# "HEY BARTENDER" DNI'S BLACK SHALE METAL COCKTAIL

SECUTOR CAPITAL MANAGEMENT CORP



#### **Company Information**

Closing Price (20/06/2011) \$0.27

Shares Outstanding (M) 59.81

Market Cap (M) 16.15

52 Week Range \$0.10 - 0.40 A massive, flat-lying deposit containing low concentrations of virtually the entire periodic table of elements could be the metal equivalent of Alberta's oil sands. Following in the footsteps of Finland's Talvivaara Mine, DNI is proposing a cheap, long-term metal source governed by a different set of economics than conventional mining projects. The Alberta Black Shale Project would not prioritize any one metal. The value would be the collective value of the polymetallic mineralization including Mo-Ni-U-V-Zn, Cu-Co-Cd-Ag (Au)-(Li) with 75-85% of the in-situ value contributed by Mo-Ni-U-V. The ore would be processed by bioleaching, recently used at Talvivaara, which involves bacteria that consume iron and sulphur. DNI Metals is currently working on an updated NI 43-101 report and PEA for the fall as well as continuing with metallurgical testing. With two proposed mineral deposits, one of which is believed to contain 1.2-1.3 B short tons of mineralized material, the other 123 million short tons, and both at higher grades than Talvivaara, DNI's next question becomes how much can be recovered and at what cost?

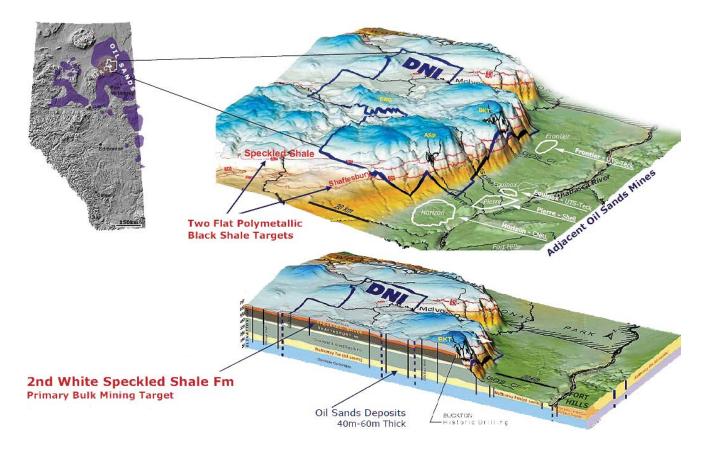


#### **COMPANY PROFILE**

DNI Metals Inc. focuses on the development of bulk mineable properties with simple mineralogy. Its flagship property is the Alberta Black Shale Project. The company is well funded, despite its size, as it recently closed a non-brokered private placement for aggregate gross proceeds of \$2.4 million.

# **LOCATION**

DNI's Black Shale Metals Project spans 2,720 km2 in Alberta's Athabasca Region, 120 km north of Fort McMurray. This mature mining district offers some significant advantages. The area has very well organized regulatory, jurisdictional, as well as permitting framework that is specific to the development of flat-lying, expansive projects. The presence of the nearby oil sands operations provides many logistical and infrastructural benefits as well as local availability of many processing reagents, such as sulphur, useful for bioleaching. Additionally, the waste products from the bioleaching processing may be used for oil sands mining.



Source: Company Filings



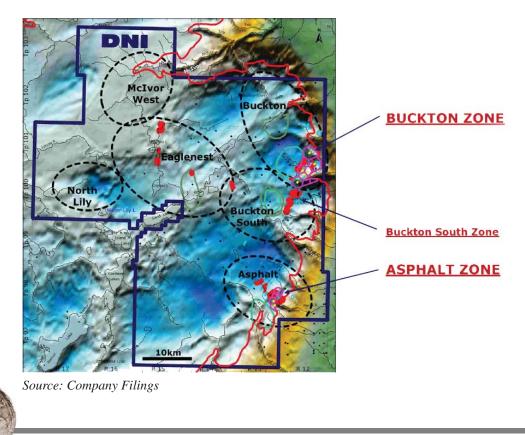
# **GEOLOGY: TWO SHALE FORMATIONS**

Two laterally extensive near surface shale units underlie the entire DNI Property: the Second White Speckled Shale and the Shaftesbury Formation. Both of these units have high organic carbon content and are enriched in molybedenum, nickel, uranium, vanadium, zinc, copper, cobalt, silver, and gold (Mo-Ni-U-V-Zn-Cu-Co-Ag and Au). Uniform bulk grades are consistent for over 60 km.

