



Cobalt-Co

Investment Opportunities NORTHWEST TERRITORIES

Government of
Northwest Territories

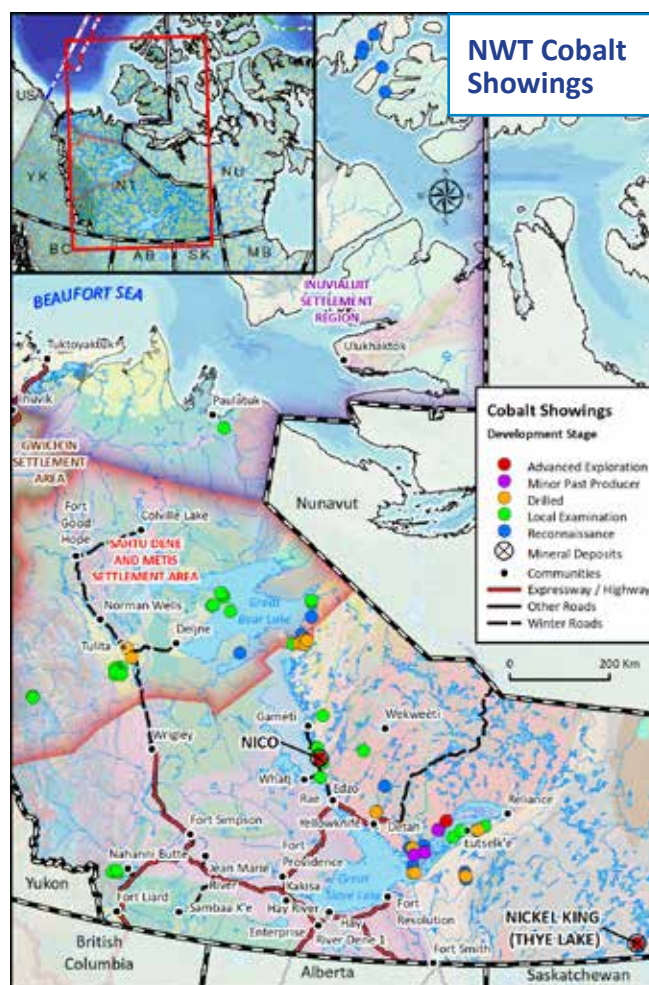
July 2018

Cobalt is recognized as a strategically important metal by both the US and European Union. This is because cobalt has become an essential metal in the rechargeable battery manufacturing and electric car industries. Metal forecasts predict that by 2019 over half of the cobalt that is produced will be used to make rechargeable batteries¹.

Northwest Territories Activity

Fortune Minerals' NICO project is an advanced cobalt-gold-bismuth-copper project that has been approved for mine development following an environmental assessment and a positive feasibility study completed in 2014. The mine as proposed was expected to support a 21-year mine life. Fortune is working on an updated feasibility study that will incorporate changes in the production rate amongst other variables. The NICO deposit contains proven and probable reserves of 33 million tonnes, including 1.1 million ounces of gold, 82 million pounds of cobalt, 102 million pounds of bismuth and 27 million pounds of copper. Negotiations into project financing are ongoing.

Fortune has environmental assessment approval to build a 49-km spur road from Whati to the proposed mine. Construction of the Tlicho all-season road from existing Highway 3 to the community of Whati is being funded by government and is slated to begin in 2019. Strongbow Exploration's Nickel King deposit in the NWT is close to the border with Saskatchewan, and approximately 145 km northeast of the town of Stony Rapids, Saskatchewan. A resource estimate was calculated in 2009 at various nickel cut-off grades. (Nickel is the primary resource, whereas cobalt is a secondary product.) Several satellite deposits and geophysical targets that remain to be tested in the area may be found to contain additional resources.



The Northwest Territories has seen cobalt production in the past from various operations located at the eastern edge of Great Bear Lake and in the vicinity of the East Arm of Great Slave Lake. Cobalt was commonly produced as a by-product of polymetallic veins.

¹ <https://electrek.co/2016/11/01/breakdown-raw-materials-tesla-batteries-possible-bottleneck/>



Cobalt-Co

Uses

- A positive electrode in lithium-ion batteries in electric vehicles and portable electronics.
- Forms a superalloy that is used in the aerospace industry to make power and jet engine turbines.
- A component of a hard-wearing alloy used in wind turbines.
- Electromechanical devices such as magnets, electric motors, generators and transformers.
- Potential as a catalyst in hydrogen fuel cells.

Growth of Cobalt Demand

Cobalt demand is currently driven by consumer demand for portable electronic devices and for electric vehicles. China is the world's largest consumer (and refiner) of cobalt and the Democratic Republic of Congo is the world's leading producer with over one-half of the world's total production.

In a typical Lithium Cobalt Oxide (LCO) battery, used in cell phones, laptops and cameras, cobalt is used as the positive electrode with approximately 60 per cent cobalt by weight. In electric vehicle batteries and power tools there is between 10-20 per cent cobalt by weight.



Cobalt is used in electric vehicle batteries.

Prospects

Name	Status	Project Owner / Manager	Resource Category	Total Resource: million tonnes (Mt)	Grade: grams per tonne (g/t)
NICO	drilled; advanced project	Fortune Minerals Ltd.	Proven and Probable Reserve	33 Mt	0.11% Co + 1.03 g/t Au + 0.14% Bi + 0.04% Cu
THYE LAKE (NICKEL KING)	drilled	Strongbow Exploration Inc.	Indicated (Main Zone)	11.1 Mt	0.4% Ni, 0.1% Cu, 0.018% Co

