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New Exploration Ideas For the Ayawilca Zinc-Silver-Indium-Tin Property, Central Peru

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Abstract

The Ayawilca zinc-silver-indium-tin discovery is a carbonate replacement deposit (CRD) hosted predominantly by Pucará Group rocks of Triassic-Jurassic age at a depth of ~150 to ~400 meters, with recent new evidence that there are repetitions of these rocks below Paleozoic basement belonging to the Excelsior Group. Sphalerite (both iron rich and iron poor) occurs as stacked massive sulphides within broadly vertical replacement zones up to 200 metres thick, or as narrow veins, or as flat lying 'mantos' typically 10-15 metres thick. Sphalerite is accompanied by other sulphides including pyrite and pyrrhotite, commonly replacing early magnetite. Zinc mineralization also occurs as thin, high grade mantos and veins within the overlying Goyllarisquizga Formation, a flat lying clastic unit typically 150-200 meters thick.

Resumen

El descubrimiento de zinc-plata-indio-estaño de Ayawilca es un yacimiento de reemplazamiento en carbonatos (CRD) hospedado principalmente en rocas del Grupo Pucará de edad Triásica-Jurásica, a profundidades de entre ~150 a ~400 metros. Datos recientes evidencian que existen repeticiones de estas rocas debajo del basamento Paleozoico perteneciente al Grupo Excelsior. La esfalerita (sea rica o pobre en fierro) ocurre como sulfuros masivos apilados dentro de cuerpos de reemplazamiento generalmente sub-verticales de hasta 200 metros de espesor, así como vetas delgadas o mantos sub-horizontales con potencias típicas entre 10 a 15 metros. La esfalerita está acompañada de otros sulfuros como pirita y pirrotita reemplazando, comúnmente, magnetita temprana. La mineralización de zinc también se presenta como mantos y vetas delgados de alta ley dentro de la Formación Goyllarisquizga sobreyacente, la cual es una unidad clástica sub-horizontal con potencias de entre 150 a 200 metros.

1. Introduction

Tinka Resources Ltd. has been exploring the Ayawilca zinc-silver-indium-tin property, located in the Pasco Region of Central Peru, since 2005 (*Figure 1*). Ayawilca was originally explored as a bulk tonnage disseminated silver prospect at the Colquipucro zone and, following the discovery of massive sulphide zinc-rich replacement bodies at Ayawilca, the exploration focus shifted towards finding zinc mineralization hosted in carbonates (Sillitoe, 2010).

In 2018, Tinka published an updated mineral resource estimate consisting of 11.7 Mt of indicated resources grading 8.1% Zn equivalent (6.9% Zn, 84 g/t In, 15 g/t Ag and 0.2% Pb), plus an additional 45.0 Mt of inferred resources grading 6.7% Zn equivalent (5.6% Zn, 67 g/t In, 17 g/t Ag and 0.2% Pb). Additionally, Ayawilca contains an inferred tin zone resource estimate consisting of 14.5 Mt grading 0.70% Sn equivalent (0.63% Sn, 0.21% Cu and 18 g/t Ag). Following a reinterpretation of the geology and the structural framework of Ayawilca, Tinka completed a 20,000-metre drill program during 2018, confirming the presence of repetitions of favourable carbonate host rocks under the basement contact and discovering mineralization in new areas.

Figure 1. Location of the Ayawilca project.

2. Geology and Mineralization

The oldest rocks found at Ayawilca are Paleozoic aged phyllites assigned to the Excelsior Group. Lying unconformably over the Excelsior Group rocks is a sequence of brecciated limestone rocks of the Triassic-Jurassic Pucará Group. The Pucará Group in this part of Central Peru is undifferentiated and is between 150 and 250 metres thick. Overlying the carbonate rocks is a 200-400 metres thick clastic sequence of conglomerate, mudstone, siltstone and sandstone units belonging to the Goyllarisquizga Group of Cretaceous age. As for the Pucará Group sequence, the Goyllarisquizga is undifferentiated in this part of Peru (Cobbing et al., 1996) (*Figure 2*).

The Mesozoic rocks in Ayawilca are generally flat-lying. An asymmetrical anticline near the western edge of the known mineralization folds the sequence and, towards the eastern edge of the deposit, the sequence is folded as an overturned syncline, leaving an apparently less deformed central block.

Zinc mineralization is hosted mainly by the Pucará Group carbonate sequence and occurs as stacked massive sulphides within broadly near vertical replacement bodies often affecting the whole carbonate equence. Additionally, sub-horizontal mantos extend up to 1 km outward from these thicker replacement bodies (Figure 3). Mineralization is also observed as veins and thin mantos in the overlying Goyllarisquizga rocks.