The Second White Speckled Shale Formation, 20 to 40 m thick, is comprised of black shale interlayerd with bentonite and carries 3-29% organic carbon and up to 20% fine sulphides. It is closer to the surface and is more metal enriched than the Shaftesbury. Extensive historic work has been conducted on the formation over the past 15 years, resulting in sample coverage for more than two thirds of DNI's Property.

## THE PROPERTIES

DNI has identified six sub-properties, each 100-300 km2, within the main project area. In addition to the polymetallic shales, three of the sub-properties are thought to potentially host sedimentary exhalative deposits usually associated with lead and zinc (SEDEX). The company plans to explore and develop each of the six properties separately due to the sheer expanse of the flat lying deposit. These properties are all at different development stages, with two of them identified as Potential Mineral Deposits: The Buckton and the Asphalt. Both of these properties are partially exposed and show open mineralization that is thought to extend for over 50 sq km.



### THE BUCKTON PROPERTY AND BUCKTON POTENTIAL MINERAL DEPOSIT

Buckton Potential Mineral Deposit: Total estimated tonnage 1.2-1.3 Billion Short Tons Grade Averages and Gross Metals Contents						
	(ppm)	(lb/st) or $(g/t)$	(lb) or (oz)			
Мо	62 - 86ppm	0.12 - 0.17 lb/st	150,000,0000 - 225,000,000 lb			
[MoO3]		0.19 - 0.26 lb/st	225,000,000 - 338,000,000 lb			
Ni	121 - 160ppm	0.24 - 0.32 lb/st	293,000,000 - 419,000,000 lb			
U	25 - 37ppm	0.05 - 0.07 lb/st	61,000,000 - 96,000,000 lb			
[U3O8]		0.06 - 0.09 lb/st	72,000,000 - 113,000,000 lb			
V	623 - 776ppm	1.25 - 1.55 lb/st	1,511,000,000 - 2,027,000,000 lb			
[V2O5]		2.24 - 2.79 lb/st	2,719,000,000 - 3,649,000,000 lb			
Zn	282 - 360ppm	0.56 - 0.72 lb/st	683,000,000 - 940,000,0000 lb			
Cu	70 - 83ppm	0.14 - 0.17 lb/st	169,000,000 - 217,000,000 lb			
Co	19 - 24ppm	0.04 - 0.05 lb/st	46,000,000 - 63,000,000 lb			
Ag	0.3 - 0.8ppm	0.3 - 0.8g/t	12,000,000 - 34,000,000 oz			
Au	assumed nil	assumed nil	assumed nil			
Mo, U and V grades also restated in equivalent						
oxide						
<i>lb/st=pounds per short ton; g/t=grams per tonne; lb=pounds; oz=ounces</i>						
Gross metal contents assume 100% recovery, rounded to nearest million units						

Source: Company Filings

The Buckton Property is underlain by a polymetallic enrichment zone called the Second White Speckled Shale Formation. The area has undergone extensive historic drilling to test mineralization zones hinted at by geochemical mineral and stratigraphic anomalies. Based on the historic data, surface exposures, surface geochemical data, and the geology, DNI believes that Buckton contains 1.2-1.3 billion short tons of mineralization, covering an area of 26 sq km and a thickness of 20.5-21.9 m. The deposit is still conceptual in nature and is not defined as a mineral resource yet due to limited infill drill data. DNI completed a winter drill program this past year to block out the resource. Mineralization remains open in three directions, to the north, south, and west. The northward trend exhibits increasing thickness, and increased frequency and distribution of bentonites. This suggests a north lying nearby volcanic source.