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For more information about these deposits, please refer to Guide to Selected Mineral Deposits of the Northwest Territories

www.iti.gov.nt.ca/en/files/guide-mineral-deposits-northwest-territories

www.nwtgeoscience.ca

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Copper-Cu

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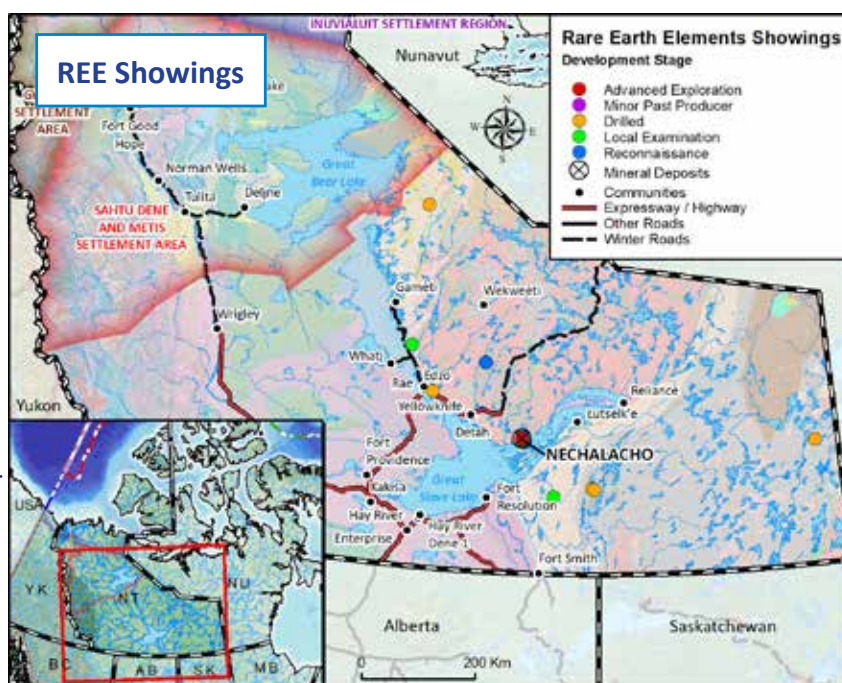
Copper is second only to silver in its ability to conduct electricity.

Native copper was initially discovered by Inuit in the Coppermine River and Coronation Gulf areas. Since then, copper has been found in sedimentary rocks in the Mackenzie Mountains, in polymetallic veins associated with silver, tungsten and gold, in iron oxide copper gold (IOCG) type deposits, in volcanogenic massive sulphide deposits and in magmatic sulphide deposits.

Past Production and Current Activity

Copper has been produced as a significant byproduct in several mines that operated in the Northwest Territories (NWT). Examples of this include the Echo Bay Mine, which was primarily a silver mine. However, from 1964 to 1976, the mine produced 4935 tonnes of copper. Echo Bay Mines Ltd's Eldorado Mine produced 2114 tonnes of copper between 1975 and 1982 as a byproduct of silver production; and, Terra Mine produced silver and byproduct copper beginning in 1969 through until 1985. In total, 1633 tonnes of copper were produced (in addition to 14.5 million ounces of silver). The Cantung Mine area was initially staked in the 1950s because of its copper showings. Cantung produced 1202 tonnes of copper in addition to over 5.3 million stu (standard ton units) of tungsten between 1962 and 1986.

Fortune Minerals Ltd's NICO project is a proposed bismuth, gold, cobalt and copper producer. The company has construction permits, is negotiating financing and will



benefit from Tlicho all-season road construction by the Government of the Northwest Territories (GNWT), planned to begin in 2019. Fortune Mineral's Sue-Dianne deposit 25 km north of NICO hosts an indicated 8.4 million tonnes of ore with an average grade of 0.8% Cu.

Copper North Mining Corp. (CNM) owns a property that covers the Coates Lake/Redstone deposit. An historic NI 43-101 non-compliant inferred resource was estimated using widely spaced holes over a strike length of 6.5 kilometres; a possible 33.6 million tonnes at a grade of 3.92% Cu was calculated. CNM is looking for a joint venture partner interested in carrying out further drilling.

Seabridge Gold Inc. (SG) holds the Deb deposit within its Courageous Lake project. Since 2003, SG has focused



Copper-Cu

its work on other areas, so the historic NI 43-101 non-compliant inferred resource of one million tonnes with an average grade of 0.83% copper, 2.96% zinc and 21.9 g/t silver has not changed.

Panarc Resources Ltd.'s Indian Mountain Lake property hosts several volcanogenic massive sulphide deposits, one of which, Kennedy Lake West, is copper enriched. An historic NI 43-101 non-compliant resource estimated the deposit contained 550,000 tonnes at an average grade of 1.12% copper.

Several other known polymetallic deposits in NWT contain copper and, if they were to be brought into production, copper would likely be produced as a byproduct.

Other Prospects

The Jay deposit lies within sedimentary rock within the Sahtu Dene and Metis Settlement Area Conservation Zone. The showing was first discovered in 1969. A non-compliant historic inferred resource estimated the stratiform deposit contained 1.2 million tonnes with an average grade of 2.7% copper.

Uses

- Widely used in the automotive industry, copper is a component in wiring, motors, radiators, connectors, brakes and bearings.
- Electrical wiring, power distribution cables, appliance wiring and communications cables all contain copper.
- Copper is in integrated circuits and printed circuit boards, electromagnets, magnetrons in microwave ovens and some cooking utensils.
- Buildings contain copper wiring, plumbing, water pipes, thermostats and paint pigments and may be used in roofs and flashing and in heat sinks and heat exchangers.
- Copper has anti-microbial applications that kill bacteria, so it is a component within bedrails, handrails, doorknobs, computer keyboards and health club equipment.

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Diamonds

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Ekati Diamond Mine, Diavik Diamond Mine and Gahcho Kué Mine are all diamond producers in the Northwest Territories (NWT). The opening of Gahcho Kué in the second half of 2016 is proof of the growth potential of NWT's diamond industry and investors' confidence.

The NWT accounts for three per cent of the world's diamond production by value. In 2017, the NWT produced approximately 20.5 million carats of diamonds with an estimated value of \$2.07 billion.¹

Diamond Production

Since November 2017, Diavik Diamond Mine is owned 60 per cent by Rio Tinto and 40 per cent by Dominion Diamond Mines ULC, a private company. Total proven and probable ore reserves at Diavik as at December 31, 2017 (and using a 1.0 mm cut-off) totalled 15 million tonnes with an average grade of 2.8 carats per tonne.

