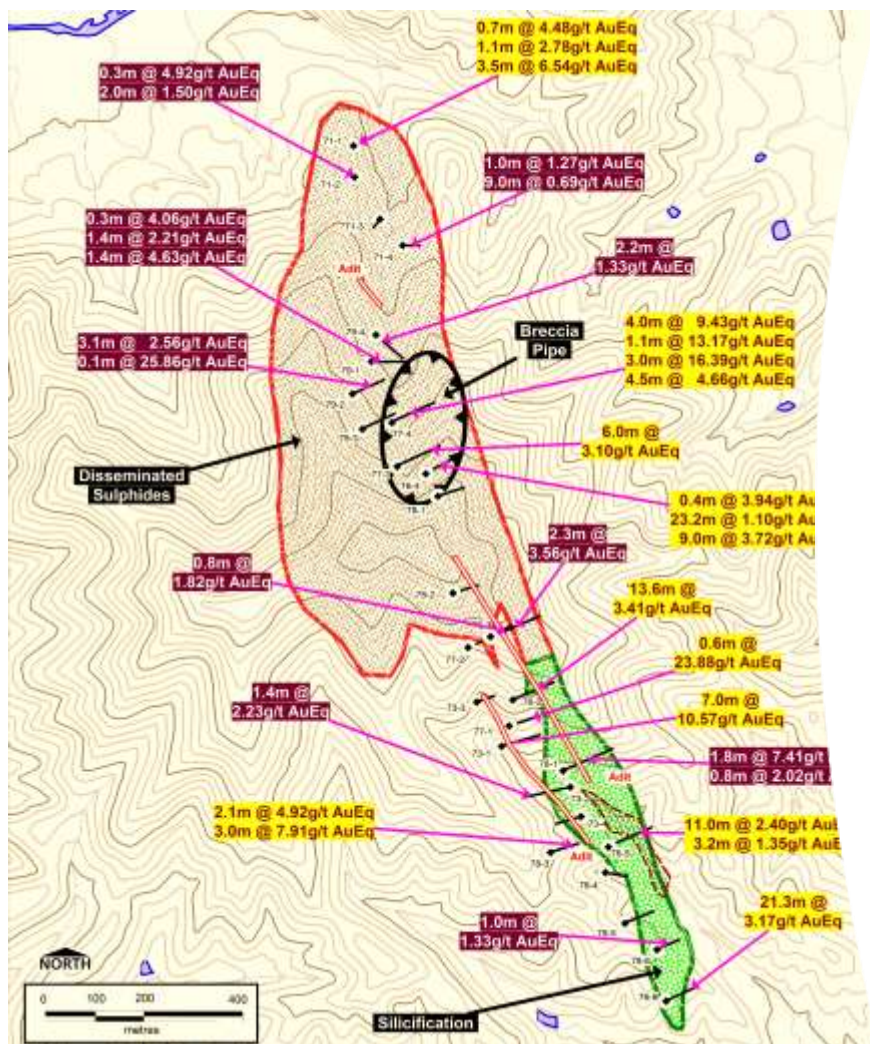
### Mineralization at Dongil:

- 1800m Strike Length x 200m Wide zone
- Breccia Pipe “Chimney”
- Sheeted Vein System: *East, Central & West Veins*
- Disseminated & Stockwork Fracture Sulphides

Copper in volcanoclastic, Central Vein



## Mineralized Intersections



### Geology:

- Volcaniclastics, siltstone, black shale (*Sagok Formation*)
- Rhyodacite dome & Pyroclastic tuff breccia (*Gusandong Tuff*)
- Purple mudstones (*Chunsan Formation*)

### Database:

- 3 Historical Adits, Limited Mining
- Historical Drilling (conducted during 1971-1979):
  - 28 Historical Drill Holes for 4,970 metres of thin AX/BQ core
  - Drill Hole Spacing - >100m
  - Drill Logs - recorded Veinlet Stockwork & Disseminated Sulphides
  - Mineralization intersected over 2000m strike length x 300m wide zone

### Sampling & Assaying Methodology by KMPC (1970s):

- Only obvious high-grade veins Assayed
- Only Pb & Zn were routinely Analyzed. Cu, Au, Ag - not regularly Analyzed
- Veinlet & Disseminated Sulphides – Not Assayed
- No downhole surveys, No SG data, No Core retained, No QA/QC Protocols

### Resource Estimate (Senlac, 2017):

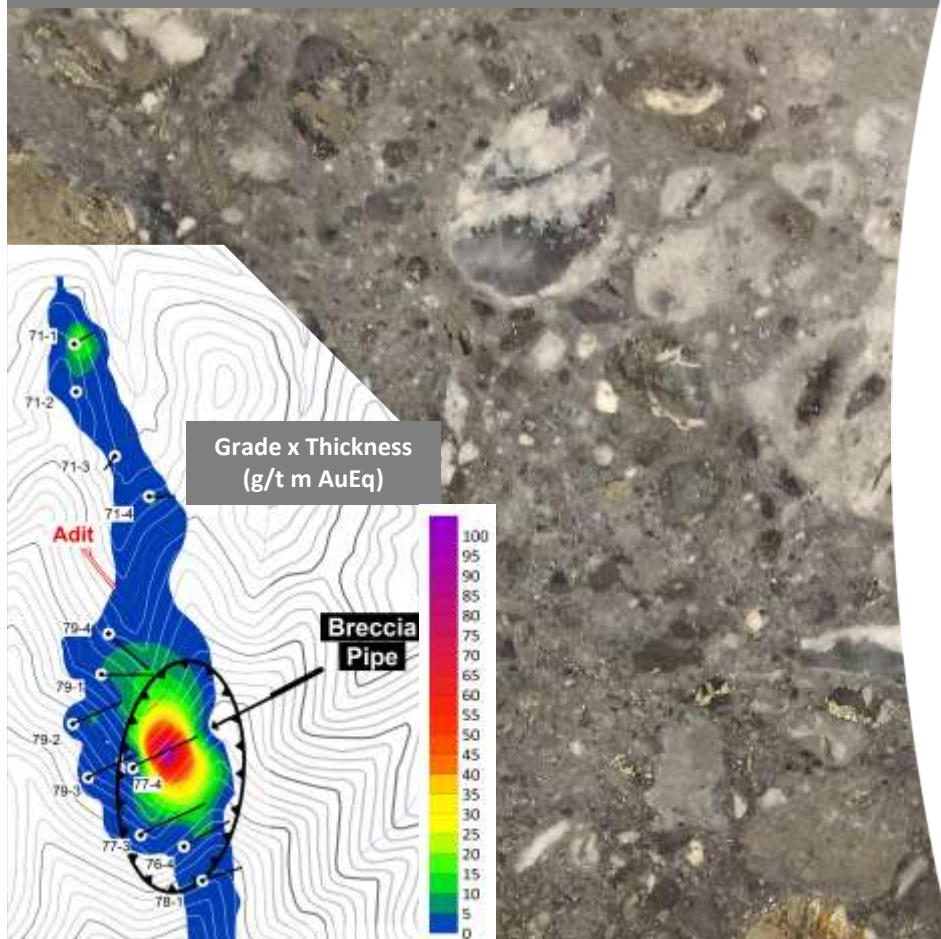
- Polygonal Method
- Confirmed by Geostatistical 3D Model (*GeoEconomics*, 2019)
- Geological Model NNW Striking, W-dipping Sheeted Vein System
- Historical data is not compliant with JORC/NI-43-101 Reporting Codes
- 9.23Mt @ 1.19g/t Au, 44g/t Ag, 0.96% Cu, 1.05% Pb, 1.05% Zn**



# Uiseong – Dongil North

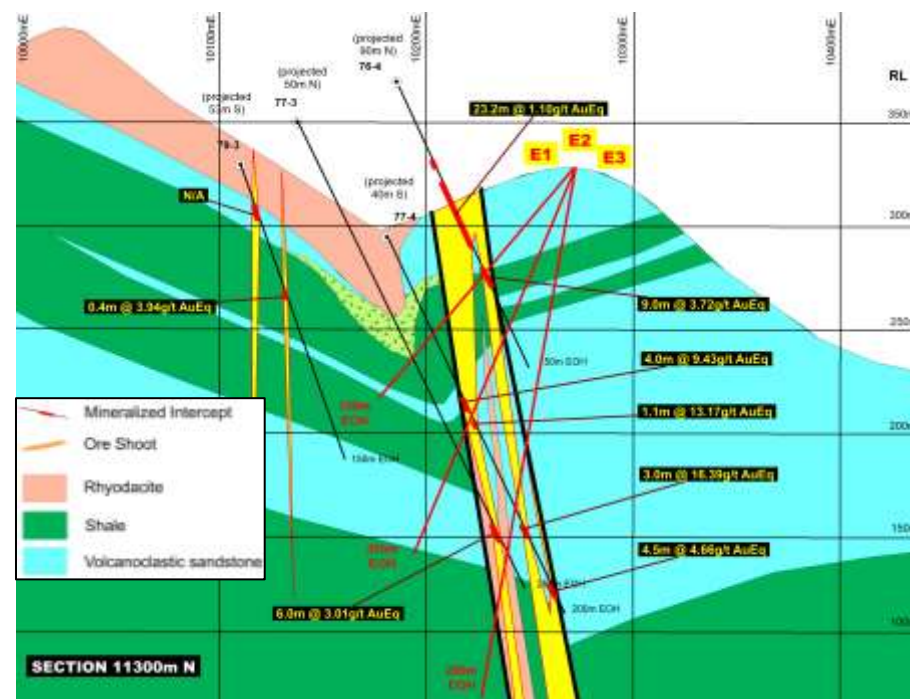
## Drill Section 11300m North

0.28g/t Au, 86g/t Ag, 0.94% Cu, 0.35% Pb, 0.83% Zn, 500ppm Sn



### “Chimney” Breccia Pipe:

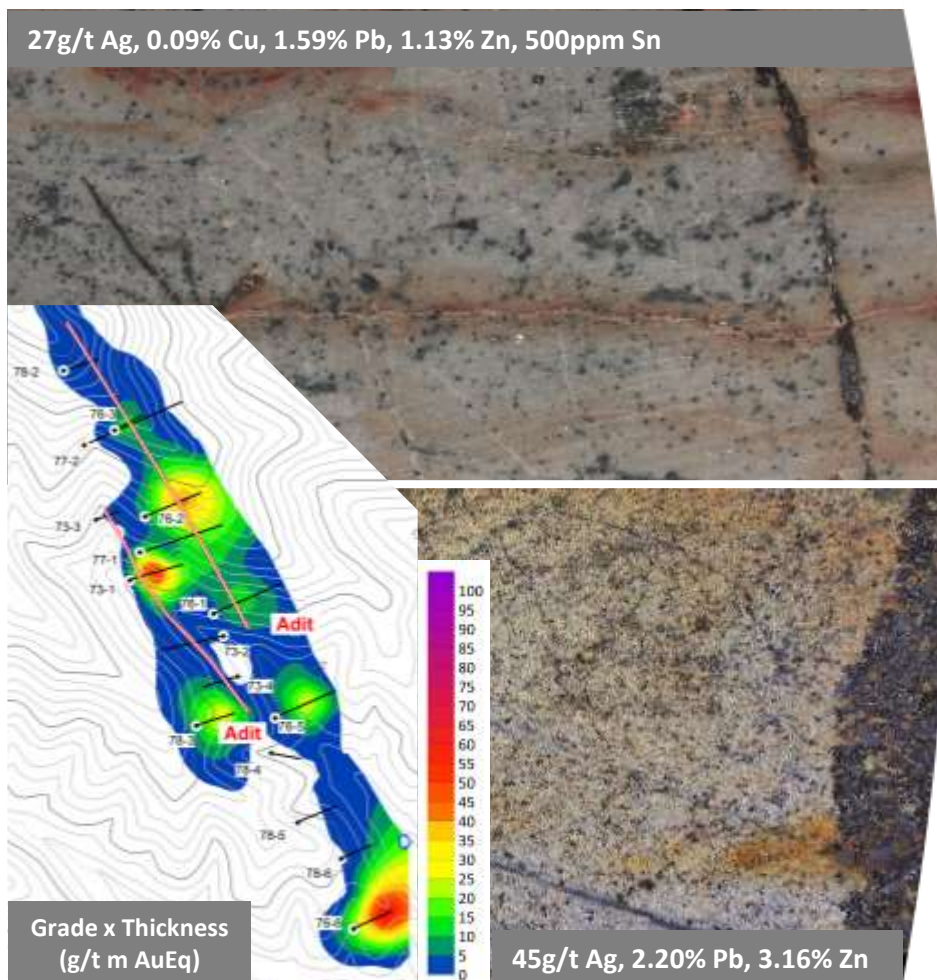
- Elliptical-shaped Pipe-like Body, probably Steeply Plunging to SW
- Good high-grade Cu-Au Drill Intercepts
- Mineralization from Surface & Extends below >250m Vertical Depth
- Veinlet & Disseminated Sulphide Halo – Not Assayed





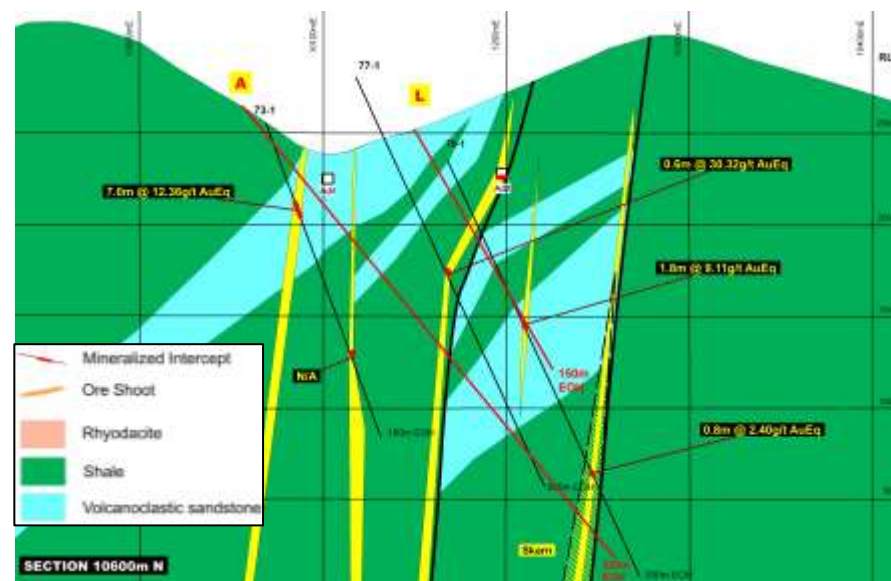
# Uiseong – Dongil South

## Drill Section 10600m North



### Stacked Sheeted Veins & Disseminated Sulphide Halos:

- Sheeted Veins (*East, Central & West*) & Stockwork System
- Veinlet & Disseminated Sulphides in Volcaniclastics – Not Assayed
- Veinlet & Disseminated Sulphides in Rhyodacite – Not Assayed
- Mineralization is “Open” up-dip to Surface
- Mineralization is Extends Down-dip >300m Depth





# Uiseong – Kyungwha

## Limited Historical Drill Testing



193g/t Ag, 0.81% Cu, 7.45% Pb



### Geology:

- Siltstone, Shale, Marl (*Sagok Formation*)
- Volcaniclastics (*Jeomgog Formation*)
- NNW striking, steep E dipping Vein system
- Veins Traced over 1200m Strike Length
- Vein Widths up to 10.5m
- Stacked En Echelon Sheeted Vein Array

### Historical Drilling:

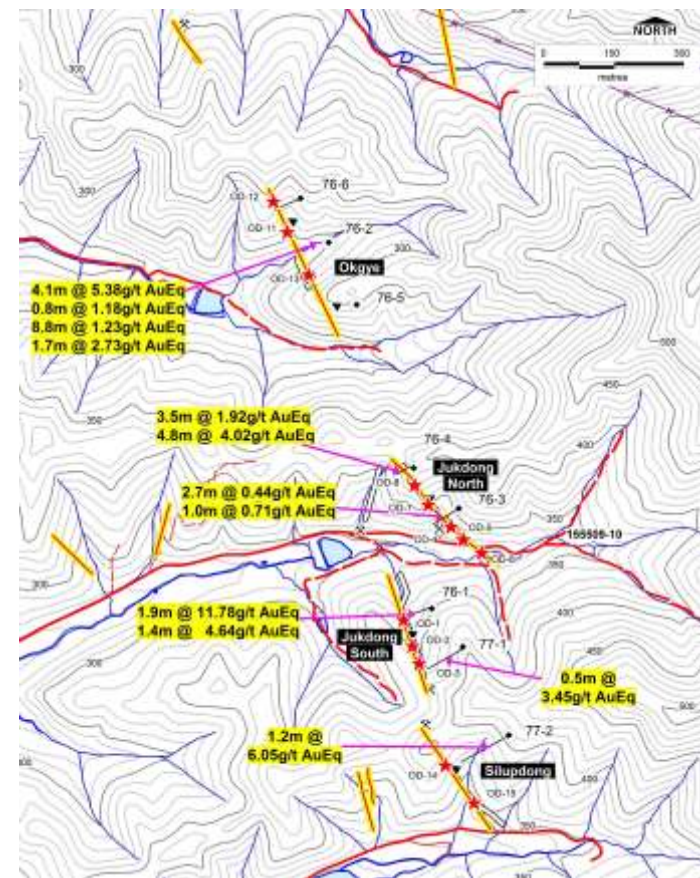
- Limited Drilling (8 holes for 1,150m)
- Significant Drill Intercepts of Au & Ag
- Mineralized intercepts up to 9m wide
- Disseminated Sulphides – Not Assayed
- Intercepts from 20m to >150m Depth