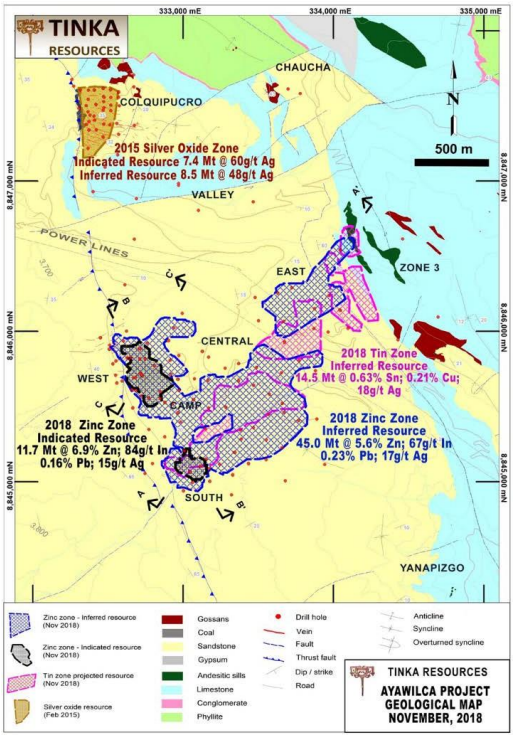

Figure 2. General Geology of the Ayawilca project.

3. New Interpretation and Recent Exploration

Recent drilling and detailed re-logging of previous holes has found that the contact between the Pucará and the Excelsior Group rocks is typically faulted. Clastic units found in contact with the Paleozoic basement at Ayawilca South are in fact Goyllarisquiza blocks overthrusted by older carbonate rocks above ramping reverse faults. Tinka geologists extrapolated that, just as carbonate rocks are thrusted over younger clastic rocks, older Paleozoic rocks may be thrusted over carbonate rocks.

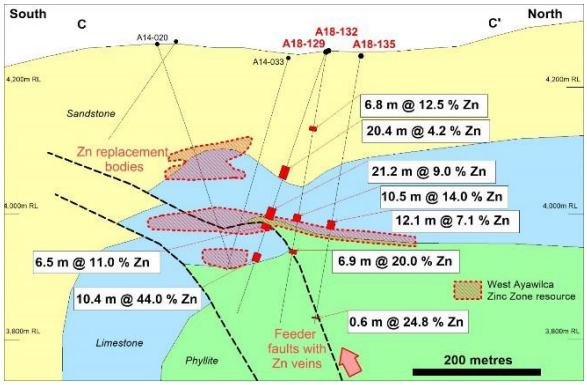

Figure 3. General cross section of West Ayawilca looking Northwest.

The 20,000 metre 2018 drill program has confirmed that Excelsior Group phyllite is thrusted over younger Pucará aged limestone in several locations, especially near the higher grade and thicker replacement bodies at Ayawilca West and South (*Figure 3* and *Figure 4*).

Multiple low angle thrusts affect the carbonate sequence at Ayawilca West and South, creating several traps for high grade mineralization and providing fluid pathways that allowed the whole carbonate sequence to be replaced by sulphides. Early assemblages, such as magnetite and/or pyrrhotite are thus observed higher up in the carbonate sequence than elsewhere in the deposit, where no thrusts are observed.

Drill hole	From (m)	To (m)	Interval (m)	Zn (%)
A18-114	300.00	319.30	**19.30**	**9.2**
including	*300.00*	*304.00*	***4.00***	***16.2***
and	351.40	365.80	**14.40**	**12.8**
including	*352.30*	*354.30*	***2.00***	***11.8***
including	*357.00*	*358.40*	***1.40***	***29.2***
including	*361.20*	*365.80*	***4.60***	***16.8***
A18-118	237.30	343.80	**106.50**	**6.8**
including	237.30	240.20	**2.90**	**24.1**
including	252.30	264.10	**11.80**	**6.4**
including	270.00	293.90	**23.90**	**9.2**
including	311.90	343.80	**31.90**	**9.6**
including	334.00	343.80	**9.80**	**17.0**
A18-129	197.60	218.00	**20.40**	**4.2**
and	*260.00*	*281.20*	***21.20***	***9.0***
including	*277.00*	*281.20*	***4.20***	***19.2***
and	*290.50*	*297.00*	***6.50***	***11.0***
and	*339.40*	*351.30*	***11.90***	***39.6***
including	*340.60*	*351.00*	***10.40***	***44.0***

Figure 4. Example of the drilling results obtained during the 2018 drill program.

4. Conclusions

Tinka has been exploring its limestone hosted Ayawilca zinc and tin deposit since 2011. Recent drilling completed during 2018 has allowed the Company to update its resource estimates for both the zinc and tin zones. A new geological model was constructed for the 2018 resource estimate, incorporating recent observations and interpretations, such as low angle thrusting placing Paleozoic rocks over the Jurassic sequence, and Jurassic aged limestone over Cretaceous aged sandstone. This previously unrecognized low angle faulting opens up further exploration potential at depth in possible repeated limestone blocks under slivers of Paleozoic rocks.

Bibliography

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