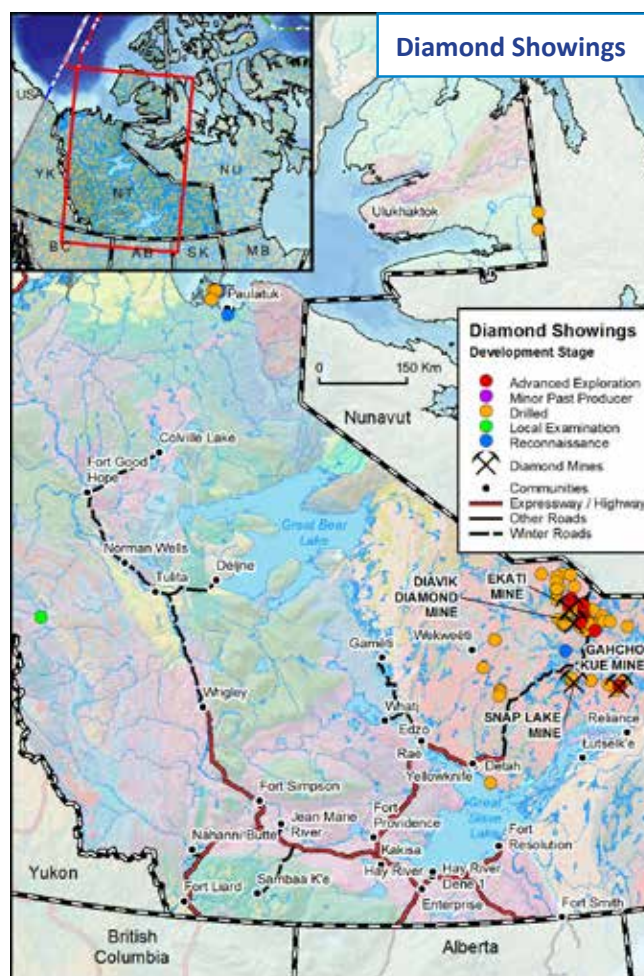
Diavik reached a production milestone of 100 million carats in 2016.

Dominion Diamond Ekati ULC owns 89.9 per cent of Ekati Mine and is the operator.

Gahcho Kué Mine officially opened in September 2016 and began commercial production in March 2017. The mine is a joint venture between De Beers Canada Inc. and Mountain Province Diamonds Inc. Mineral Reserves stood at a probable 31.5 Mt of diamond with an average grade of 1.57 carats per tonne of ore (calculated using a 1.0 mm cut-off). During 2017, the Gahcho Kué Mine recovered approximately 5.9 million carats of diamonds.

For the three months ended March 31, 2018 Gahcho Kué produced 1.641 million carats of diamond from 786,000 tonnes of ore, resulting in an average of 2.09 carats per tonne of ore. An exceptional 95 carat gem-quality diamond was recovered in May 2018.

¹ <http://www.nrcan.gc.ca/mining-materials/publications/17722>



NWT Investment Opportunities

In July 2016, DeBeers announced that it was placing the Snap Lake diamond mine up for sale. In addition to the reserves at year-end 2015 (see table), Snap Lake Mine had an indicated resource of 4.1 million tonnes with an average grade of 1.78 carats of diamonds per tonne. The mine is currently in care and maintenance and DeBeers Canada continues clean-up and restoration at the site.

Diamonds



Diamond Exploration

Mountain Province Diamonds Inc. acquired Kennady Diamonds Inc. in April 2018. The Kennady North project is adjacent to the Gahcho Kue Mine and kimberlite sampling in 2017 was highlighted by a 276-tonne sample that averaged 1.67 carats per tonne and contained a 7.78 carat gem. **Margaret Lake Diamonds** (Margaret Lake Project) and **Canterra Minerals** (Marlin, Rex, and King properties) are working in the vicinity of Gahcho Kué and Snap Lake. In addition, Margaret Lake Diamonds has partnered with **Arctic Star Exploration Corp.** to explore in the Lac de Gras area.

Exploration continues both south and north of the Ekati and Diavik diamond mines. **GGL Resources Corp.** staked an area by Yamba Lake in early 2018 that is known to host kimberlite. They plan to explore for additional kimberlite using up-to-date technology.

Northwest Territories Geological Survey released regional airborne geophysical surveys and indicator mineral datasets in 2017 that indicate high diamond, gold and base metal potential in several underexplored areas in the Slave Geological Province.

Project Name	Project Owner / Manager	Sample Result ¹	Sample Size ²	Diamonds Recovered
Lac de Gras (WO / DO27)	72.1% Peregrine Diamonds Ltd.; 17.6% Archon Minerals Limited; 10.3% DHK Diamonds Inc.	DO 27 Ind (Aug. 7 2008)	19.5 Mt	0.94 ct/t
Yamba Lake/Torrie/Triceratops	GGL Resources Corp.	Prelim	83.6 kg	68 diamonds; 6 macros
CL 25 (Camsell Lake)	Canterra Minerals Corp.	Prelim	350.4 kg	221 diamonds; 9 macros
Afridi Lake	Crown Land	Prelim	511.3 kg	46 diamonds; 4 macros
Blue Ice/Victoria Island	Crown Land	Prelim	934 kg	172 diamonds
Nicholas Bay	Crown Land	Prelim	127.7 kg	1,174 diamonds
Drybones Bay/Mud Lake	David Smith	Prelim	10 t (Drybones); 100 t (Mud Lake)	97 macros; 11 macros
Snap Lake Mine	De Beers Canada Inc.	Prb (Dec. 31, 2015)	5.7 Mt	1.26 ct/t
Kennady North	Kennady Diamonds Inc.	Kelvin (Ind); Faraday (Inf)	8.5 Mt; 3.3 Mt	1.6 ct/t; 1.54 ct/t
Ranch Lake	Mike Magrum	Prelim	855 kg	266 diamonds; 46 macros
Hoam	Olivut Resources Ltd.	Prelim	TBD	6 diamonds from 3 kimberlites
Darnley Bay Gravity Anomaly	Generation Mining Ltd.	Prelim	533.1 kg	65 diamonds; 2 macros
Roundrock	Stornoway Diamond Corp.	Prelim	134.2 kg	19 diamonds; 6 macros
Cross Property	Stornoway Diamond Corp.	Prelim	2.4 t	7 diamonds
Munn Lake/Mackay Lake	Zimtu Capital Corp. / DG Resource Management	Prelim	42 kg	14 diamonds; 2 macros

¹Indicated Resource (Ind); Inferred Resource (Inf); Probable Reserve (Prb); Preliminary Sample Result (Prelim) ²Tonnes (t); Million tonnes (Mt); Kilograms (kg); TBD (to be determined)

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Gold-Au

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Gold is among the most useful of metals; it conducts electricity, does not tarnish, is very easy to work, and alloys with other metals. The Northwest Territories is renowned for its deposits of gold, often hosted in quartz veins in Archean volcanic rocks such as the Yellowknife Greenstone Belt and associated with shear zones in the Slave Structural Province.