### Mineralization:

- Argillic clay alteration
- Colloform banded chalcodony vein breccias
- Good Au, Ag & Cu grades hit in drill holes
- Veining localized at competent rock contacts
- Mineralization is “Open” in all directions

### Resource Estimate (Senlac, 2017):

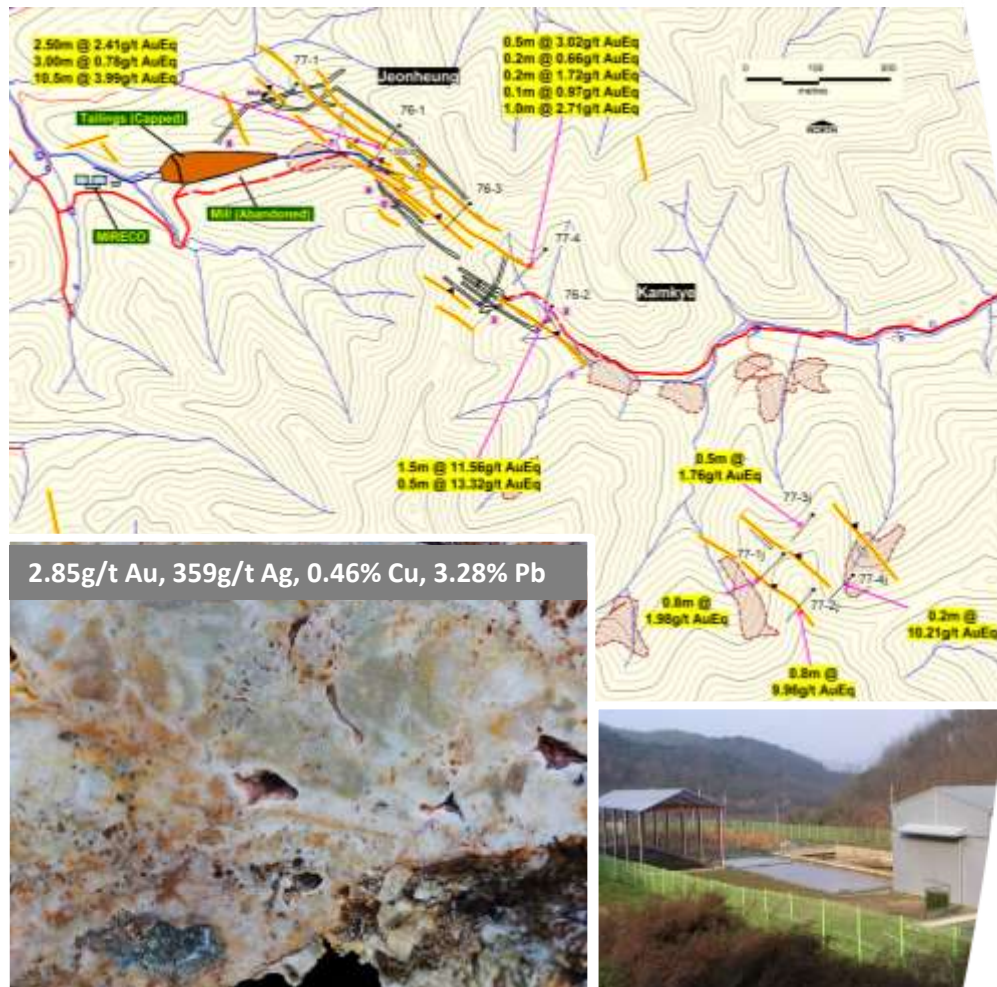
- 4.80Mt @ 0.25g/t Au, 42g/t Ag, 0.66% Cu, 1.69% Pb, 0.98% Zn
- Historical data is not compliant with JORC/NI-43-101 Reporting Codes





# Uiseong – Jeonheung

## Historical Jeonheung Mine



### Largest Mining Operation in Uiseong district

- 100tpd capacity Flotation Mill (1976-1988)
- 5 Adits & 200m deep Shaft
- AMD mine run-off Water Treatment Facility (MIRECO)

### Geology:

- Black shale, sandstone (*Jeomgog Formation*)
- NW striking, steep NE dipping Vein system
- Veins traced over 900m Strike Length, may extend 400m to SE
- 5 x Stacked En Echelon Sheeted Vein Array

### Historical Drilling:

- Limited Drilling (5 holes for 950metres BQ core)
- Significant Drill Intercepts of Au, Ag & Cu
- Mineralized intercepts up to 10.5m wide
- Disseminated Sulphide halo – Not Assayed
- Veins intersected from 53m to below >250m Depth

### Mineralization:

- Argillic clay alteration at surface
- Colloform banding, bladed carbonate pseudomorph textures
- Quartz vein breccias
- Au, Ag & Cu in drill holes

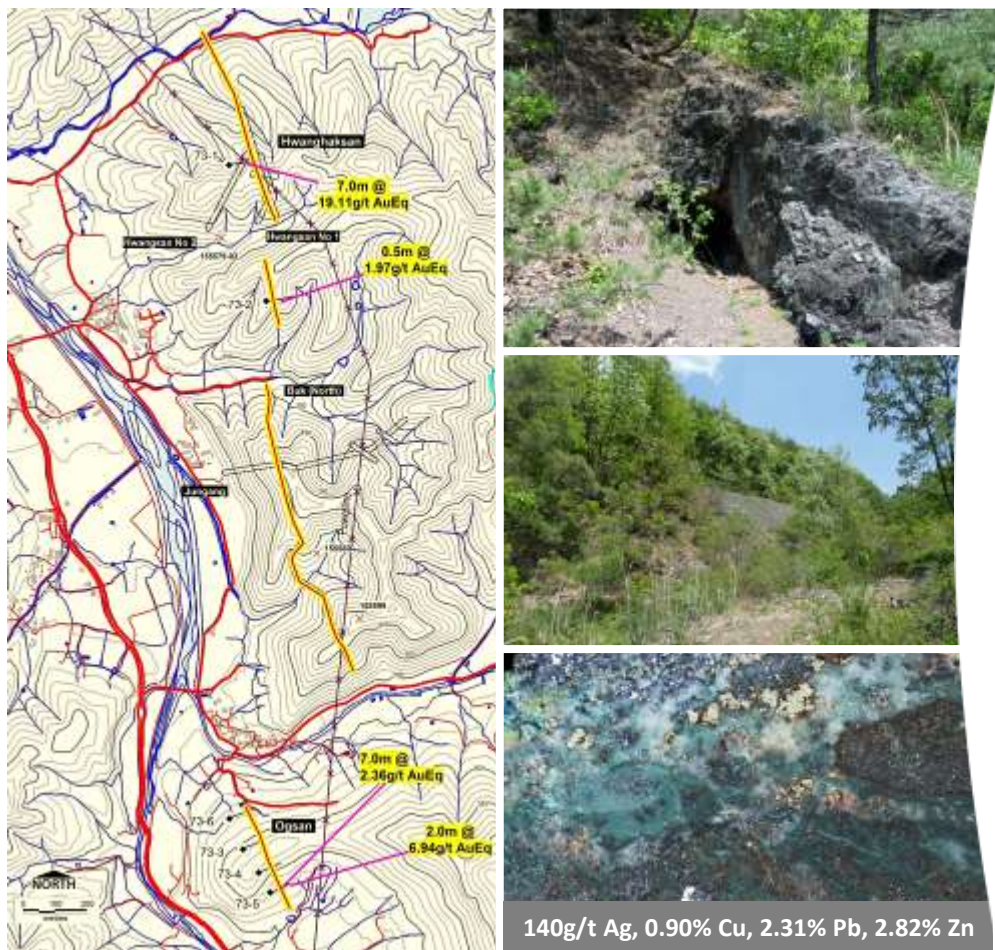
### Resource Estimate (Senlac, 2017):

- 2.47Mt @ 1.90g/t Au, 39g/t Ag, 0.46% Cu, 0.67% Pb, 0.73% Zn
- 1.0Mt of Oxide Ore (KIGAM 1977; grade not specified)
- Historical data is not compliant with JORC/NI-43-101 Reporting Codes



# Uiseong - Ogsan

## Limited Historical Drill Testing



### Geology:

- Chert, quartzite, sandstone (*Jeomgog Formation*)
- “Red bed” sandstone, siltstone, shale (*Sagok Formation*)
- **NNW striking, steep W dipping Vein**
- **Traced over 3000m Strike Length & up to 7m Wide.**
- Probable NE Fault offsets of Vein
- **New Vein Breccia Discovered at T9 Anomaly**

### Historical Drilling:

- **Limited Drilling (6 holes for 650m)**
- **Significant Drill Intercepts of Au, Ag, Cu, Pb, Zn**
- **Mineralized intercepts up to 7m wide**
- **Disseminated Sulphide halo – Not Assayed**
- **Veins intersected from 22m to below >120m Vertical Depth**

### Mineralization:

- Argillic clay alteration at surface
- Amethystine zonal quartz & Comb quartz vein breccias
- **Good Au, Ag & Cu grades in drill holes**
- **Mineralization is “Open” in all directions**
- **“Chert” & “Quartzite” logged - probably Silica Alteration**

### Resource Estimate (Senlac, 2017):

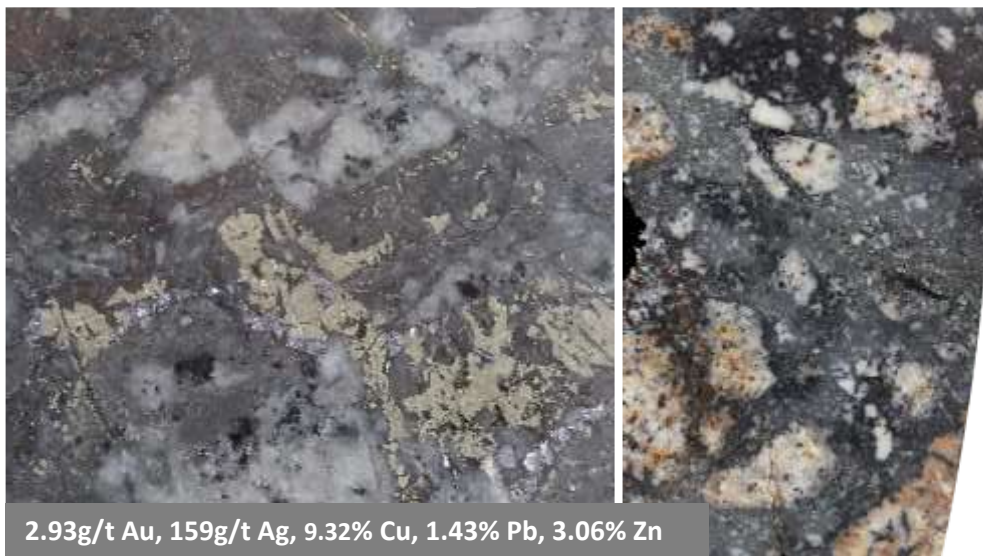
- **3.00Mt @ 1.32g/t Au, 61g/t Ag, 3.24% Cu, 3.95% Pb, 1.60% Zn**
- Historical data is not compliant with JORC/NI-43-101 Reporting Codes



# Uiseong – Goroseoksan & Keumdongchilbo



## Monzonite Intrusion Host



### Keumdongchilbo:

- NNW striking, steep E dip; 900m Strike Length
- At least 4 subparallel Veins within 25m Wide Zone
- Prominent Magnetic Low Anomaly
- Monzonite porphyry host (actinolite-quartz altered, xenolithic)

### Goroseoksan:

- Single N-S striking, steep W dipping Vein, 4.0m Wide
- Tourmaline magmatic intrusion breccia in Monzonite porphyry
- Mine run-off Water Treatment Facility (MIRECO)
- Never Drilled

### Historical Drilling at Keumdongchilbo only:

- Limited Drilling (8 holes for 1600m)
- Significant Drill Intercepts of Au, Ag, Pb, Zn
- Cu Never Assayed...BUT IS PRESENT
- Mineralized intercepts up to 17.1m wide
- Disseminated Sulphide halo – Not Assayed
- Veins extend down below >450m Vertical Depth

### Mineralization:

- Hydrothermal Magmatic Intrusion Breccias
- Good Au, Ag, Cu, Pb, Zn grades
- Mineralization is “Open” in all directions

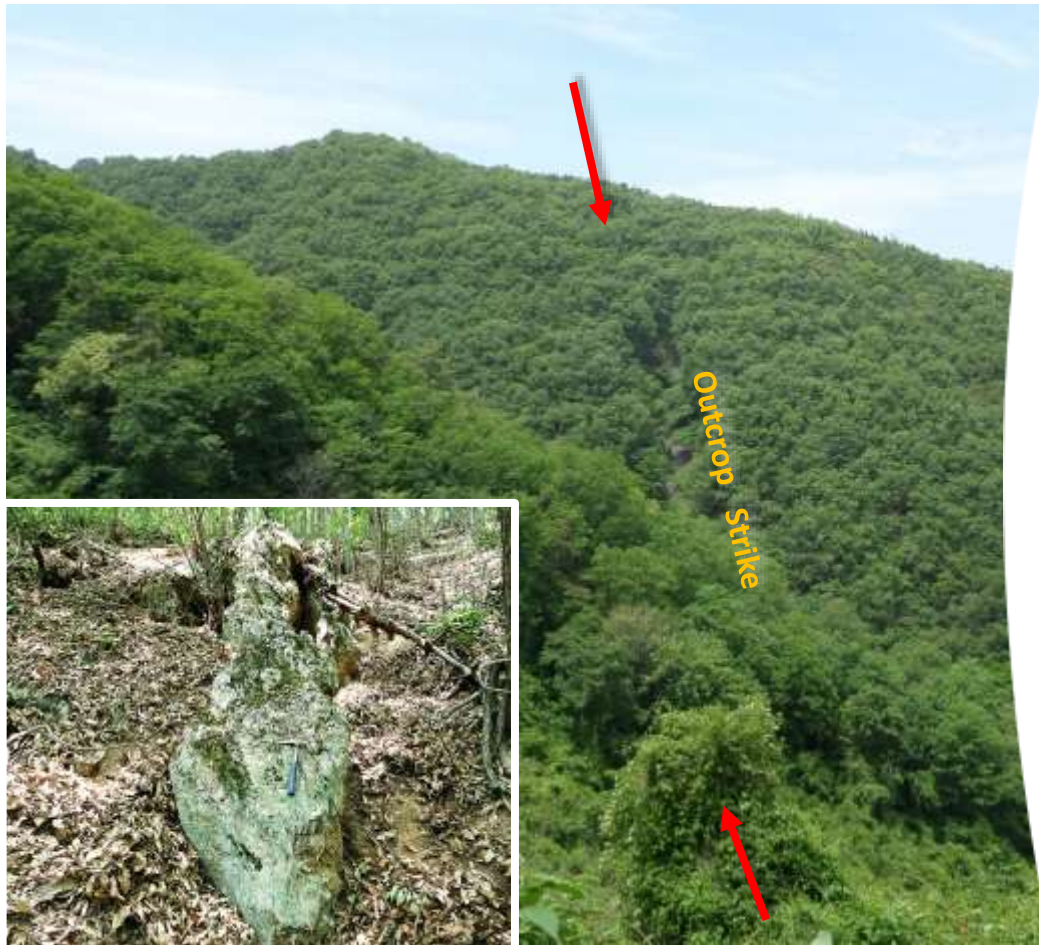
### Resource Estimate (Senlac, 2017):

- 1.23Mt @ 0.94g/t Au, 35g/t Ag, N/A Cu, 2.19% Pb, 1.85% Zn
- Historical data is not compliant with JORC/NI-43-101 Reporting Codes



# Uiseong - Exploration Potential

## *New Discoveries made by KME*



### Exploration by KME since 2015:

- Reconnaissance Geological Mapping & Sampling
- Recognition of new Geological Models
- New Veins Discovered S of Jeonheung & E of Kyungwha
- Au-Ag-W geochemical signature
- Bladed Carbonate Replacement - "Boiling" Textures





# Uiseong – Geological Model

## *Intermediate-Sulphidation Epithermal Au-Ag-Cu-Pb-Zn*

0.78g/t Au, 201g/t Ag, 0.14% Cu, 4.32% Pb, 5.61% Zn



### **Mineralization Style:**

- NNW-striking, Sheeted, En Echelon Vein arrays
- “Chimney” Breccia Pipe “feeder pipes”
- Surrounding Halo of Stockworks & Disseminated Sulphides
- Skarn-hornfels zones - High heat flow structures

### **Mineralized Structures:**

- Strike extensive: 1000 – 3000 metres strike length
- Extend down to vertical depths of >450m

### **Early Stage:**

High-temperature (250-350°C), Moderate salinity fluids (1-10 wt% NaCl) deposited quartz veining, Fe-rich sphalerite, disseminated Cu-Zn-Pb-Fe-As sulphides, Fe-poor sphalerite

