# NA Tungsten - Cantung
## Knelson Gravity Solution Project Fact Sheet

**Project:** Cantung Mine
**Owner:** North American Tungsten
**Location:** Tungsten, NWT
**History:** Operated from 1962 -1986, again from 2002 - 2003
Re-Opened in 2005
**Objective:** Scavenging Scheelite Flotation Tails with CVD32-2
**Application** Tungsten – Scheelite ($WO_3$)

### Background

NA Tungsten operates the Cantung mine situated in the Northwest Territories near the Yukon border. The 1200t/day (50t/hr) tungsten operation consists of crushing, grinding, sulfide flotation, shaking tables and scheelite flotation. Mill feed grade ranges from 1.0-1.5% $WO_3$ with overall recoveries in mid 70's. Cantung is 100% owned by NA Tungsten and is the "Western world's largest tungsten supplier".

Knelson Concentrators was commissioned by NA Tungsten to conduct metallurgical test work to investigate the recovery of tungsten in the form of Scheelite from mill tailings. Initial bench scale test work conducted at Knelson's Research and Technology Center located in Langley, British Columbia produced encouraging results. The results warranted pilot scale trials using Knelson's Continuous Variable Discharge (CVD-6) onsite. The trials confirmed the positive findings from the bench tests.

### Application

The Cantung processing plant takes advantage of the difference in specific gravity between $WO_3$ (SG 6.0) and its host rock (SG 2.6) by utilizing a gravity circuit in their plant through a series of rougher, scavenger and cleaner tables to recover the coarse fraction followed by scheelite flotation to recover the fines fraction. Knelson's CVD32-2 was installed in the scheelite flotation tails stream to scavenge $WO_3$. The objective was to upgrade the scheelite flotation tails from 0.3% to 1.0% WO3 or higher and return the concentrate back to circuit at the rougher tables for reprocessing. The aim was to recover

30% of $WO_3$ remaining in the tails in a 10% concentrate mass while maintaining at least a 1.0% $WO_3$ grade.

**Successful Implementation**

After various optimization initiatives the CVD32-2 is consistently producing concentrate in the range of 1.0% $WO_3$ and in less than 10% of the tailings stream. Concentrate produced from the CVD32-2 is pumped to a Knelson designated primary rougher and cleaner table. Assays on cleaner table concentrate show that $WO_3$ of saleable grade and sizable quantity is produced, providing immediate economic benefit. The true economic benefit from the CVD32-2 is difficult to quantify since table middlings and tails are integrated back to the main process circuit for regrind, additional tabling and flotation.

**Mill Data**

- Reopened in 2005 after being shut down in 2003
- Mill feed grade 1 -1.5 % $WO_3$ processed at 50 t/hr
- Overall recovery in the mid 70's
- Final tailings grade 0.3% $WO_3$
- Final tailings has a $P_{80}$ = 230 µm

**Knelson Installation Benefits**

- Final mill tails grade dropped by approximately 0.02% $WO_3$
- Concentrate produced is coarse therefore easily tabled
- Acts a recovery scavenging blanket during plant upsets
- Increased overall mill recovery by at least 1%
- At current production pay-back of Knelson well under 1year

**Client Feedback**

> "In our economic analysis we determined that over a 4 month period we realized an incremental increase in over-all recovery of 1.5% generating on an annual basis in excess of $800,000; resulting in a payback of about 4 months on a capital cost of $262,000."
>
> **Harold Schwenk; Chief Financial Officer**
> **North American Tungsten Corporation Ltd.**