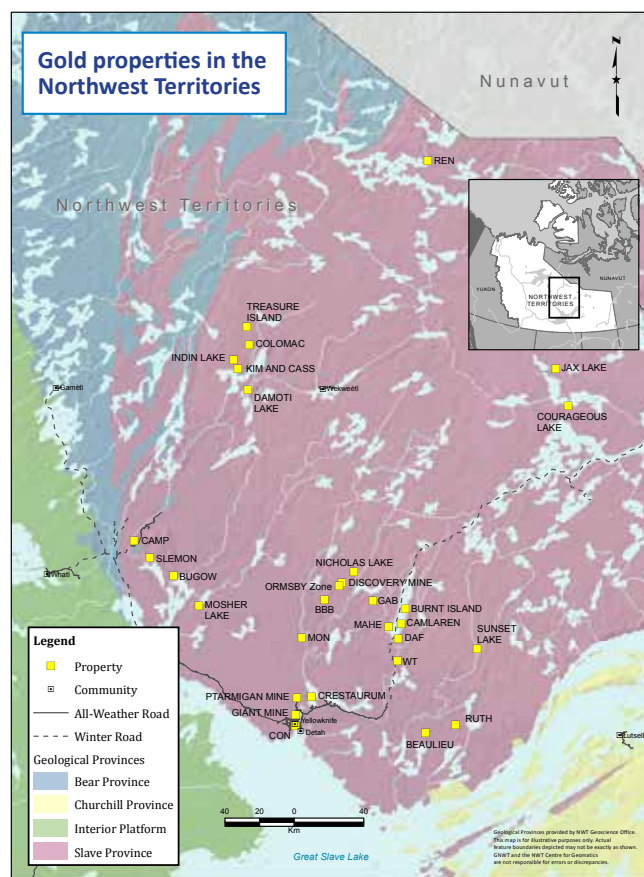
The former Con and Giant mines in Yellowknife are examples of this type of host. Together, they produced some 12 million ounces of gold over a mine-life of close to 70 years. The Discovery Mine, north of Yellowknife, produced one million ounces from one million tonnes of ore.

Other known gold deposits are found in folded Archean banded iron formations, and quartz-sulphide veins within granodiorite.

Current Activity

Extensive exploration is underway across the NWT. Several past producing mine properties and their environs are being explored. **Seabridge Gold Inc.** has defined resources at Courageous Lake and continues to discover new deposits; **Nighthawk Gold Corp.** is exploring in the Indin Lake area and, apart from expanding the Colomac resource, has identified near-surface gold in several zones; and, **TerraX Minerals Inc.** is exploring its Yellowknife City Gold Project (which hosts past producers Crestaurum and Burwash Mines) and covers a 70-km stretch of the Yellowknife Greenstone Belt.

Sixty North Gold Mining Ltd. has plans to bulk sample the Mon deposit beginning in 2019. Mon is a past-producer that is fully permitted for mining and milling at a rate of 100 tons per day.



In addition, there are several companies with considerable exploration plans. **GoldMining Inc.** is preparing a technical report and resource estimate on its Yellowknife Gold project. **BNT Gold Resources Ltd.** explored in the Margaret Lake area in 2017 and **Evrin Exploration Canada Corp.** performed work on properties in the Mackenzie Mountains. **Rover Metals Corp.** focused its work near Yellowknife; it plans to expand exploration to its Cabin Lake properties in 2018.



Gold-Au

Uses

- Gold is used in clean and green technology.
- Gold is usually alloyed with other metals, commonly copper.
- Gold is a coating on aircraft windows and thin gold films protect spacecraft and office towers from infrared rays.
- Gold is used in connectors, switch contacts and connecting wires.
- Computer cable fittings contain gold and small amounts of nickel or cobalt to increase durability.
- A small amount of gold is used in cell phones, GPS units and television sets.
- Gold is used in medicine to seal wounds, to treat arthritis and in laser surgery tools.
- Gold is used in auto airbag deployment systems.

Business case

The NWT has high potential to host future gold mines. An extensive collection of scientific data from previous studies, exploration records, and assessments are available from the Northwest Territories Geological Survey. Many companies are investing in exploration and carrying out advanced programs because they believe the NWT's future is golden.

Prospects

Name	Owner	Resource Category ¹	Total Resource tonnes (t); million tonnes (Mt)	Grade grams per tonne (g/t)
Bugow	Silver Range Resources (optioned to Rover Metals Corp.)	~	70,000t	10.29g/t
Gab	Aurora Geosciences	~	27,215 t	10.63 g/t
Camp	Crown Land	~	46,400/N Zone 11,840t S Zone	13.70/ 12.00 g/t
Slemon	Crown Land	~	31,751 t	6.80 g/t
Discovery Mine	GoldMining Inc.	~	206,897 t	22.62 g/t
Nicholas Lake	GoldMining Inc.	Meas + ind	1.109 Mt	6.87 g/t
Ormsby Zone	GoldMining Inc.	Meas	7.339 Mt	1.59 g/t
Mosher Lake	Lane Dewar/ M.Magrum/T.Teedy	~	500,765 t	2.81 g/t
Ren	Lane Dewar/ Mike Magrum	~	1.8 Mt	10.00 g/t
Mon	New Discovery Mines	PP	10,070 t	10.00 g/t (recov)
Damoti	Nighthawk Gold Corp.	Meas + ind	40,600 t	26.17 g/t
Colomac	Nighthawk Gold Corp.	inf	36.973 Mt	1.65 g/t
Treasure Island	Nighthawk Gold Corp.	~	105,400 t	14.09 g/t
Indin Lake	Nighthawk Gold Corp.	~	214,000 t	16.46 g/t
Jax Lake	Crown Land	~	36,287 t	14.10 g/t
Kim and Cass	Pine Cliff Energy Ltd.	~	448,950 t	7.37 g/t
Courageous Lake	Seabridge Gold Inc.	Prv; Prb	12.3 Mt/Prv 78.8 Mt/Prb	2.41 / 2.17 g/t
Mahe	Silver Pursuit Resources	~	156,840 t	17.28 g/t
Crestaurem	TerraX Minerals Inc.	~ind + inf	145,150 t	7.54 g/t
Daf	Walter Humphries	~	3,500 t	30.40 g/t