### **Middle Stage:**

Boiling and over-pressuring breccia event

### **Late Stage:**

Mixing, Dilution and Cooling with Oxygenated Meteoric Waters deposited Au-Ag and Ag-Sb-Bi sulphosalts at low temperatures (200-300°C)

### **Mineralization Age:**

- 78-60 Ma. Hydrothermal system may have been active for 18 million years

### **Classification: Intermediate-Sulphidation Epithermal (5-10% S)**

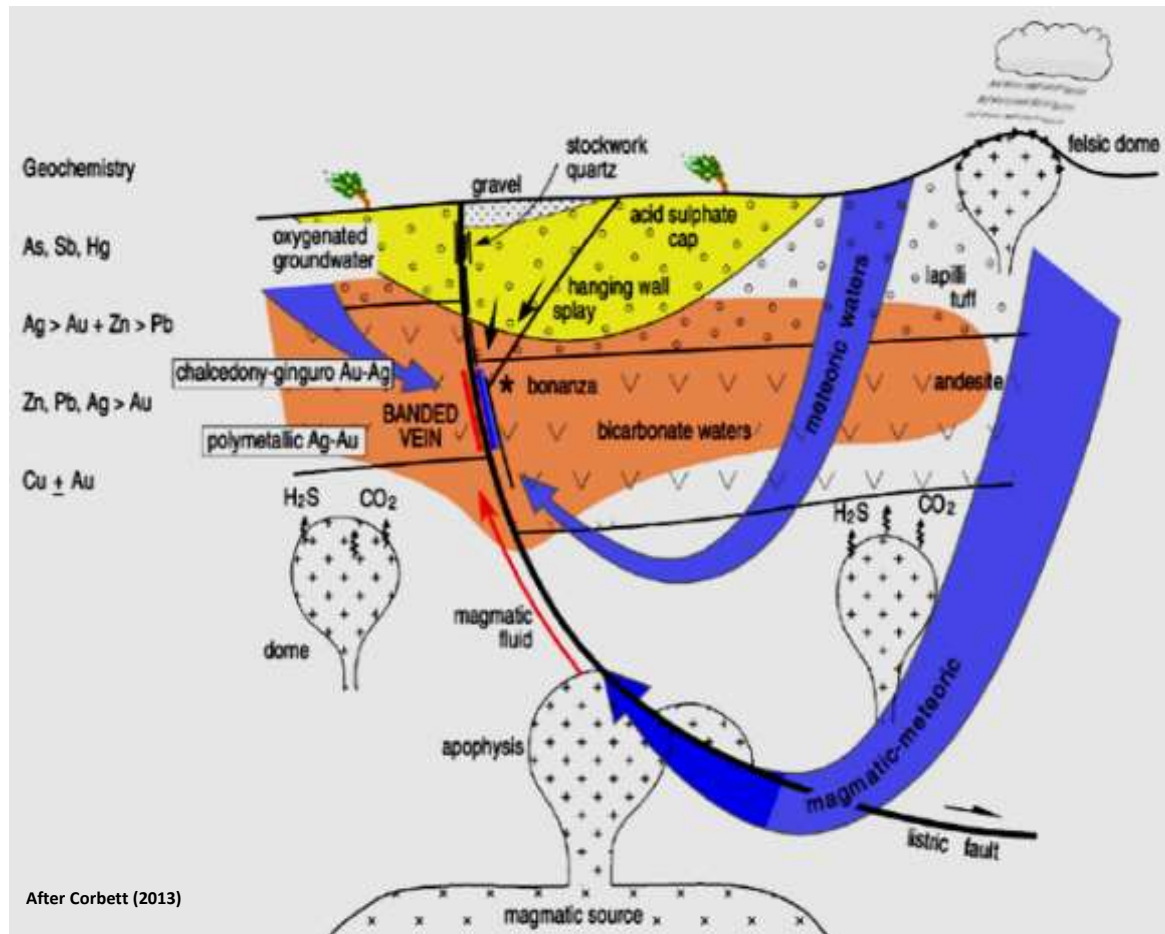
- Deposited at shallow-deep epithermal depth (200-1000m)

### **Analogues: Zacatecas & Fresnilo district Mexico**



# Uiseong – Geological Model

## Intermediate-Sulphidation Epithermal Au-Ag-Cu-Pb-Zn



### Geology:

- Felsic dome intrusion
- Diatreme venting – lapilli tuff, pyroclastics

### Vertical Geochemical Zonation:

- As, Sb, Bi, Hg, Ba near palaeosurface
- Ag (Ag:Au ratio >100)
- Au banded quartz vein - “Bonanza” grades
- Zn, Pb ± In-Ga-Cd
- Cu, Au
- W ± Sn

### Alteration Zonation:

- **Acid Sulphate assemblage** cap at surface
  - Alunite, jarosite, kaolinite, dickite, hematite
- **Argillic assemblage** at water table
  - Hematite (thermal oxidation)
  - Kaolinite, dickite, illite, smectite clays
- **Inner Propylitic assemblage** near veins
  - Epidote, chlorite, sericite, pyrite
  - Skarn (high heat flow structures)
- **Outer Propylitic assemblage** at depth
  - Chlorite



# Haman Project

Cu-Ag-Au  $\pm$  Co-W

3





# Haman – Location & Infrastructure



## *Location for Mining is Excellent*



### Haman-Gun County:

- **Mountainous rural setting, mainly Vacant Forest**
- Local economy is mainly agriculture-based; watermelon fruit & forestry logging
- **Local population is ageing**
- **Youth has moved to industrial cities for education & employment**
- Good road network – sealed & logging road access
- Rail infrastructure (Kwangju-Busan Railway Line)
- Perennial tributaries of the Namgang River drain the project area
- Several surface Water Storage Dams for agriculture use
- Mild climate - hot & wet in summer, winter snowfalls are uncommon
- Baseload electrical power supply
- Communications is excellent (cell phone & internet)
- Local Government very supportive of new Developments
- Base Metal Refineries located 100km from site
- Significant opportunity for Mining Development

### Gaya Town:

- 5 hours drive from Seoul to Gaya via Namhae Expressway
- Gaya is 15 minutes drive from project area
- Gaya town population is 63,435 (2018) and declining
- Empty residences, shops, offices
- Reasonable hotel-motel style accommodation
- Heavy Industrial Machinery Real Estate Complex

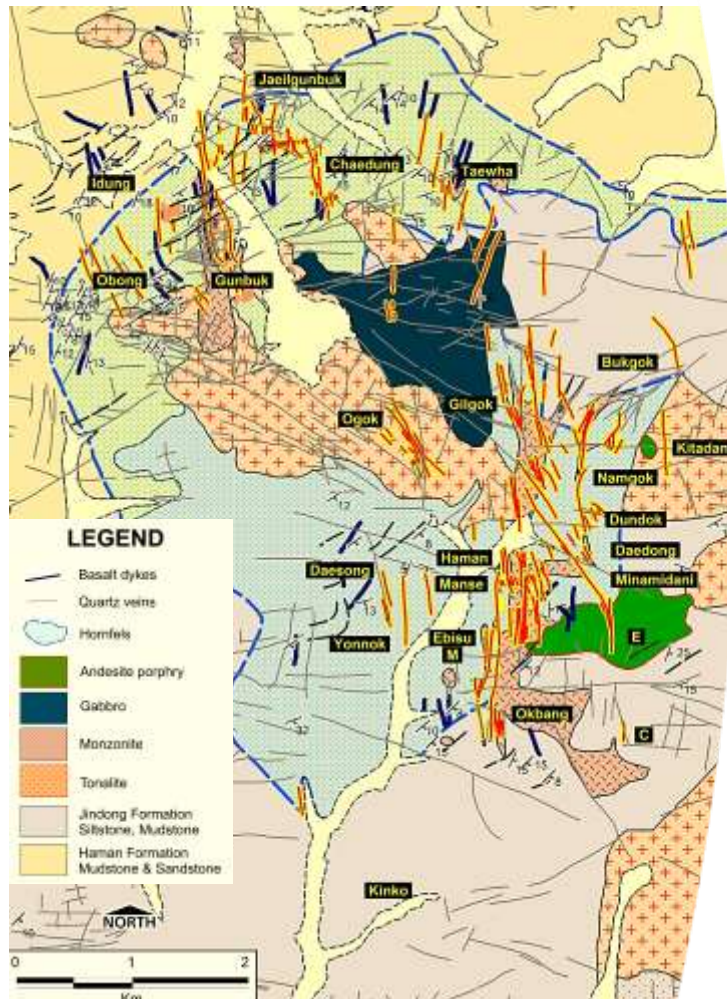
### Haman Tenure:

- **11 Granted Mining Rights covering 3,022ha held 100% by *Shin Han Mines Inc***



# Haman - Geology

## Geology of the Haman District



### Historical Mining Activities:

- Principal copper producing region of South Korea; 1915-1945 & 1968-1975
- 20 historical mines & workings
- Flotation Mills: Gunbuk (100tpd), Haman (50tpd) & Jaellgunbuk
- Recorded Production: 110,000t @ 5.59% Cu, 11.55g/t Au, 59g/t Ag + 11t of Co

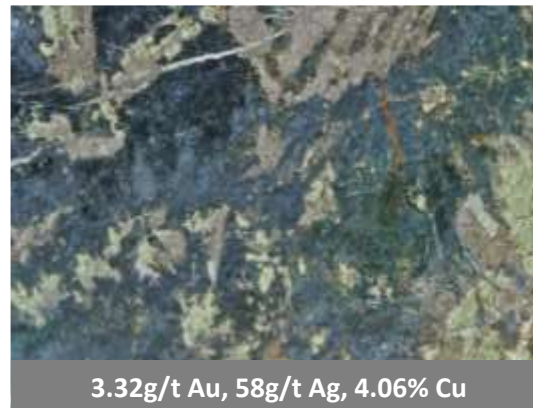
### Geology:

#### Hayang Group Sequence

- Mudstone & Sandstone (*Haman Formation*) altered to “chert” – **silicification !**
- Siltstone, Mudstone (*Jindong Formation*)

#### Intrusion Sequence:

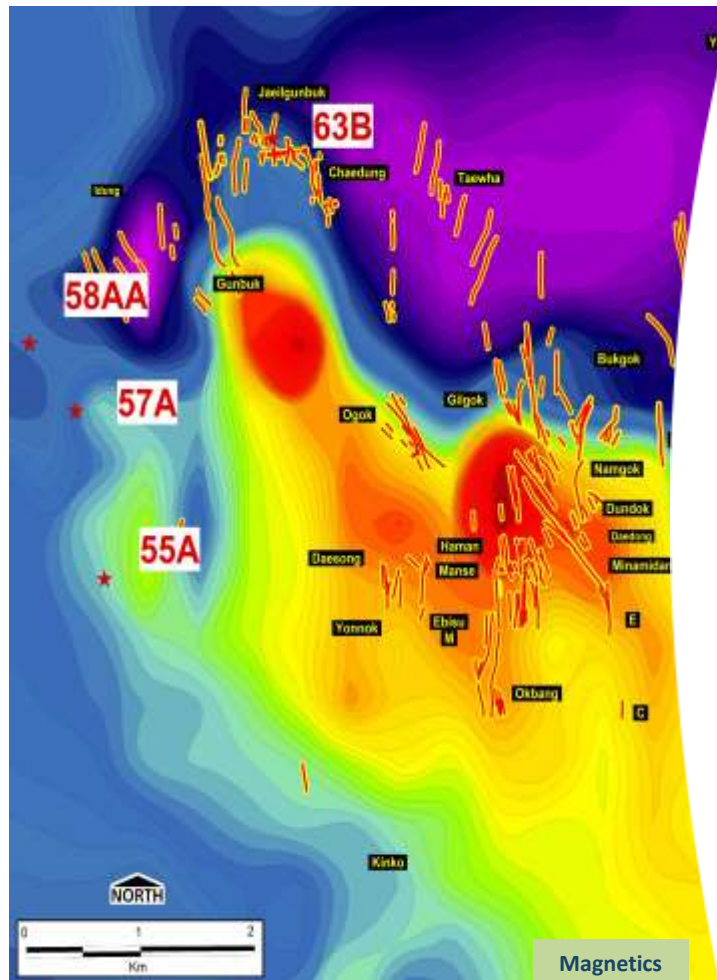
- Tonalite Adakite → Gabbro → **Monzonite porphyry** → Andesite porphyry





# Haman - Geophysics

## Geophysical Anomalies



### Historical Exploration Activities:

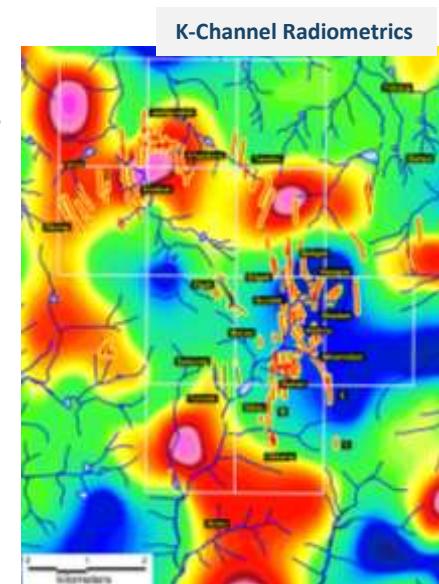
- KMPC drilled 93 holes for 20,076 metres AX core (1968-1981)
  - Au & Ag Not Assayed in 1970, 1971, 1975 or 1976 Drill Programs
  - No Drill Core available
  - No QA/QC protocols
- Heliborne EM & Magnetometer Survey – Sanders Geophysics (1975)
- Radiometric & Magnetometer Survey – 1km line spacing (1989-1991)
- Self Potential Geophysical Surveys

### Geophysical Anomalies:

- Sanders Geophysics (1975) data re-processed by KME
- “Bulls eye” Magnetic Anomalies with N-S “Tails”
  - Gunbuk-Ojuk
  - Gilgok-Haman
  - Coincide with Monzonite “pencil” porphyry
- Veins located on Margins of Magnetic Anomalies
- EM Anomalies on Margin of Monzonite

### Self Potential Geophysical Surveys:

- Grids at Gunbuk-Jaeilgunbuk, Haman-Gilgok.
- Narrow Anomalies coincide with Veins
- Larger Anomalies (Disseminated Sulphides):
  - Gunbuk South
  - Jaeilgunbuk
  - Gilgok





# Haman – Gunbuk

## High-Grade Resource Target



### Gunbuk Mine:

- Copper producer 1938-1945 and 1968-1975
- Flotation mill
- Main Vein “stoped out” down to 3<sup>rd</sup> Level (5masl)
- Daesin Vein “missed” by Japanese
- Prospecting down to 6<sup>th</sup> Level -71masl
- Main Vein Resource below -75MASL is “Open”

### Au-Ag-Cu ± Co-W Mineralization:

- Chalcopyrite, Pyrite, Pyrrhotite, Arsenopyrite
- Sulphosalts, Electrum, Wolframite, Cobaltite
- Vein Gangue Minerals:  
Quartz, Magnetite, Specularite, Tourmaline, Carbonate
- Hydro-fracture Stockwork halo is Mineralized
- Evaporite facies in sediments ... brine fluid source ?

**Main Adit:** Access is open to *Main Level* (92masl)

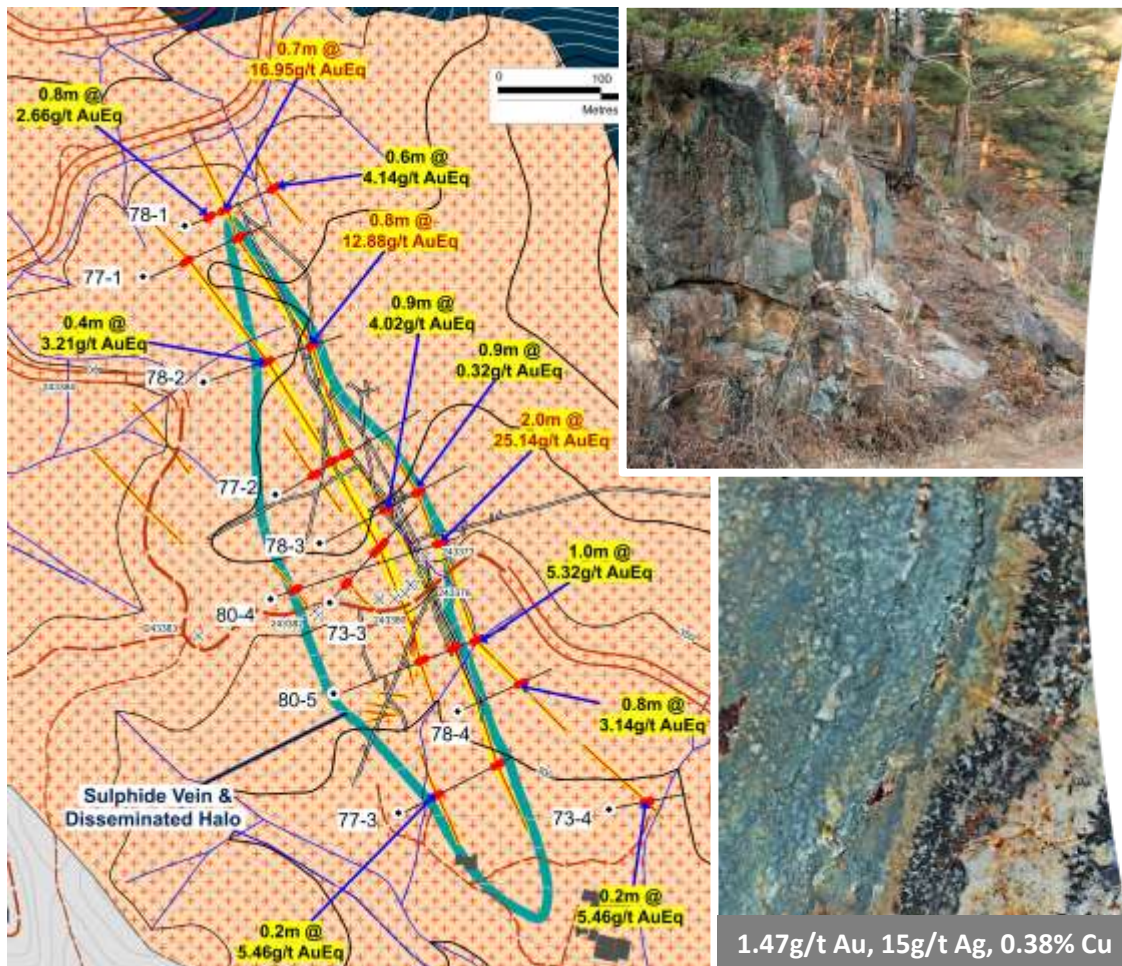
### Resource Targets:

- **3.00Mt @ 1.89g/t Au, 59g/t Ag, 3.27% Cu**
  - The *Daesin Vein* is a High-Grade Exploration Target
  - Historical data is not compliant with JORC/NI-43-101 Reporting Codes
- **Bulk tonnage Exploration Target to south**
  - SP Conductor Anomaly
  - Monzonite porphyry + disseminated sulphides



# Haman – Oguk

## High-Grade Resource Target



### Geology:

- Tonalite (Adakite) and Monzonite host
- Gabbro contact in NE

### Au-Ag-Cu ± Co-W Mineralization:

- Chalcopyrite, Pyrite, Pyrrhotite, Arsenopyrite
- Sulphosalts, Wolframite, Cobaltite
- Quartz, Magnetite, Specularite, Tourmaline, Carbonate
- Disseminated Sulphides & Veinlets – Not Assayed

### Alteration:

- Albite-Biotite-Magnetite
- Magnetite-Actinolite-Tourmaline

### Geophysics:

- “Bullseye” Magnetic anomaly

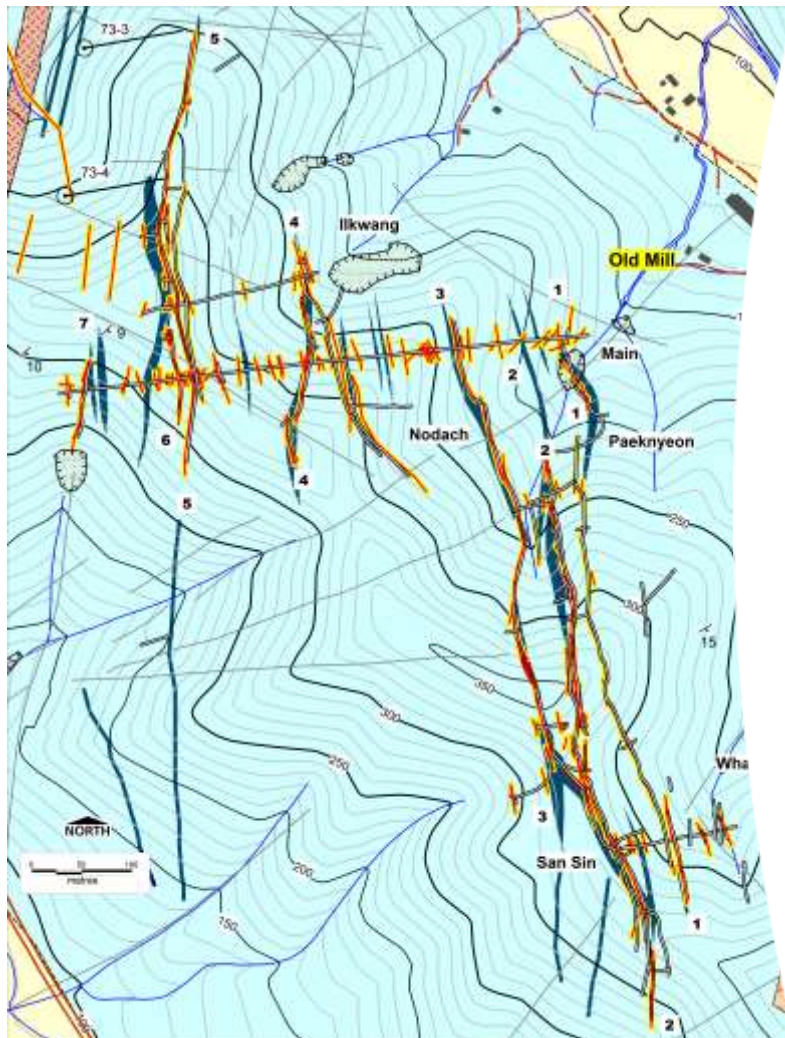
### Resource Estimate (Sennitt, 2017):

- 0.44Mt @ 7.59g/t Au, 20g/t Ag, 4.77% Cu
- Historical data is not compliant with JORC/NI-43-101 Reporting Codes
- High-Grade Resource Target
- Bulk Tonnage Exploration Target



# Haman – Jaeilgunbuk

## Bulk Tonnage Gold Exploration Target



### Jaeilgunbuk Mine:

- Small flotation mill operated 1963-1975. Processed ore from 6 “prospecting adits”
- Only limited production recorded: 30,000t @ 19.71g/t Au, 90g/t Ag & 7.19% Cu

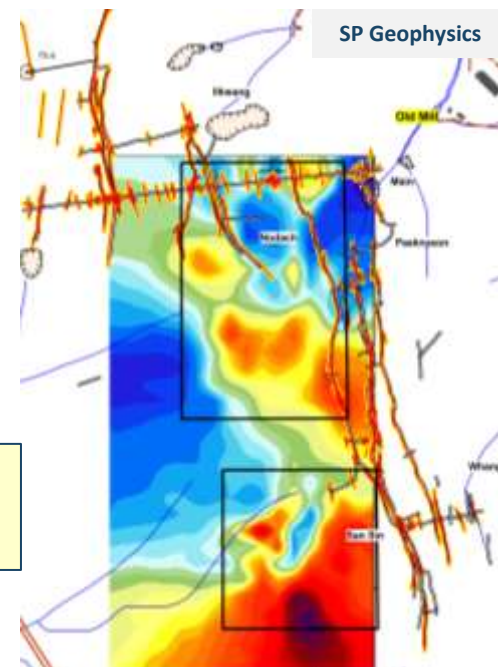
### Geology:

- **Sheeted Au-Cu-W Vein-Fracture stockwork System**
- **960m long x 500m wide area**
- Siltstone (*Haman Formation*)
- Mafic dyke swarm intrudes siltstone
- Close association of veins with dykes

### Geophysical Response:

- SP Anomalies coincide with Veins
- Large SP Anomaly in south - interpreted as disseminated sulphides
- EM Anomaly
- Magnetic Low
- K-Channel Radiometric Anomaly

**Bulk Tonnage Exploration Target  
Never Drilled !**





# Haman – Jaeilgunbuk

## Bulk Tonnage Gold Exploration Target



12.15g/t Au, 0.33% Cu, 146ppm Co, 277ppm W, 406ppm As

### Sheeted Vein-Fracture stockwork System

- 960m long x 500m wide area
- Mafic dyke swarm intrudes siltstone (*Haman Formation*)
- Close association of veins with dyke structures

### Au-Cu-W Breccia Vein Mineralization:

- Early Magnetite-Specularite
- Jigsaw Quartz (recrystallized amorphous quartz)
- Late Pyrite-Chalcopyrite-Pyrrhotite-Wolframite

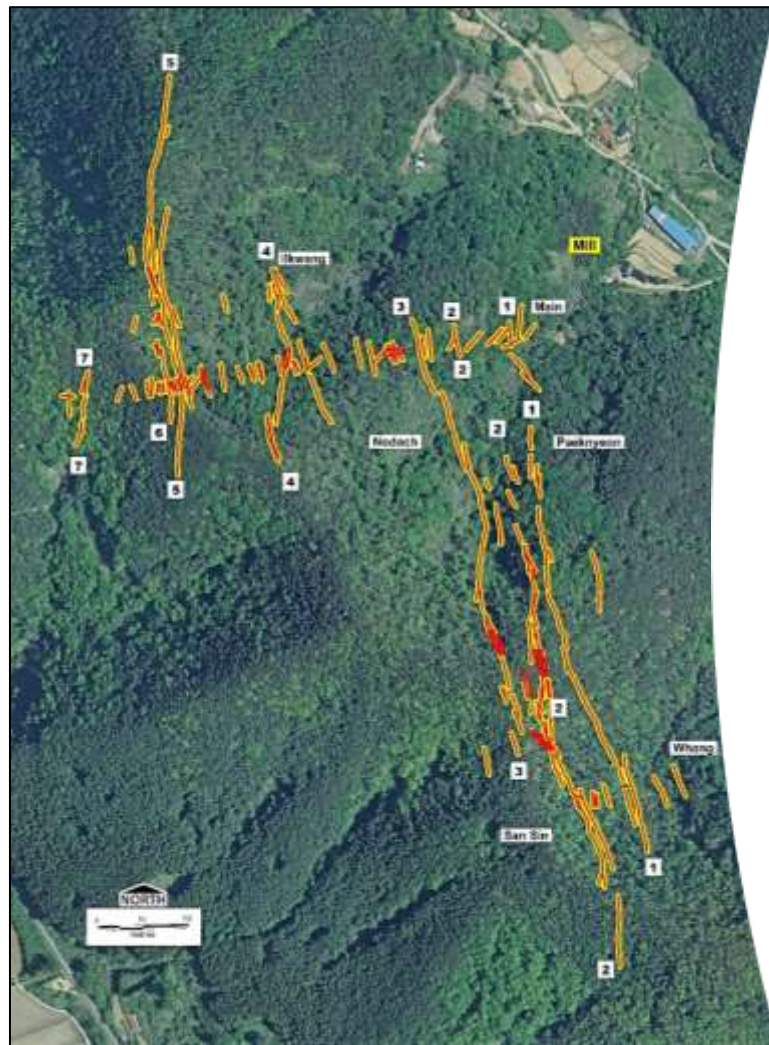


Nodach Adit



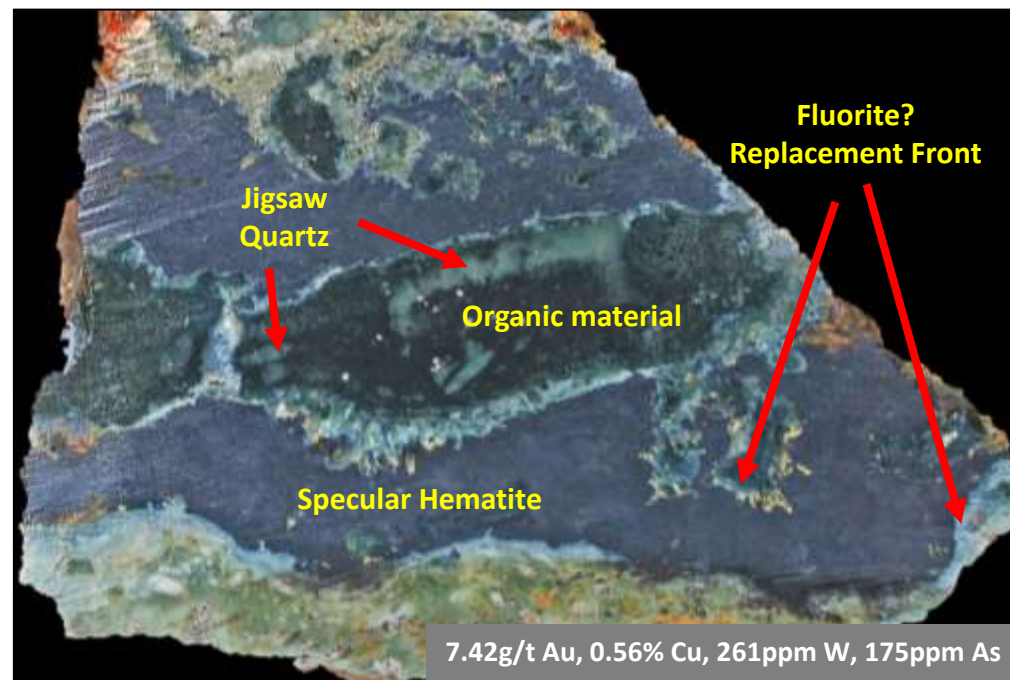


## Sediment-hosted Replacement Style Mineralization



### Unusual Au-Cu-W-As Replacive Style Mineralization:

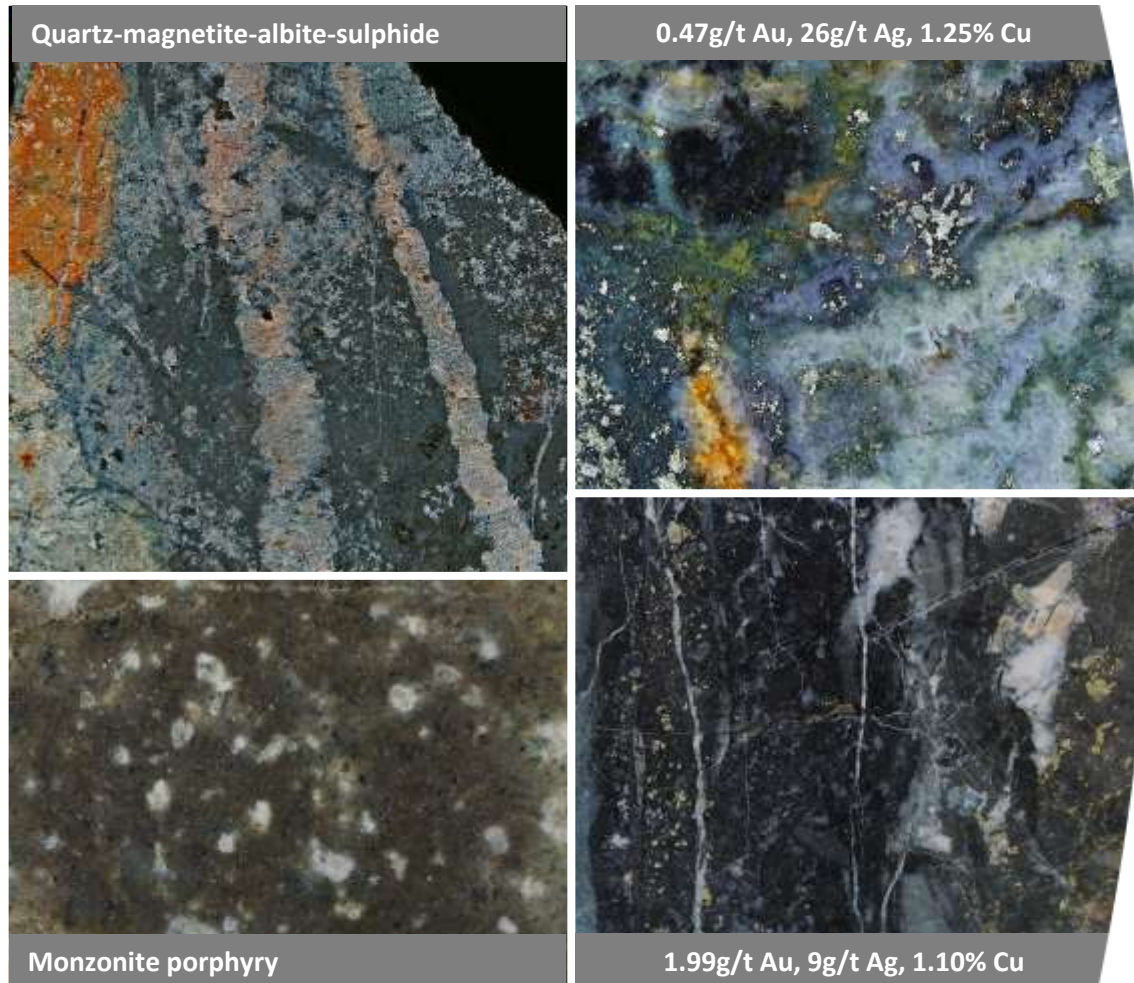
- Siltstone, Sandstone host (*Haman Formation*)
- Early Specularite alteration
- Fluorite with carbonate rim forms a replacive front
- Organic material/debris being swept & assimilated
- Jigsaw-textured quartz (recrystallization of amorphous silica)





# Haman – Geological Model

## Alkalic Porphyry Cu-Au model



### Multi-phase, evolved intrusive complex:

- Tonalite (Adakite)
- Gabbro
- Monzonite “pencil” porphyry

### Au-Ag-Cu ± Co-W Mineralization:

- Chalcopyrite, Pyrite, Pyrrhotite, Arsenopyrite
- Sulphosalts, Wolframite, Cobaltite
- Quartz, Magnetite, Specularite, Tourmaline, Carbonate, Jarosite
- Copper transported as chloride complex

### Calcic Potassic alteration assemblage:

- Albite, Biotite, Magnetite, K-feldspar

### Inner Propylitic alteration assemblage:

- Magnetite-Actinolite-Tourmaline
- Magnetite-Pyroxene-Tremolite Skarn

### Silicification-Hornfelsing:

- “Chert” – silica replacement of evaporite facies
- Chloride brine fluid source ?