¹ indicated (ind); inferred (inf); Measured (Meas); Proven Reserve (Prv); Probable Reserve (Prb); Historic (NI 43-101 non-compliant)(~); Past Production mined (PP);

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Lithium-Li

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Demand is growing fast for lithium, the wonder metal powering electric vehicles, smart phones and space exploration. Based on past work, the Yellowknife area has high potential to become a hub for lithium-bearing pegmatites that were the focus of extensive exploration in the mid to late 1950s.

In the mid to late 1970s, numerous pegmatites were discovered within a 100-km radius east, northeast and southeast of Yellowknife. Historic (pre NI 43-101) inferred tonnage for eight of those deposits varied from 2.3 million tonnes (grading 1.5% Li₂O) to 13.9 million tonnes (grading 1.2% Li₂O).

Production and current activity

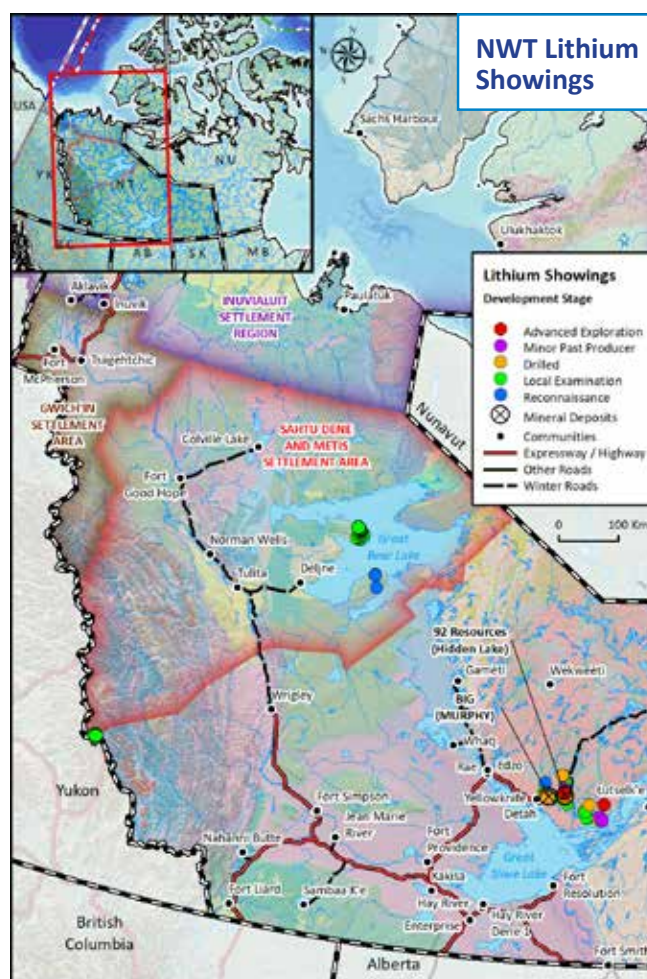
Destaffany Mine southeast of Yellowknife produced some 17,052 lb of lithium in the late 1940s and early 1950s, before the mine closed due to lack of demand.

Erex International, a private company, holds mineral leases on the majority of the large known deposits, including the Big/Murphy lithium deposit, 21 km east of Yellowknife, which was first staked in the 1950s.

Far Resources Ltd. has optioned claims in the vicinity of Hidden Lake from **92 Resources Corp.**. A drill program is following up on extensive surface sampling that identified significant lithium values on four main dikes.

Clean Commodities Corp. has picked up the Phoenix lithium project from North Arrow Minerals Inc., about 300 km north of Yellowknife. Drilling results for 2009 are highlighted by a hole that cut 34.3 metres that assayed 1.24% Li₂O.

Equitorial Exploration Corp. plans to drill its LNPG (Li,



Cs, Ta) property in the Mackenzie Mountains. In 2016, channel sampling was highlighted by one sample that cut 1.63 per cent Li₂O, 52.9 g/t Ta₂O₅ and 0.1 per cent SnO₂ across 5.15 metres.



Lithium-Li

Prospects

Name	Commodity	Owner	Historic Inferred Resource (tonnes)	Grade Li ₂ O
Big/Murphy	Li	Erex International Ltd.	7.2 million	1.47%
FI Main Dyke	Li	Erex International Ltd.	6.5 million	1.49%
Echo-Thor	Li	Erex International Ltd.	1.7 million	1.50%

Uses

- Lithium, the lightest metal, is extremely soft, highly reactive and flammable.
- Automakers around the world are now competing to develop electric cars that are expected to use large, rechargeable lithium-ion batteries.
- Highly efficient, rechargeable, lithium-ion batteries are used extensively in portable electronic devices such as cell phones, cameras, music players, and GPS units, and as batteries for electric tools.
- Lithium is an ingredient in high temperature lubricating greases.
- Alloys are used to create high performance aircraft parts.
- Lithium is used to remove carbon dioxide in space vehicles and submarines.

- Lithium also has a medical use, as it appears to lighten moods.
- Glazes containing lithium are used for ovenware.

Lithium is in world demand

China dominates the world lithium market. China is also stepping up production of electric vehicles, including buses. South Korea, Japan and Hong Kong buy significant quantities of lithium for battery use. In the United States, Tesla Motors is planning to produce lithium-ion batteries for up to half a million cars. Lithium can also be used to store electricity generated by wind or solar power. Tesla Motors has announced it will be selling and installing battery packs for US and Australian homes to store solar-generated energy. Power utilities, including one in Alaska, are testing the viability of giant lithium-ion

back-up battery packs to store power for use at peak demand times.