### Propylitic alteration assemblage:

- Chlorite-Epidote-Carbonate-Pyrite

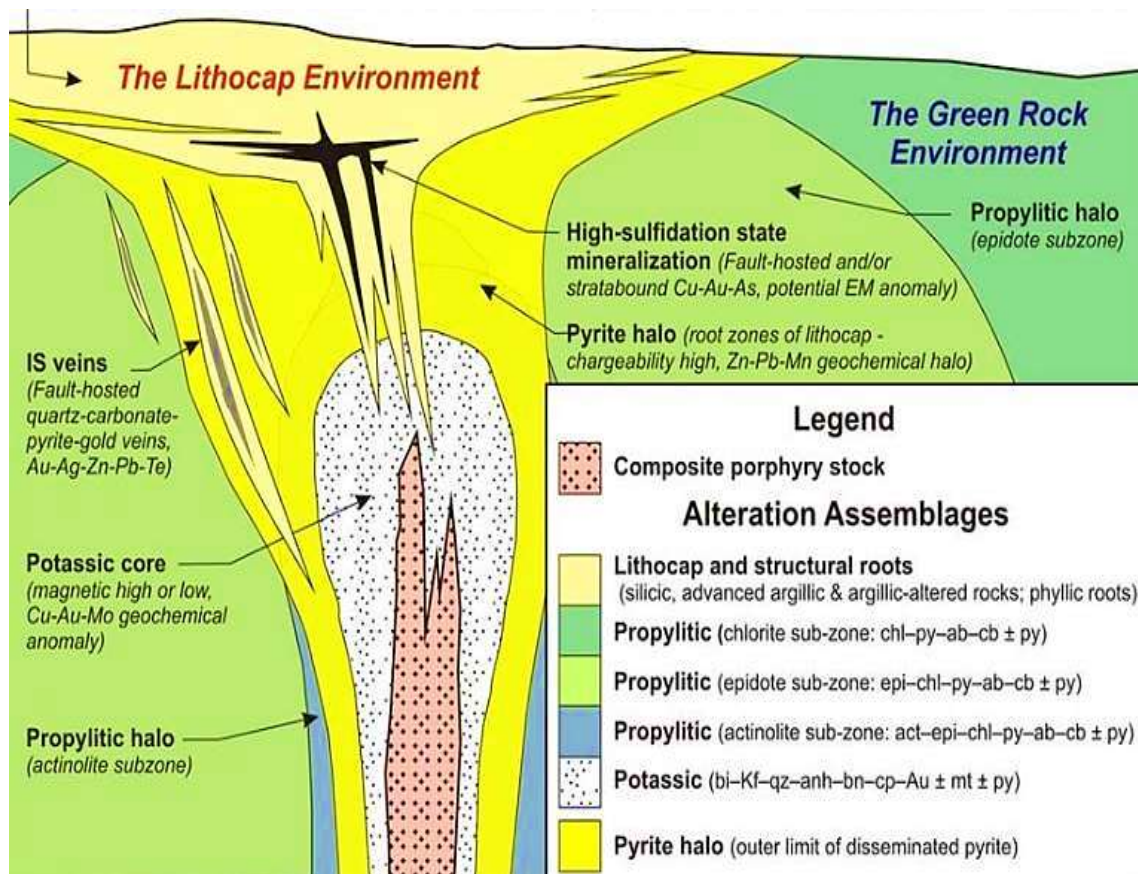
### Argillic Clay alteration assemblage:

- Illite, Hematite



# Haman – Geological Model

## Alkalic Porphyry Cu-Au model



After Cooke et al (2017)

### Multi-phase, evolved intrusive complex:

- Tonalite (Adakite) → Gabbro → Monzonite porphyry

### Au-Ag-Cu ± Co-W Mineralization:

- Chalcopyrite, Pyrite, Pyrrhotite, Arsenopyrite
- Sulphosalts, Wolframite, Cobaltite
- Quartz, Magnetite, Specularite, Tourmaline, Carbonate
- Evaporite facies in sediments – chloride brine fluid source ?

### Calcic Potassic alteration assemblage:

- Albite, Biotite, Magnetite, K-feldspar

### Inner Propylitic alteration assemblage:

- Magnetite-Actinolite-Tourmaline
- Magnetite-pyroxene-tremolite skarn

### Propylitic alteration assemblage:

- Chlorite-Epidote-Carbonate-Pyrite

### Argillic Clay alteration assemblage:

- Illite, Hematite

### Analogues:

- Dinkidi (Luzon), Red Chris (BC), Endeavour 26 (NSW)



# Goseong Project

Cu-Ag-Au

4





# Goseong – Location & Infrastructure



## *Location for Mining is Good*



### **Goseong Town & County:**

- Mountainous coastal setting, mild climate (snowfall is uncommon)
- Local economy is dominated by agriculture, fishing & shipbuilding
- Sealed road & forestry road access
- Several surface Water Storage Dams for agriculture use
- Communications is excellent (cell phone & internet)
- Base Metal Refineries located 100km from site
- 5 hours drive from Seoul to Goseong via Tongyeong Expressway
- Goseong town is 15 minutes drive from project area
- Goseong town population is 55,950 (2018)
- Modern shops, offices, apartments, houses, hotel-motel style accommodation

### **Historical Mining Activities:**

- **Copper producing region 1915-1945 and again 1970-1992 (11 mines)**
- **Flotation Mills:** Goseong (50tpd), Samsanjaeil (130tpd), Samsan & Jinheung (100tpd)
- **Recorded Production: 216,512t @ 2.94% Cu, 0.17g/t Au, 34g/t Ag**

### **Goseong Tenure:**

- 3 Granted Mining Rights

### **Historical Resource Estimate (KMPC 1980-1994):**

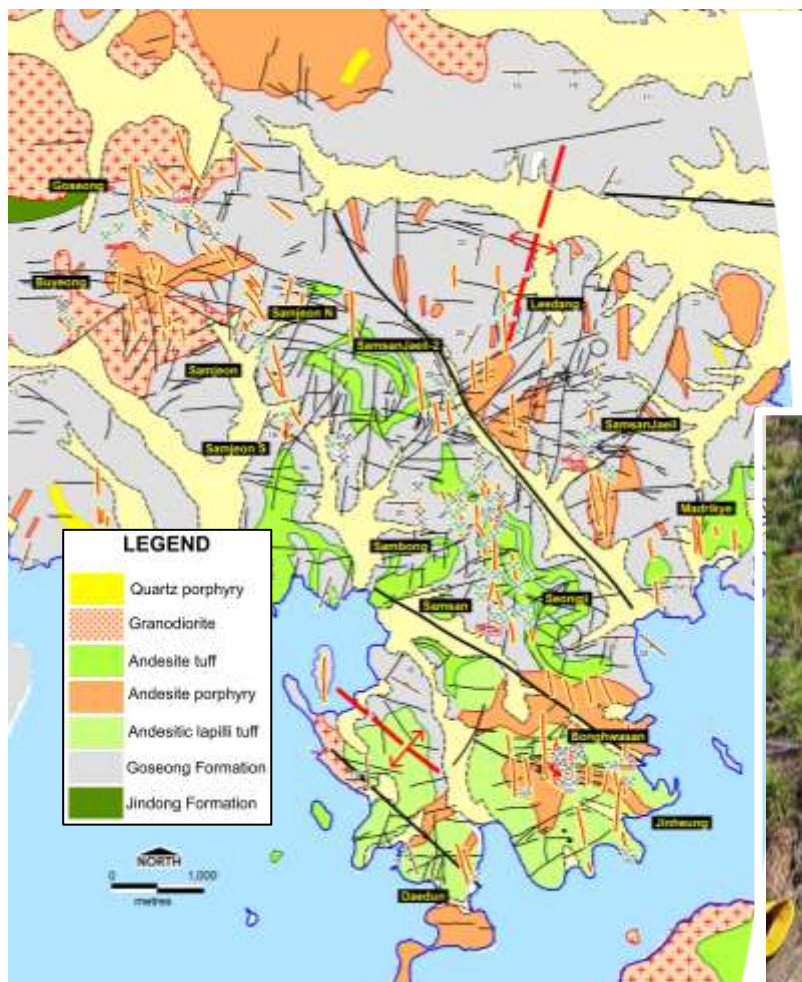
Combined Jinheung, Samsanjaeil, Samsan, Sambong & Buyeong “Mine Reserves”:

- **0.58Mt @ 1.62g/t Au, 370g/t Ag, 5.45% Cu**
- Historical data is not compliant with JORC/NI-43-101 Reporting Codes



# Goseong – Geology

## Historical Mining District



### Geology:

#### Hayang Group Sequence

- Siltstone, Mudstone basement (*Jindong Formation*)

#### Yuchon Group Sequence

- Siltstone, Mudstone (*Goseong Formation*)
- Andesite tuffs (*Jusasan Andesite*)
- Interpreted maar collapse environment

#### Intrusions:

- Granodiorite, **Monzonite porphyry (plug)** & **Andesite porphyry (dome)**

### Mineralization:

- >50 Veins mapped



Samsanjaeil North vein outcrop

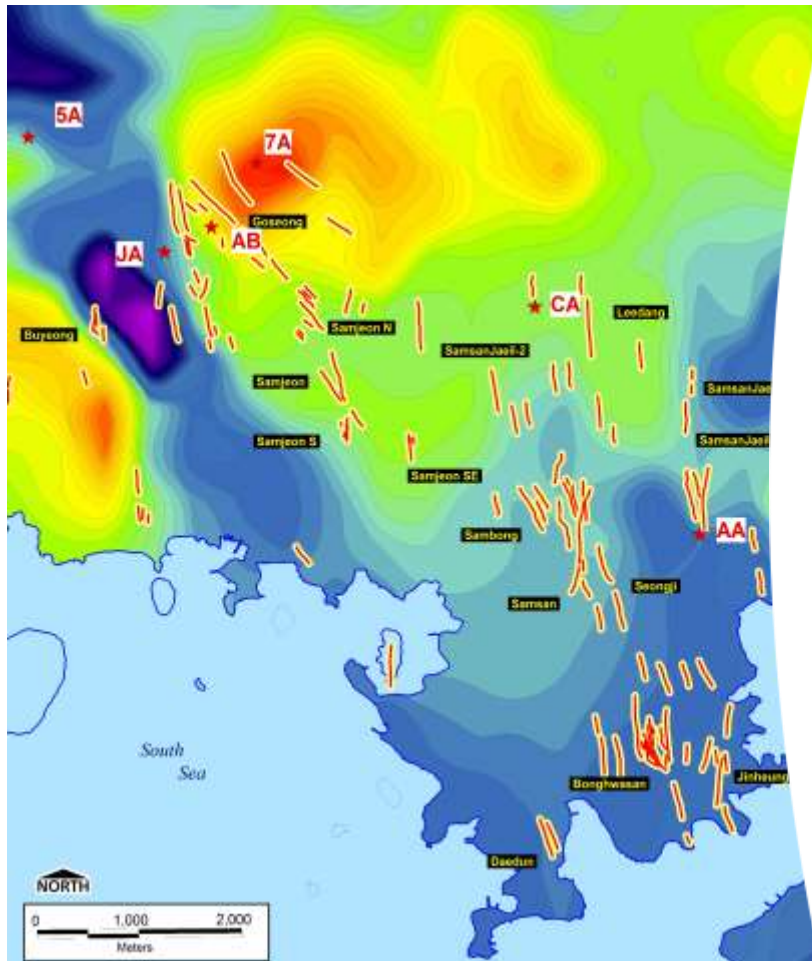


Seongji Vein in adit roof



# Goseong – Geophysics

## Geophysical Surveys



### Historical Exploration Activities:

- KMPC drilled 64 holes for 6,282 metres AX core (1970-1980)
  - Only Cu routinely assayed
  - No Drill Core available
  - No QA/QC protocols
  - No drill logs available
- Heliborne EM & Magnetometer Survey (Sanders Geophysics, 1975)
- Radiometric-Magnetometer Survey – 1km line spacing (KIGAM, 1989-1991)
- Self Potential Geophysical Surveys

### Geophysical Anomalies:

- Sanders Geophysics 1975 survey data re-processed by KME
- “Bulls eye” Magnetic Anomaly at Goseong - Monzonite porphyry
- Elongate N-S Magnetic Anomaly south of Buyeong
- Prominent NW-SE Magnetic Low “Corridor” between Goseong-Buyeong
- EM Anomalies at Goseong, Leedang (CA) & Samsanjaeil South (AA)
- Large K-Channel Radiometric Anomalies (phyllitic alteration):
  - Samjeon group of mines
  - Sambong-Samsan-Seongji-Bongwhasan

### Self Potential Geophysical Surveys:

- Buyeong, Goseong-Samsan, Jinheung, Sambong West, Leedang & Samsanjaeil
- Numerous small Chargeability Anomalies coincide with Veins
- Larger SP Anomalies interpreted as Disseminated Sulphides



# Goseong – Samjeon

## Bulk Tonnage Exploration Target



### Geology:

NNW striking, steep Dipping Sheeted Vein stockwork  
Developed over 500m long x 300m wide area

- Andesite porphyry dome intrusion emplaced into mudstone & siltstone (*Goseong Formation*)
- Chlorite-pyrite-silica alteration
- Argillic alteration
- “Red Soil” Colour Anomaly
- Quartz-Alunite Acid Sulphate Alteration

### Mineralization:

- Epithermal Quartz Vein breccias
- Colloform, comb, crustiform, jigsaw quartz vein textures with chalcedony veins & colloidal silica
- Au-Ag-Cu-As-Bi-Sb-Co-Pb-Zn mineralization
- Splay veins & strong veinlet stockwork

### Geophysics:

- K-Channel Radiometric Anomaly
- U-Channel Radiometric Anomaly

### Exploration Potential:

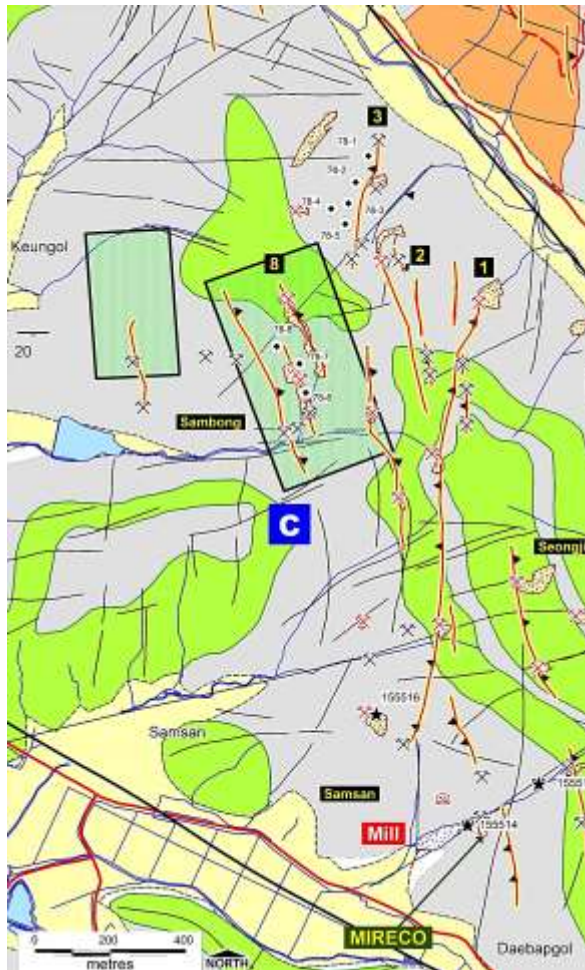
- Only limited drilling, no drill logs or assay data
- Poor drill hole siting at Samjeon Central
- Adits are still Open & accessible
- Bulk Tonnage Exploration Target
- High-Grade Epithermal Mineralization potential



# Goseong – Sambong-Seongji-Samsan



## High Grade Exploration Target



1.35g/t Au, 496g/t Ag, 6.02% Cu



### Geology:

**NNW striking, steep Dipping Sheeted Vein stockwork  
Developed over 3,500m long x 900m wide area**

- Sambong mine was largest producer (1969-1985)
- Historical Flotation Mill at Samsan
- MIRECO water treatment facility
- Andesite tuffs (*Jusasan Andesite*)
- Mudstone & siltstone (*Goseong Formation*)
- Chlorite-pyrite-silica alteration

### Mineralization:

- Comb quartz veins & chalcedony veins
- Vein widths up to 2.00m
- Vertical zonation geochemical pattern recognized:
  - Pb-Zn shallow level, Cu-Ag increasing with depth