The demand for supplies of lithium was expected to grow by some eight percent annually in 2014. However, with the creation of mega lithium-ion battery factories, analysts believe demand will double.



Little Nahanni pegmatites in the Mackenzie Mountains

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Rare Earth Elements-REE

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Rare earth elements (REE) is the term used to describe 17 elements that include lanthanum and the lanthanide elements¹ (atomic numbers 57 through 71 on the periodic table), as well as scandium and yttrium. These elements tend to occur together, but are rarely found concentrated in deposits that can be mined. The rare earth elements are all metals and are also known as rare earth metals (REM).

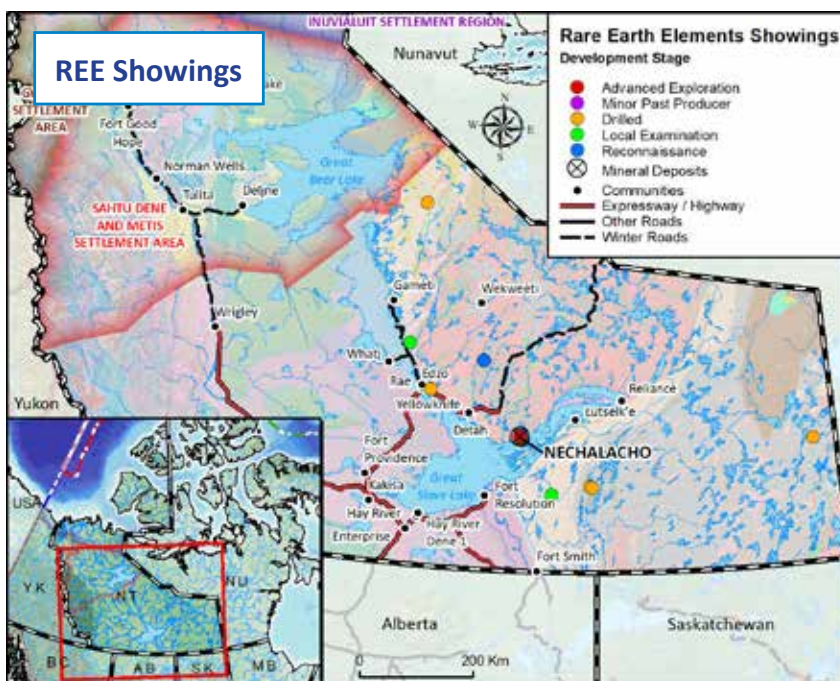
Rare earth elements are commonly found as oxides and categorized as heavy rare earth oxides (HREO) and light rare earth oxides (LREO). The two can be combined and reported as total rare earth oxides (TREO).

Current Activity

Avalon Advanced Materials Inc. (AVL) calculated a proven and probable mineral reserve in April 2013, which formed part of a feasibility study for the Nechalacho project, located at Thor Lake about 100 kilometres southeast of the capital city of Yellowknife. In August, 2013, an updated resource estimate was released taking into account zircon, niobium and tantalum oxides.

The project has undergone an environmental assessment and in 2014 was approved for pre-construction work that included the development of an underground decline. Avalon has not begun this work as the company continues to explore options to improve the economics of the project.

The deposit is flat lying, lies approximately 200 metres below surface and is amenable to low-cost underground bulk mining methods.



The mine-life is forecast to be 20 years using a mining production rate of 2,000 tonnes per day. AVL is working to optimize value by making changes to the metallurgical process flowsheets.

In the past, deposits in the Thor Lake area have also been assessed for their Beryllium, Tantalum, Niobium (Columbium) and Thorium content.

AVL plans to focus on defining high-grade, near-surface neodymium-praseodymium rich resources in the T-Zone and Tardiff Lake Zones in 2018. Sampling will also be carried out in order to calculate a lithium resource in the T-Zone.

¹ The lanthanides include the metals cerium (Ce), praseodymium (Pr), neodymium (Nd), promethium (Pm), samarium (Sm), europium (Eu), gadolinium (Gd), terbium (Tb), dysprosium (Dy), holmium (Ho), erbium (Er), thulium (Tm), ytterbium (Yb) and lutetium (Lu).



Rare Earth Elements-REE

Uses

- High strength permanent magnets used in electric vehicles, industrial motors, air-conditioners, wind and tidal turbine generators.
- LED Lighting in consumer goods such as televisions, computers, mobile phones, cameras and tablets, and in fluorescent lighting.
- Military technologies such as satellite communication, radar, night-vision goggles, mine detectors, jet engines and sonar.
- Rare Earths are used in catalysts for air pollution control.

Global production and market price

China produces over 80 per cent of the world's rare earth metal materials and is host to over 30 per cent of the world's reserves (USGS Mineral Commodity Summary Fact Sheet 2017). China is starting to control its production (including a crackdown on illegal miners) which will lead to improved prices. Companies with resources are poised to begin work that will fast-track to production when the market rebounds.

Other Known REE Showings

Several showings south of Great Slave Lake have been drilled and tested for their uranium, thorium and rare earth potential. Some of the uranium showings in the Churchill Geological Province were found to contain highly anomalous REE values. Other IOCG (Iron Oxide Copper Gold) targets northwest of Yellowknife in the Bear Geological Province have been found to contain anomalous REE values and REE have also been found within carbonatite in the Slave Geological Province.



Rare Earth elements used in satellite communication technologies.