### Exploration Potential:

- Only limited drilling, no drill logs or assay data
- Adits are still Open & accessible
- Cu & Ag were assayed, but only limited Au assays
- SP Geophysical Survey at Sambong - chargeability Anomalies coincidental with Vein structures
- K-Channel Radiometric Anomaly peak over Sambong
- Vein dips appear to merge & coalesce at depth.  
Potential for High-Grade Exploration Target



# Goseong – Bongwhasan & Jinheung

## High-Grade & Bulk Tonnage Exploration Target

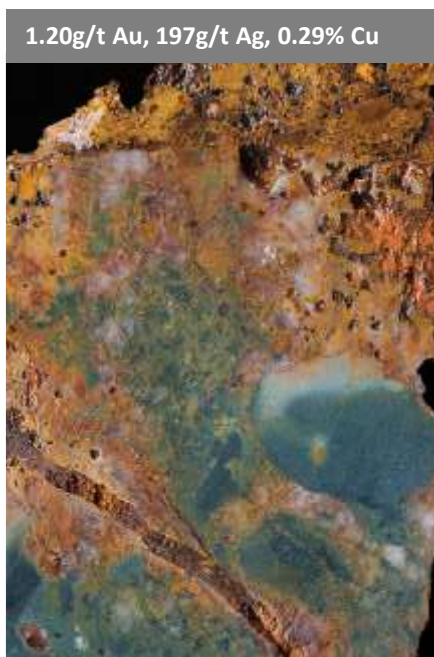


### NNW striking Sheeted Veins 1,200m Long x 2,000m Wide area

- Historical 100tpd Flotation Mill at Jinheung
- Andesite-feldspar porphyry, tuffs (*Jusasan Andesite*)
- Mudstone & siltstone (*Goseong Formation*)
- Amethystine quartz-hematite, jigsaw-crackle cataclastic brecciation with prismatic zonal cockade quartz infill
- Au-Ag-Cu-As-Bi-Mo-Pb-Zn mineralization**
- Argillic clay-hematite-jarosite alteration**

### Exploration Potential:

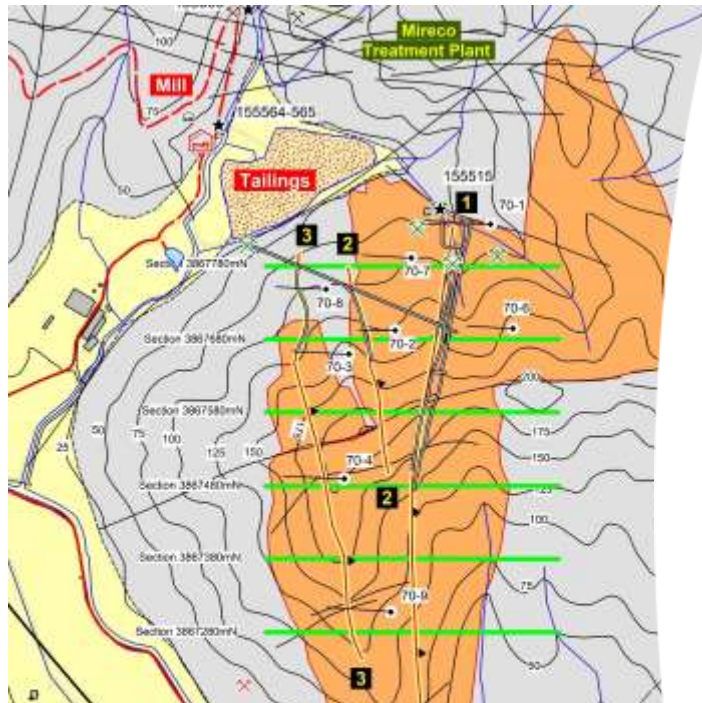
- Only limited drilling, no drill logs, assays for Cu, Ag only
- Adits are still Open & accessible
- K-Channel Radiometric Anomaly over Jinheung
- SP chargeability anomalies coincidental with veins
- High-Grade “Bonanza” Target .... Merging of Veins**
- Bulk Tonnage Target indicated by Density of Stockworks**





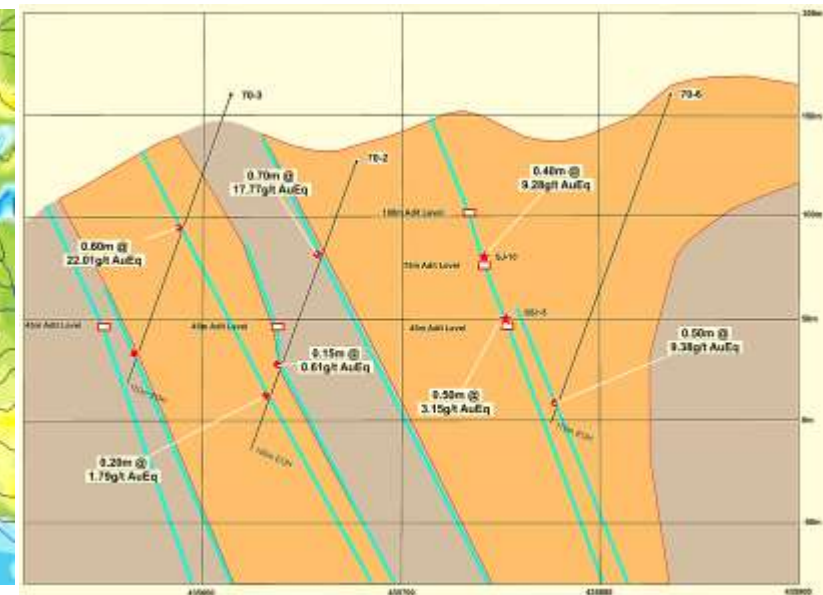
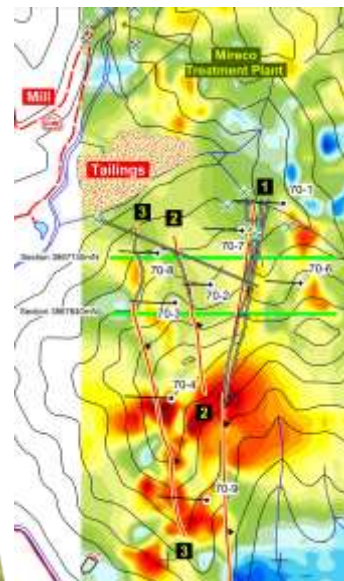
# Goseong – Samsanjaeil South

## Bulk Tonnage Exploration Target



### N-S striking, Sheeted Vein system over 1300m Long x 200m Wide

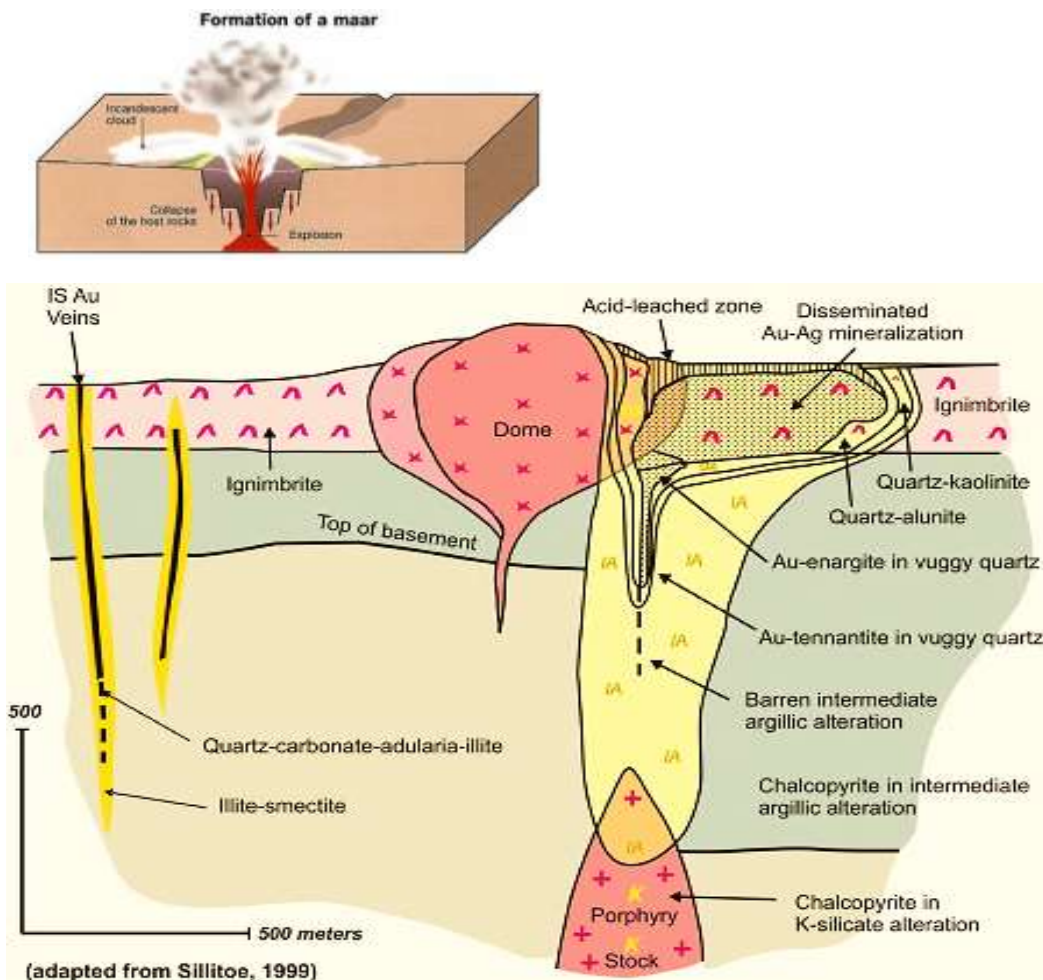
- Historical 130tpd Flotation Mill
- AMD Water Treatment Facility (Mirecco)
- Adits are flooded at 75masl Level
- Andesite porphyry dome intrusion into mudstone, siltstone (*Goseong Fm*)
- “Jigsaw” & comb textured quartz & colloidal silica (Epithermal)
- EM Conductor & Large SP Chargeability Geophysical Anomalies
- **Capped Tailings – Potential for Re-processing**
- **Bulk Tonnage Target indicated by Limited Drilling**





# Goseong – Geological Model

## Transitional IS Epithermal – Alkalic Porphyry Cu-Au



### Geological Environment:

- Mudstone, siltstone (*Goseong Formation*)
- Andesite lavas, tuffs, lapilli tuff (*Jusasan Andesite*)
- Andesite - Sediment Contact – *Hishikari Model*
- Post-collapse Maar setting

### Multi-phase, evolved intrusion:

- Monzonite/Quartz porphyry
- Andesite porphyry dome

### Au-Ag-Cu Mineralization:

- Chalcopyrite, pyrite, pyrrhotite, arsenopyrite
- Bi, Co, Pb, Zn  $\pm$  In-Ga-Ge
- Cu-Au-Ag  $\pm$  Te-Se

### Inner Propylitic alteration assemblage:

- Actinolite-tourmaline- magnetite-chlorite (Fe)

### Outer Propylitic alteration assemblage:

- Chlorite-epidote-hematite-carbonate

### Argillic Clay alteration assemblage:

- Illite, hematite

### Advanced Argillic alteration assemblage:

- Alunite, quartz, jarosite, hematite

### Analogues:

- Dinkidi (Luzon) & Hishikari (Japan)





# Jangheung Project

Cu-Ag-Zn-Pb

5





# Jangheung – Location & Infrastructure



## Location for Mining is Good



### Jangheung Town & County:

- Mountainous coastal setting, mild climate (snowfall is uncommon)
- Local economy is dominated by cattle feedlot, agriculture & fishing
- Sealed road & forestry road access
- Several surface Water Storage Dams for agriculture use
- Communications is excellent (cell phone & internet)
- 3.5 hours drive from Seoul to Jangheung via Suncheon Expressway
- Jangheung town is 15 minutes drive from project area
- Jangheung town population is 53,392
- Modern shops, offices, apartments, houses, hotel-motel style accommodation

### Historical Exploration:

*The Korean Institute of Energy Resources* explored the area 1971-1982. KIER and discovered:

- 'Cluster' of 16 Breccia Pipes, related to Diorite Porphyry intrusion
- Pipes display subvertical 'inverted cone', 'carrot-shaped' morphology
- Only 3 pipes were drill-tested (12 holes for 1,524 metres)
- Ag not assayed in core but is significant ( $>100\text{g/t Ag}$ ) in rock chips
- Bulk sample assayed 1.12% Cu, 5.43% Pb, 4.30% Zn, 143g/t Ag

### Jangheung Tenure:

- Application Rights for 4 Mining Rights. In process to Granted status.

### Exploration Potential:

- Most of the Breccia Pipes are un-explored and remain open
- More 'blind' pipes can be expected



# Jangheung - Polymetallic Breccia Pipes

## Historical Drill Intersections:

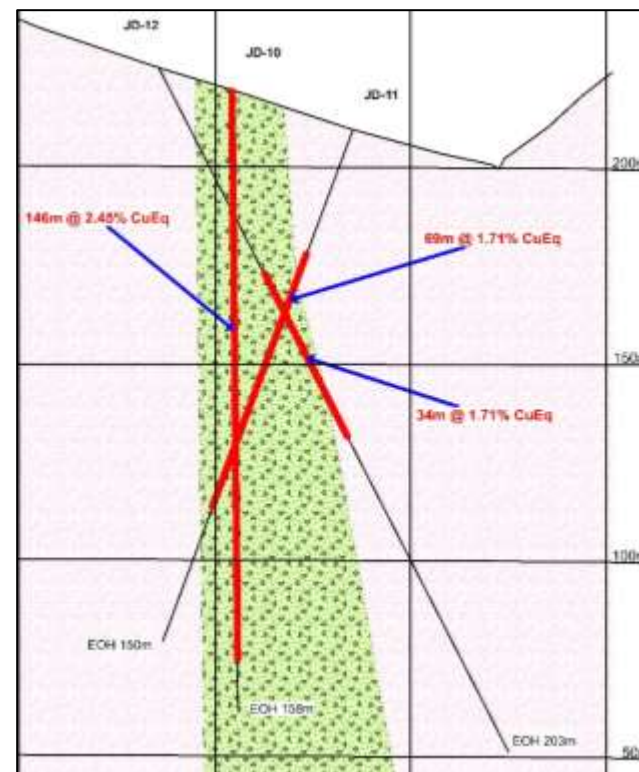
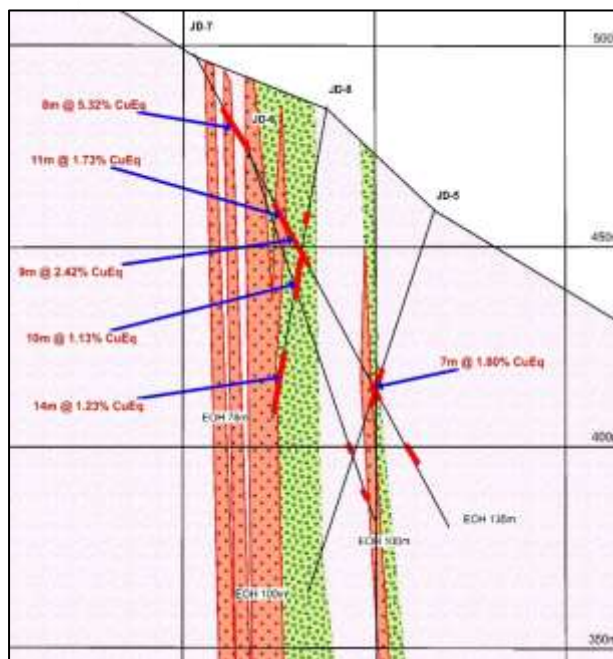
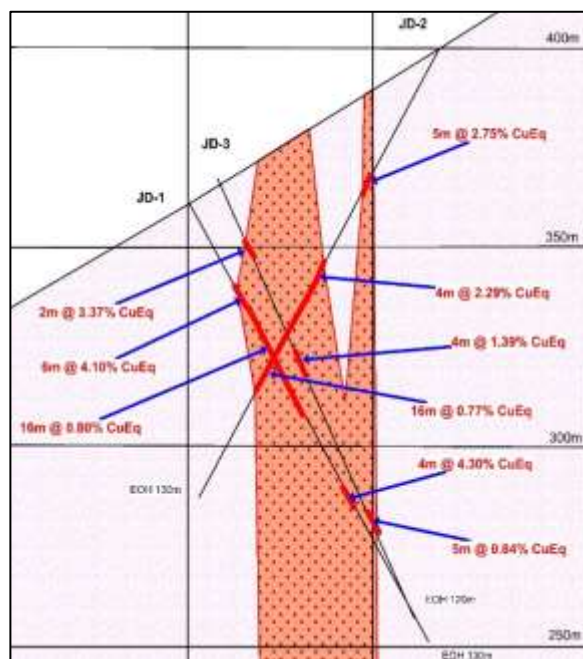
Intersection	CuEq (%)	Hole ID	Interval	Breccia ID	Cu (%)	Pb (%)	Zn (%)
146m	2.45	JD-10	0 - 146m	Anomaly B	0.44	0.26	4.87
69m	1.71	JD-11	33 - 102m	Anomaly B	0.21	0.09	3.73
34m	1.71	JD-12	71 - 105m	Anomaly B	0.28	0.19	3.47
8m	5.32	JD-7	16 - 24m	Anomaly E	1.27	6.03	4.80
9m	2.42	JD-7	53 - 62m	Anomaly E	1.10	1.27	2.20
6m	4.10	JD-1	23 - 29m	Anomaly I	0.16	2.85	7.40

CuEq was calculated using April 2016 metal prices of: Cu = US\$2.18/lb, Pb = US\$0.78/lb, Zn = US\$0.86/lb

## Historical Resource Estimate:

KIER (1982) estimated an “inferred mineral resource” of:

- **1Mt @ 5% combined Cu-Pb-Zn**
- This resource estimate is historical and is not compliant with the current JORC reporting code.





# Jangheung – Geological Model

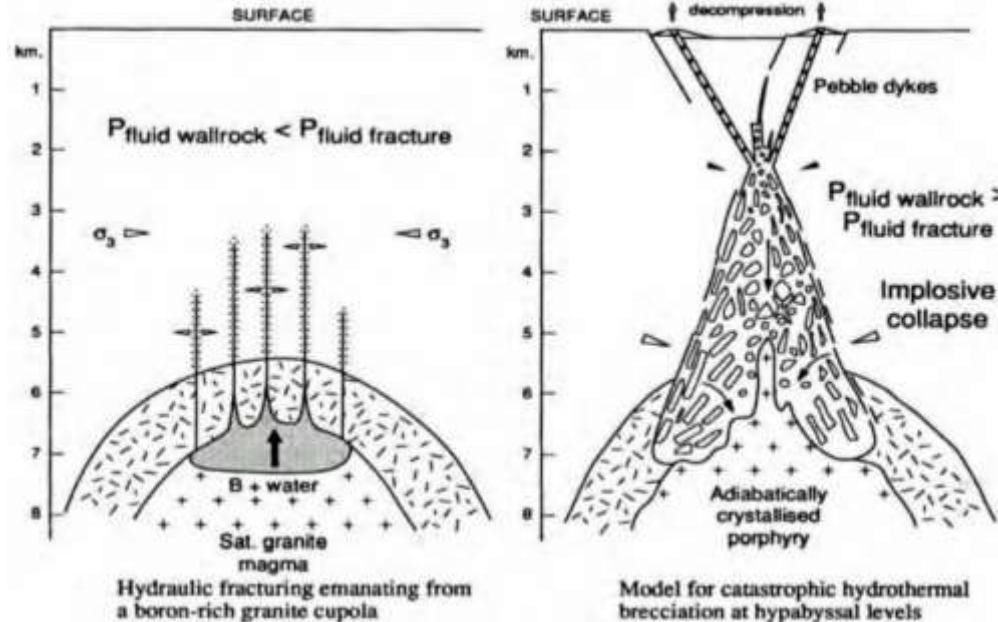
## Magmatic-Hydrothermal Breccia Pipe Model




### Magmatic-Hydrothermal Breccia Pipe Model (Halls, 1994)

The breccia pipe is developed as an inverted cone/carrot-shaped body, sitting above an inferred 'blind' porphyry intrusion at depth.

- As the granite magma rises, boron-rich fluids and volatiles accumulate in the cupola of the (diorite porphyry) intrusion.
- Fluid pressures build up in the overlying rocks as the (diorite porphyry) intrusion rises.
- Hydraulic fracturing "ring fractures" form around the pipe, propagate and then penetrate upwards.
- When fluid pressures in the wallrocks exceed the fluid pressures in the overlying fractures, sudden decompression occurs.
- Implosive collapse follows decompression event.
- Mineralization is deposited in void spaces in the breccia. Best grades occur on pipe margins.
- Adiabatic crystallization (due to heat loss) of the underlying (diorite porphyry) intrusion.







# Exploration Program

6



# Exploration & Development Program



## Uiseong Program & Budget – Year 1



### Geological Surveys:

- Geological Mapping & Sampling at 1:5,000 scale
- Preliminary 3D Geological Model .... Completed by *GeoEconomics*

### Geophysical Survey:

- Drone UAV Airborne Magnetometer & VLF-EM Survey (US\$50,000)

### Phase 1 Drilling Program – Dongil:

- Designed to Check/Confirm Historical Drill Results (US\$900,000)
  - 300m hole spacing, 12 holes (2,800m HQ core)
- Evaluate Deposit Geology & Mineralization orientation & style

### Phase 2 Resource Definition Drilling Program - Dongil:

- Establish Field Depot, Equipment purchases (US\$500,000)
- Phase 2 Resource Definition Drilling (US\$1,000,000)
  - 50m hole spacing, 25 holes (4,900m RC-HQ core)
- DGPS Surveying of Drill Sites (including Historical & Phase 1 Drill Sites)
- JORC Resource Estimate (US\$50,000)

### Metallurgical Testwork - Dongil:

- Complete Detailed Metallurgical Studies on Drill Core (US\$120,000)
- Evaluate Processing Options (Gravity, Flotation, Leach, Sorter Technologies)
- Locked Cycle Testwork (US\$200,000)

### Geotechnical Studies - Dongil:

- Geotechnical Studies - routinely undertaken on HQ Drill Core
- Evaluate Sustainable Mining with Drilling Method



# Exploration & Development Program



## *Haman & Goseong Programs – Year 1 & 2*



### **Geological & Geophysical Surveys Haman & Goseong:**

- Geological Mapping & Sampling at 1:5,000 scale
- Drone Airborne Magnetometer & VLF-EM Surveys (US\$60,000)

### **Exploration Target Drilling - Haman:**

- Phase 1 Check/Confirmation Drilling of Historical Drill Results (US\$650,000)
  - Jaeilgunbuk, 2 holes (600m HQ core)
  - Oguk, 1 hole (300m HQ core)
  - Gilgok, 2 holes (600m HQ core)
  - Bukgok, 1 hole, (300m HQ core)
  - Ebisu, 1 hole (300m HQ core)
  - Gunbuk, 2 holes (600m HQ core)

### **Resource Definition Drilling:**

- Evaluate results from Haman Phase 1 Drilling Programs
- Phase 2 Drilling of best Exploration Target (US\$1,000,000)
  - 12-15 holes, 3,550m RC-HQ core
  - DGPS Surveying of Drill Sites (including historical drill sites)
- Preliminary JORC Resource Estimate (US\$50,000)

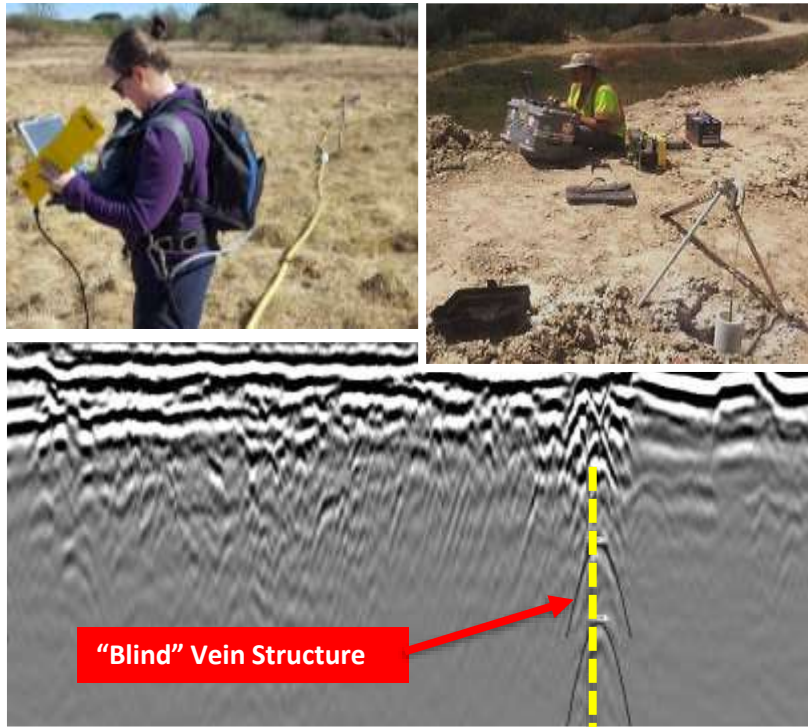
### **Exploration Target Drilling - Goseong:**

- Phase 1 Check/Confirmation Drilling of Historical Drill Results (US\$650,000)
  - Samjeon, 2 holes (600m HQ core)
  - Samsanjaeil South, 2 holes (600m HQ core)
  - Goseong/Samsan/Seongji, 2 holes (600m HQ core)



# Vein Mapping Technologies

## Narrow Vein Mapping Technologies



### Ground Penetrating Radar:

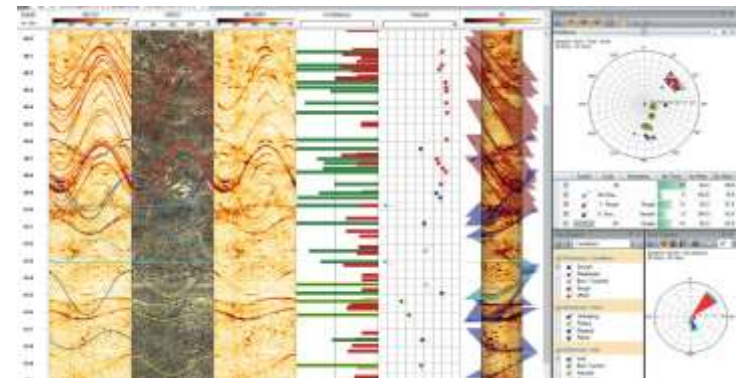
- Rough Terrain Antenna “snake” dragged through jungle
- Radio signals Transmitted
- Reflected Pulse Return signal Recorded
- “See the Vein” within Bedrock below Soil-Colluvium “Cover”

### Diamond Core & RC/DTH Drill Holes:

- Orientated Core used to Confirm Vein Structure
- Geology, RQD, Fractures, Joints, Hardness, Strength Data
- Geochemical Assaying of Vein & Alteration halo
- Engineering Data evaluated for SMD operation
- Geo-Metallurgical Data evaluated for Mill operation
- Resource Estimation

### Acoustic/Optical Borehole Televiewer:

- Lowered by winch into Drill Holes after completion
- Drill Hole Orientation Survey is highly accurate
- Sonic pulses transmitted and return signal recorded
- Vein, RQD, Fracture & Joint Orientations Confirmed insitu
- Engineering Data collected evaluated for SMD operation

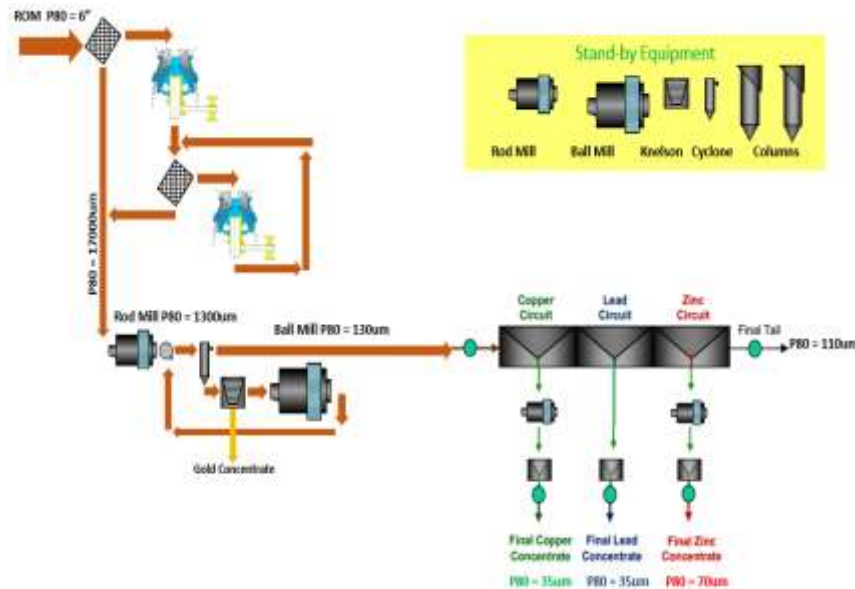




# Exploration & Development Program



## Uiseong Program & Budget – Year 2



### Preliminary Economic Assessment:

- Resource Estimate JORC Compliant (US\$1.2M)
- Metallurgical Flow Sheet (US\$500,000)
- Complete Preliminary Economic Assessment Report (US\$200,000)
- Review Results & Recommendations
- Continue Feasibility Studies

### Environmental Social Impact Assessment:

- Commence 12-Month, 4-Seasons "Baseline" Studies (US\$400,000)
- Permit to Mine - Application prepared & lodged (US\$100,000)

### Bulk Trial Mining Study:

- Sustainable Mining by Drilling
  - On-site evaluation of Pile Top RCD Drill
  - Pilot Plant
- Conventional Mining Evaluation

### Mine Engineering Studies:

- Development Studies (US\$100,000)
  - Optimization Studies
  - Satellite Mine Options
- Drone UAV High-Res 3D LIDAR-Photogrammetry Survey (US\$50,000)
- Preliminary Site Engineering Studies (US\$100,000)
- Review Results & Recommendations
- Continue Feasibility Studies



# Environmental & Social Impact Assessment



## EISA Process & Mine Permitting

### Adopt Environmental “Best Practice”:

- Non-Toxic Glycine Lixiviant
- Acid Flows – Contained within Vats
- Recovery & Recycle use of Glycine & Process Water
- Low Energy Consumption
- No Tailings Dams – Paste Backfill of RCD Drill holes
- Rapid Rehabilitation & Revegetation of RCD Drill sites



### Community Engagement Concepts:

- KME experience working with Local Government & Community
- No Tailings – Community Acceptance for Mining
- School Facilities, Scholarships, Local Community Projects
- Local Business - Supply Contracts
- Land Acquisition or Long Term Land Lease – if required

Project Description: Project Characterization & Background Document, Scoping Study Report.

#### Draft Assessment Plan (DAR):

- Qualified ESIA Agent selected & appointed.
- ESIA Committee established..
- Identify Stakeholders, including Landowners, Local Community, Local Government, Provincial Government, Regulatory Agencies involved in ESIA process.
- Key Project Issues, Regulatory Responsibilities, Stakeholder engagement, Develop Regulatory Review & Tracking Mechanisms, Identification of Local Restrictions, Habitat Conservation Protection Zones, Cultural Heritage.
- Identify additional Technical Issues to meet International Best Practice.
- Development of Management Plan, Prevention & Mitigation Measures.
- Preparation of Draft Assessment Report (DAR). Submission of DAR to Stakeholders.

#### Baseline Studies

- Baseline Studies designed. Background data collected over 4 seasons (12-month period):
  - Surface Hydrology.
  - Groundwater.
  - Air Quality: Dust, Noise.
  - Fauna & Flora.
  - Local Community – Household Survey.
- Data Analyzed & Social Impact Evaluation.

#### Stakeholder Engagement, Group Discussion & Public Consultation

- Regulatory Agencies involved in ESIA process.
- Project Background Information Document distributed to Local Community for comment.
- Community Liason Office. 30-day Public Notification Awareness Campaign.
- Group Discussion Meeting.

#### Public Hearing

- Comments from Stakeholders.
- Comments from Local Community.

#### Revision of the DAR & Finalization of the ESIA

- Collection of Opinions on the DAR.
- Collect Opinions from Public Hearing.
- Review of ESIA by Korea Environmental Institute.
- Recommendations from ESIA Committee.