AVALON ADVANCED MATERIALS NECHALACHO DEPOSIT AS AT AUGUST 15, 2013

Resource Category	Zone	Tonnes millions	TREO %	HREO %	%HREO/ TREO	ZrO2 %	Nb2O5 %	Ta2O5 %
Measured	Basal	12.56	1.71	0.38	22.50	3.20	0.40	0.04
Indicated	Basal	49.33	1.62	0.35	21.27	3.07	0.40	0.04

Note: HREO comprises Y_2O_3 , Eu_2O_3 , Gd_2O_3 , Tb_4O_7 , Dy_2O_3 , Ho_2O_3 , Er_2O_3 , Tm_2O_3 , Yb_2O_3 and Lu_2O_3 , while TREO comprises HREO plus La_2O_3 , CeO_2 , Pr_6O_{11} , Nd_2O_3 and Sm_2O_3

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www.iti.gov.nt.ca/en/files/guide-mineral-deposits-northwest-territories

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Tungsten-W

Investment Opportunities NORTHWEST TERRITORIES

Government of
Northwest Territories

July 2018

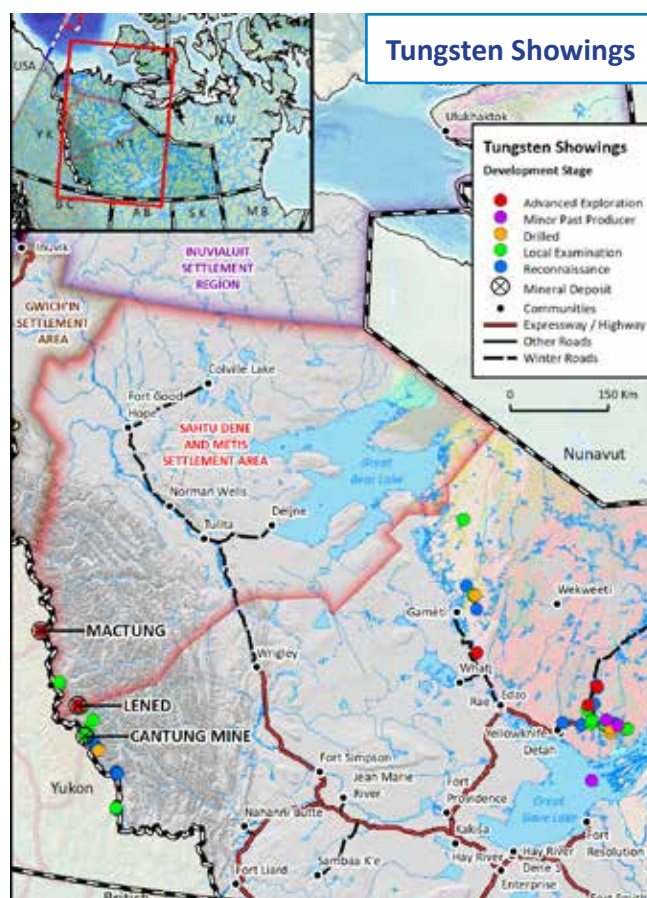
Tungsten is a metal with a unique set of chemical properties that contributes significantly to products manufactured and used globally. With qualities that include a high melting point ($3,422 \pm 150^\circ\text{C}$), high density, high tensile strength, exceptional hardness and corrosion-resistance, tungsten has many uses.

Known world-class NWT Tungsten Resources

The Northwest Territories (NWT) hosts globally significant tungsten resources and is home to one of the world's largest tungsten deposits outside of China. Two substantial tungsten deposits overlap the NWT/Yukon border, the past-producing Cantung Mine and the Mactung deposit.

The Cantung Mine is road-accessible via Watson Lake, Yukon, which lies about 300 kilometres southwest of the mine. Discovered in 1954 and mined since 1962, the Cantung Mine produced tungsten, off and on, until October 2015. The price of tungsten has been cyclical. Between 2011 and 2014, the mine profited from prices that were sporadically almost double of what they had been (and later would become).

The undeveloped Mactung is one of the world's highest grade deposits. It lies 160 kilometres northwest of Cantung and is currently accessible via road from Ross River, Yukon. Mactung has an indicated mineral resource that totals 33 million tonnes with an average grade of 0.88% WO₃ and an additional inferred resource of 11.9 million tonnes at 0.78% WO₃ (as of April, 2009). In 2009, a feasibility study was completed for Mactung; an underground mine was envisioned with a mining rate of 2,000 tonnes/day. Mine life for the underground development was predicted to be 11 years, while an open pit had the potential to expand the mine life by 17 years.



Through a court-approved process in 2015, the Government of the Northwest Territories purchased the Mactung property and the Government of Canada purchased the Cantung mine. The GNWT is working on a marketing plan. or the sale of Mactung.



Tungsten-W

Other Prospects

Historically, small deposits in the NWT have produced tungsten as a byproduct (e.g. the Outpost Island Mine) and this may happen in the future (e.g. Fortune Minerals' NICO deposit hosts some tungsten).

The Lened deposit, within the Sahtu Dene and Metis Settlement Area, has been designated a conservation area under the Sahtu Land Use Plan. A historic NI 43-101 non-compliant resource was calculated in 1986; the deposit was estimated to contain approximately 750,000 tonnes of ore with an average grade of 1.2% WO₃.

Uses

Cemented carbides used by the metalworking, mining and construction industries

- Hardened steel manufacturing
- Wires and electrodes in modern lamp systems
- X-Ray tubes (as both filament and target)
- Windings and heating elements for electrical furnaces
- Electrodes in TIG welding, superalloys and radiation shielding
- Military applications
- Vehicle window heating

- Industrial catalysts

Future Role of NWT Tungsten

The NWT was once the largest producer of tungsten in the western world and it is poised to become a future producer. The 2009 Mactung feasibility study concluded the mine would result in a recovery of invested capital in less than three years. Other small mines in the NWT have



Tungsten is used in the development of wires and electrodes.

Prospects

Name	Project Owner / Manager	Resource Category	Total Resource:	Grade:	Resource Calculated
Mactung	Government of the NWT	Indicated	33 million tonnes	0.88% WO ₃	April 2009
Cantung Mine	North American Tungsten Corp. / Government of Canada	Indicated	3.45 million tonnes	0.97% WO ₃	Sept. 2014

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Lead-Zinc – Pb-Zn

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Zinc and lead are commonly found within the same deposits and mined as co-products. Zinc is the fourth most consumed metal after iron, aluminum and copper. It bonds well with other metals and resists corrosion; three quarters of global zinc production is used in the manufacturing of galvanized metal.