Mining  
Concept

7

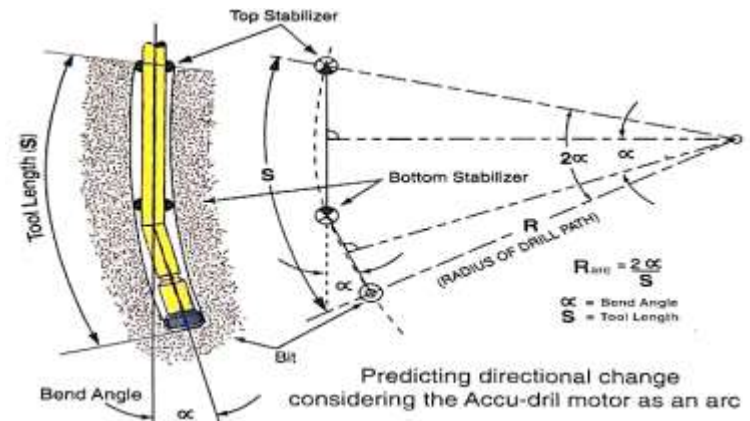
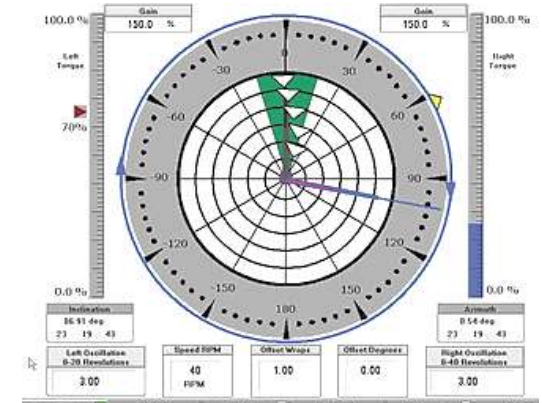
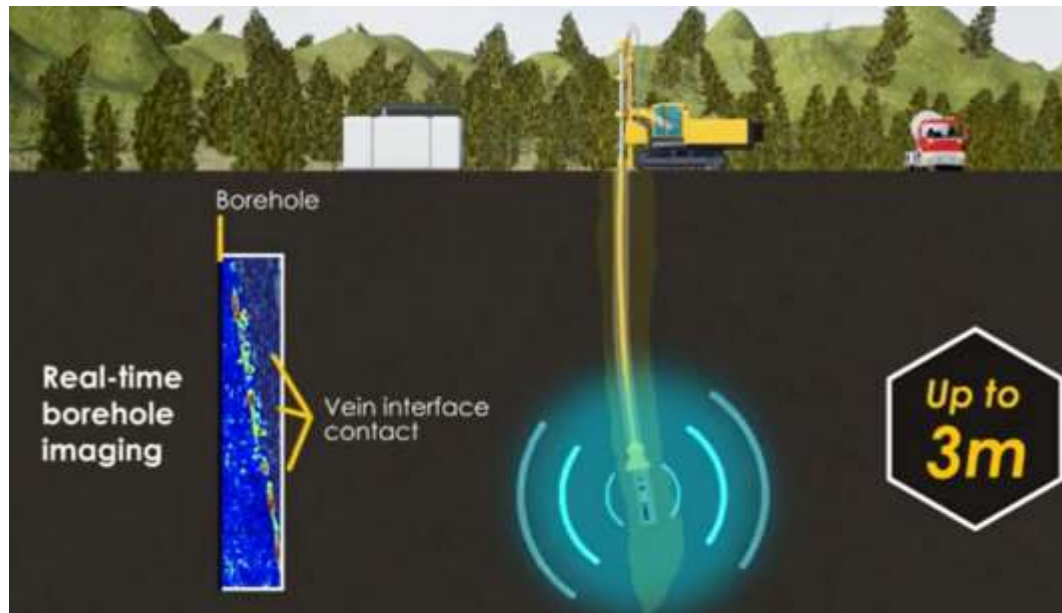


# Vein Mapping & Directional Steering Technology



## Novamera Inc Technology

1. Pilot Hole drilled into Vein with Borehole Radar Probe attached to NQ Core Barrel
2. Subsurface Imaging Radar & Direction Locator guides the Pilot Hole
3. Survey Tool - Measures Continuous Hole Orientation (Azimuth, Dip & Depth)
4. Borehole Radar Imaging - "Sees the Vein" by Varying Radio Signal Frequency
5. Directional Steering Motor Tool - steers the Pilot Hole to "Follow the Vein"
6. Objective is to keep the Pilot Hole midway between Hangingwall and Footwall





# Pile Top RCD Drill Rig

## Principle of Operation

Used in Civil Engineering - Foundation Piles

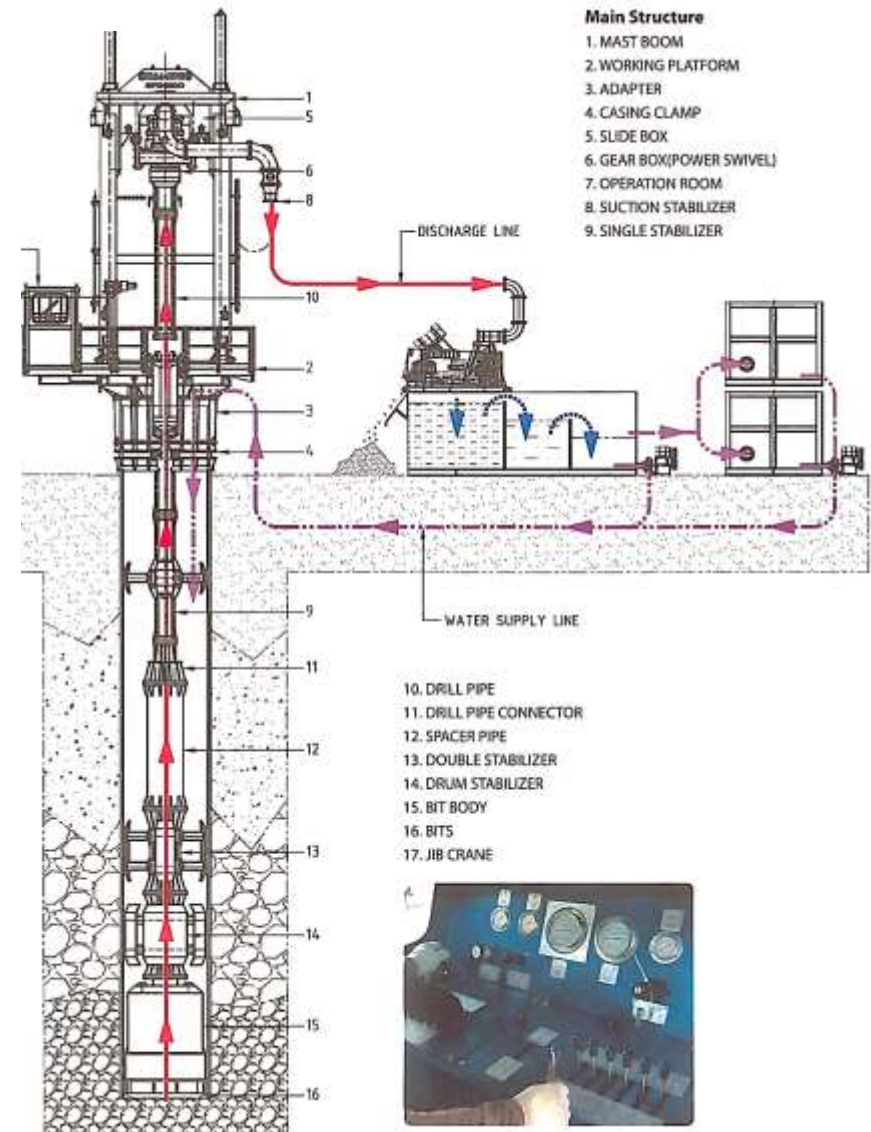
Reverse Circulation Drilling method (“RCD”)

Standard Equipment for Pile Top RCD Operation:

- Power Pack
- Air Compressor
- 1 Driller + 2 Offsiders
- Wireless Remote Monitoring & Control

Pile Top RCD Operation Sequence:

1. RCD Drill positioned over Pilot Hole
2. Bottom Hole Assembly attached to Power Swivel
3. Water Pumped into the Hole and Drilling proceeds
4. Compressed Air injected through the Drill Pipe
5. Solid Cuttings enter the Cutting Head-Suction opening
6. Air-Liquid flow “Lifts” Cuttings to surface inside Drill Tube
7. Drill Rod String is extended by adding 3m Drill Pipe runs
8. Stabilizers are fitted to support the Drill String
9. Drill Cuttings de-watered by Cyclone and Mud Tanks
10. Water Recycled by Mud Tanks for Re-use by RCD Drill
11. Drill Tube recovered
12. RCD Drill moved to next hole





# Pile Top RCD Drill Rig

## Drill Bit Cutter Technology

**Novamera has 8 Custom Innovation Patents pending:**

**Near Borehole Imaging Tool (“NBIT”) Developments:**

- Directionality improvements to Reflected Return Pulse signal
- Integrate Survey Tool into GPR & Wireline Tool

**Drill Bit Developments:**

- “Stinger” follows pilot hole trace within the Vein
- Deviation of 1° per 3m run with Drill Tube “Joiner”



- Hole Drill Bit Diameter 1.0 – 6.8m is Varied to suit Vein width
- Number of Roller Bit Cutters fitted depends on Hole Diameter
- Cutter Selection - depends on Rock “Drillability” Parameters:
  - Hardness, Abrasivity, Tensile & Compressive Strength
- Tungsten-Carbide Bit & Matrix Metallurgy - Continuous Development
- Manufactured in South Korea, Germany, Sweden, UK & Canada
- Series 13 Roller Bit Cutters: Button, Tooth, Disc or Universal Types

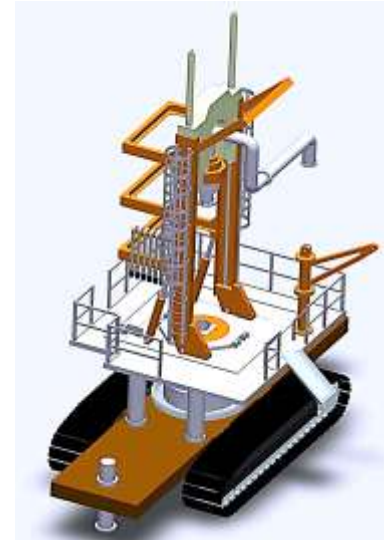


# Sustainable Mining by Drilling

## *Sustainable Mining by Drilling Operation*

### Mobile Crawler Track-Mounted Design:

- Engineering Drawings prepared (*Novamera*)
- Power Pack, Air Compressor
- Tracked Carrier with Jib Crane to support
- 1 Driller + 2 Offsiders
- Wireless Remote “Off Site” Monitoring & Control



### Envisaged Sustainable Mining by Drilling Operation:

1. Bottom Hole Assembly is attached to Power Swivel
2. Water pumped into the Hole and Drilling proceeds
3. Drill Cuttings “air-lifted” to surface as a slurry
4. Solids dewatered & collected
5. Transported to mill by pumping or truck
6. Water is recycled for re-use in Drilling Operation
7. Drill Bit and Drill Tube recovered when EOH reached
8. RCD Drill Rig moves onto next Drill Site
9. A 2-4m “Stope” left between holes is “Mined” later
10. RCD Hole is backfilled with Waste and Mill Tailings
11. Rehabilitation & Revegetation of Drill Site commences





# Milling Concept

8



# Beneficiation of SMD Drill Cuttings

## Pre-Concentration Technologies Identified



-2mm Drill Cuttings



SMD Drill Cuttings provide direct “Run-Of-Mine” Feed:

- Real Time Assaying of Cuttings – Waste or Ore streams
- Waste is returned to RCD Hole void
- -2mm can be Tertiary Crushed by VSI/Cone Crusher

Classifier Plant (Wet):

- *Alljig, Floatex Hydrosizer, Reflux Classifier, Hydrosort*

Dense Media Separation Plant (Wet):

- 2-1mm processed to Concentrate Sulphide Ore Feed
- *Sepron Condor*

Gravity Concentration Plant (Wet):

- -1mm Screened Slurry processed to Recover GR-Gold
- *Gekko IPJ, Falcon, Knelson Concentrators*

Advantages:

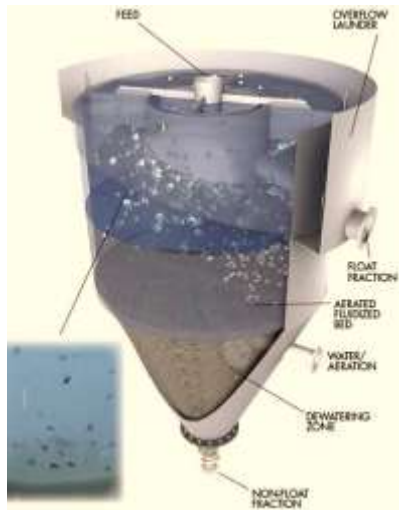
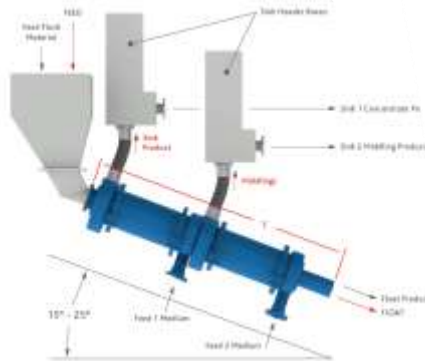
- Low Capital & Low Operating Costs
- Highly Effective in “Up-Grading” Mill Feed
- Early Rejection of Waste - Minimize Dilution & Handling
- Waste is Returned to the RCD Hole void as Backfill
- Water is Recycled for re-use
- Fully Automated, Compact Size & Easily Transported
- Suitable for Satellite Mining Operations





# Pre-Concentration & Flotation

## Pre-Concentration & Flotation of Sulphides



### **Sepro Condor Dense Media Separator**

- Collects -2mm heavies (Sulphides); Rejects light (Waste)

### **Flash Flotation Pre-Concentration Plant Options**

- Processes the Gravity Concentration Circuit Overflow
- **Pre-Concentrate Sulphide Ore**
- **Increases Feed Grade to VAT Leach Plant**

### **Eriez Hydrofloat™ Separator**

- Efficient Recovery of coarse Sulphides

### **OutuTec C-Plant Flotation**

- “Turn Key” Flexible Small Plant Design
- Flotation & Launder Modules
- *OutuTec Courier® Analyzer* - Instant Assays of Flotation products
- High level of Automation & On-Site Troubleshooting possible
- **Reduced EPC Costs**
- Minimal Civil Engineering Site Works
- Pre-Commissioning done before Delivery
- **Low Capital Cost**
- Compact Size; Containerized for easy Transport
- **Mobile Plant - Ideal for Satellite Mine Operations**



# Milling Technology

## Environmentally-Friendly CVL Process



### Continuous Vat Leach (“CVL”) Plant

#### “Turn Key” 50-100tph Capacity Plant (*Innovat MPS*)

- Plant Simplicity, Value for Money
- Simple to Operate – only limited Operator Training required
- Low Capital Cost
- Low Operating Cost (low electrical power requirement)
- Compact Size - Minimal Impact on Environment

### GlyLeach™ Process

#### Developed by *Mining & Process Solutions Pty Ltd* (Perth)

- Glycine amino acid Lixiviant
- Readily Available & Low Cost
- Suitable for Treating both Cu-Au-Ag Sulphide & Oxide Ores
- Covellite Copper Concentrate product – sold to Refinery
- Recovery of Pb & Zn is possible
- Au & Ag Dore produced by conventional Electrowin & “Batch” Gold Pour
- “Sighter Testwork” by MPS Perth

### Environmental Best Practice – Community Acceptance

- Non-Toxic
- Acid Flows – Contained within Vats
- Recovery & Recycle use of Glycine
- Reclaim & Recycle of Process Water
- Low Energy Consumption (water pumps, conveyors)
- No Tailings Dams – Paste Backfill of RCD holes



# Water Recycling & Waste-Tailings Disposal

## RCD Hole Void:

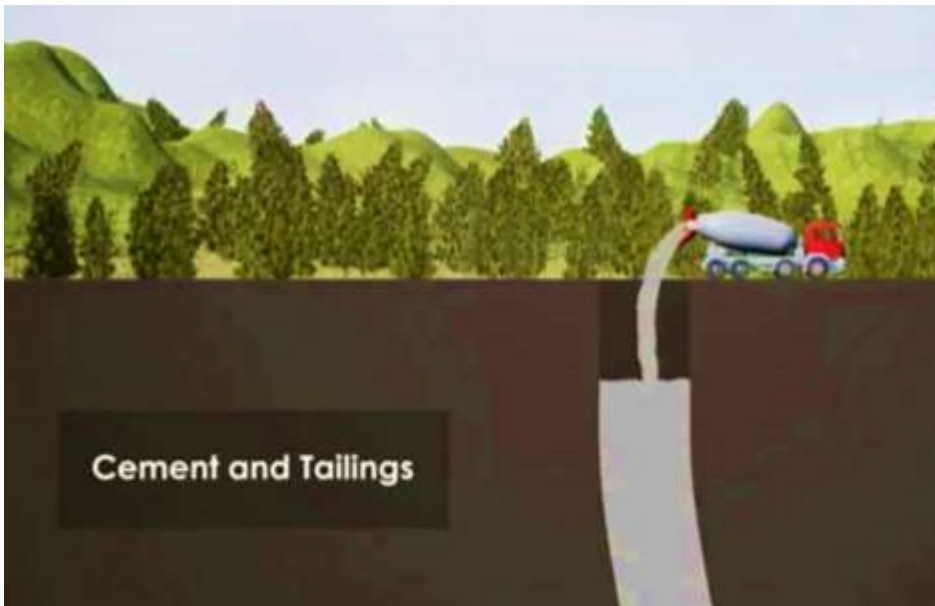
- Used as a Temporary Water Storage Facility for the next RCD Drilling Operation

## Waste Cuttings & Mill Tailings (Wet or Dry) is Returned to the RCD Hole Void:

- De-watered by De-Sander or Filter Press
- Returned to the RCD Hole as Dry, Moist or Wet Backfill
- Settling of Wet Tailings is aided by “Columnar” configuration of Hole & Water Currents
- Precipitation by Mineral Turbidity can be Expedited by addition of Flocculants/Coagulants
- Water is Clarified and Recovered from Top of Column
- Water is Re-used in Drilling & Milling operations

## Paste Tailings can be Backfilled in RCD Hole void:

- Paste Backfill can also be Cemented/Neutralized if needed





# Rehabilitation of Drill Site & Mine Closure

**SMD operation facilitates Rapid Restoration of the “mined path” above Veins**

**Rehabilitation commences after the RCD Drill moves onto next Drill Site:**

- Stockpiled Topsoil is Replaced on the Drill Site
- Dressing, Seeding & Sapling Planting commences
- Rehabilitation facilitated using existing Water Storage Ponds

**Water Ponds used as Dams & Wildlife Habitat after Mine Closure**





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