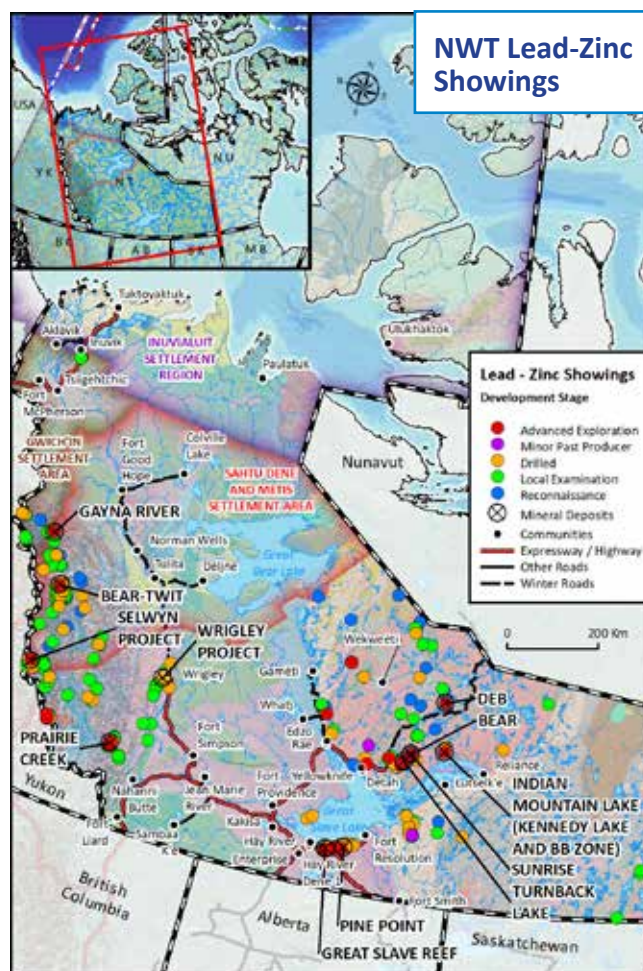
Lead's high density and corrosion-resistant properties make it ideal for use in highly acidic environments; its primary use is in lead-acid storage batteries.

Current NWT Activity

The Northwest Territories (NWT) is home to three advanced-stage lead-zinc exploration projects, namely Prairie Creek Mine, the Selwyn Project and the Pine Point project. Many other projects have identified resources that could lead to economic discoveries.

NorZinc Ltd.'s (CZN) Prairie Creek Mine project has been approved to commence mining and milling, subject to water licence and land use permit conditions. A decision regarding an application for a permit to build and use an all-season access road is imminent. Prairie Creek already has extensive infrastructure (e.g. 5 km of underground workings, 1,000-metre airstrip, 180-km winter road, and a 1,000 ton per day mill); the 2017 preliminary feasibility study estimated pre-production capital costs of \$279 million. The study envisioned a 15-year mine-life, an after-tax NPV (net present value) of \$188 million and an IRR (internal rate of return) of 18.4 percent. These values were calculated using lead and zinc prices of US\$1.00 per pound and US\$1.10 per pound, respectively, and a silver price of US\$19 per ounce, plus an exchange rate of \$1.25 Canadian for each US\$.

Selwyn Chihong Mining Ltd.'s (SCML) Selwyn Project is one of the largest undeveloped zinc-lead deposits in the world. The project area hosts 14 drill-defined deposits



within a 40-km-long belt along the NWT/Yukon border. Approximately 10 per cent of the project is located within the NWT. SCML is in the process of getting approval for the upgrade of the access road to the project. The project as planned has a capital cost of approximately US\$2.12 billion and a mine-life of more than 11 years at a mining rate of 35,000 tonnes of ore per day.



Zinc-Lead – Zn-Pb

Pine Point Mining Ltd. (a wholly-owned subsidiary of Osisko Metals Inc.) is actively drilling targets in the central 20-km stretch of the Pine Point Mining camp in an effort to firm up resources that will be incorporated into a forthcoming feasibility study.

Historically, the property hosted Pine Point Mine, which produced lead and zinc from 51 deposits beginning in 1964 through 1987. Drilling during 2018 in the HZ deposit is highlighted by a 7.8-metre intercept that averaged 8.75% zinc and 0.49% lead, while a hole in the K-35 deposit area cut a six-metre interval that graded 22.97%

zinc and 2.22% lead. The focus is to prove up near-surface resources that can be mined using open pit methods.

Numerous companies hold the rights to other significant NWT lead-zinc deposits: Eagle Plains Resources Ltd. (Bear-Twit, and Bronco projects); Blind Creek Resources Ltd. (AB project); SSR Mining Inc. (Sunrise Project); Panarc Resources Ltd. (Indian Mountain Lake Project); Silver Bear Mines Inc. (Bear Property) and Teck Resources Ltd. (Turnback Lake Project), to name a few. Some contain multiple elements (gold, silver and copper) in combination with lead and zinc that will improve project economics.

Prospects

Project Name	Commodity	Owner	Resource Category Indicated (Ind); Measured	Total Resource tonnes (t); million tonnes (Mt)	Grade grams per tonne (g/t)	Resource Effective Date
Prairie Creek	zinc, lead, silver	NorZinc Ltd.	Meas + Ind	8.70 Mt	9.50% Zn, 8.90% Pb, 136 g/t Ag	Sept. 2015
Pine Point	zinc, lead	Osisko Metals Inc.	Meas + Ind	25.8 Mt	2.94% Zn, 1.12% Pb	April 2017
Pine Point (Great Slave Reef)	zinc, lead	Osisko Metals Inc. (Pine Point Mining Ltd.)	Meas (R-190 deposit)	647,000 Mt	12.47% Zn, 6.10% Pb	Mar. 2014
Selwyn Project	zinc, lead, silver	Selwyn Chihong Mining Ltd.	Ind	185.6 Mt	5.20% Zn, 1.79% Pb	Aug. 2012

Zinc-Lead Uses

- Zinc provides corrosion protection on immersed steel structures such as ships, pipelines, and drill rigs.
- Building and construction industries use zinc in the coated steel strips of roofing and for cladding.
- Zinc oxide is used in the production of rubber (tire industry) and in ceramics, paints and agriculture; it also has medicinal uses.
- Brass is an alloy containing 95 per cent copper and five per cent zinc. Bronze is primarily an alloy of copper with tin, but it may contain zinc. Other zinc alloys are used in automobiles and electrical components.
- Lead is a significant component in batteries, particularly in lead-acid ignition (vehicle) batteries.
- Lead is widely used in manufacturing various alloys.
- Lead is used as ballast in the keel of sailboats.
- Lead is able to shield radiation, so it is commonly used in the medical field to shield x-rays.

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