### THE ASPHALT PROPERTY AND ASPHALT POTENTIAL MINERAL DEPOSIT

Asphalt Potential Mineral Deposit: Total estimated tonnage 109-132 Million Short							
Tons							
Grade Averages and Gross Metals Contents							
Metal or Oxide	Grade Range	Grade Range	Gross Metal/Oxide Content Range				
	(ppm)	(lb/st) or $(g/t)$	(lb) or (oz)				
Мо	63 - 73ppm	0.13 - 0.15 lb/st	14,000,000 - 19,000,000 lb				
[MoO3]		0.19 - 0.22 lb/st	20,000,0000 - 29,000,000 lb				
Ni	122 - 144ppm	0.24 - 0.29 lb/st	27,000,000 - 38,000,000 lb				
U	31 - 47ppm	0.06 - 0.09 lb/st	7,000,000 - 12,000,000 lb				
[U3O8]		0.07 - 0.11 lb/st	8,000,000 - 15,000,000 lb				
V	664 - 690ppm	1.33 - 1.38 lb/st	145,000,000 - 182,000,000 lb				
[V2O5]		2.39 - 2.48 lb/st	261,000,000 - 328,000,000 lb				
Zn	282 - 376ppm	0.56 - 0.75 lb/st	62,000,000 - 99,000,000 lb				
Cu	89 - 89ppm	0.18 - 0.18 lb/st	19,000,000 - 24,000,000 lb				
Со	20 - 20ppm	0.04 - 0.04 lb/st	4,000,000 - 5,000,000 lb				
Ag	0.3 - 0.3ppm	0.3 - 0.3g/t	1,000,000 - 1,000,000 oz				
Au	assumed nil	assumed nil	assumed nil				
Mo, U and V grades also restated in equivalent							
oxide							
<i>lb/st=pounds per short ton; g/t=grams per tonne; lb=pounds; oz=ounces</i>							
Gross metal contents assume 100% recovery, rounded to nearest million units							

Source: Company Filings

The Asphalt Property, like Buckton, also hosts a near-surface polymetallic enrichment zone in the Speckled Shale Formation. Two historic drill holes, 900 m apart, and surface geochemical results and exposures place the mineralization at Asphalt to be approximately 109-132 million short tons. The drill holes demonstrate that the average metal grade for the Asphalt Property is consistent with the average grade of the Buckton Zone, 30 km away. The proposed Asphalt Mineral Deposit extends for 4.5 km with a thickness of 7.2-11.6 m. This deposit is also conceptual with classification as a mineral resource depending on infill drill results.



### **DNI'S CURRENT WORK**

DNI is currently working on releasing an updated NI 43-101 in the fall. It will include new property boundaries and revised potential mineral deposit numbers based on the past winter's drill program for the Buckton Property. Drilling for the summer was halted because of the Alberta forest fire and will hopefully commence in the fall. DNI needs about two months to finish the drill program, which will be helicoptersupported.

The project's viability ultimately depends on whether the cocktail of metals can be economically recovered from the shale. The metallurgical testwork will continue to focus on defining optimum metal recovery parameters. Bioleaching and related R&D work is being conducted in commercial analytical labs under DNI's direction, the Alberta Research Council (ARC), and by the Bureau de Recherches Geologiques et Minieres (BRGM), France's leading Earth Sciences public institution. Tests have so far demonstrated excellent recoveries with Ni-U-Zn-Co-Cd at 80-90%. Mo-V-Cu-Li recoveries are middling, with recoveries between 10 and 60%. The chart below reports stage one testing which exclusively used surface samples. Stage two testing was recently started by ARC and will include composite samples with results planned for release by late October or early November.

	Sulfuric	Bioleaching	Bioleaching	
	Leaching Tests	BRGM	ARC-456*	
Мо	51%	16%	53%	
Ni	89%	88%	92%)	
U	86%	88%	96%)	
v	51%	6%	38%	
Zn	88%	83%	89%)	
Cu	60%		77%	
Со	86%	86%	94%)	
Cd	93%		99%	
Li	58%		46%	

Source: Company Filings

Discerning optimum parameters for the metal recovery is a challenge that is all about balance. For example, in order to obtain high uranium recovery rates, the vanadium yield would have to be lower. The largest test carried out so far used only 300 g of sample. DNI plans to upgrade the testwork to column scale and eventually a small-scale pilot heap within the next two years to better simulate a commercial operation. The main challenge for DNI associated with upgrading scales is finding an appropriate laboratory with the necessary knowledge. Some labs may understand the metallurgical testing but not the biology or vice versa. Possible candidates to carry out the metallurgical work include BRGM and Mintek in Johannesburg. Additionally, physical parameters, like defining appropriate percolation rates, also need refining for the larger scale tests. This challenge is almost all trial and error.



## POLYMETALLIC BLACK SHALES

Polymetallic black shales are a fairly new deposit type, receiving recognition just over the past decade as potential hosts for huge, low-grade polymetallic deposits. The Alberta black shales are similar to other polymetallic black shales from around the world. They are laminated, dark, fine-grained sedimentary rocks that usually have 5-10% organic carbon by weight. Though not all shales are metalliferous, the ones that do contain metals are typically polymetallic. They have a variable sulphide content with metal particulates being physically trapped within the organics or the fine clay sediments. Shales are generally deposited in anoxic deep water but can also be found in various shallow depositional environments. The expansive lateral uniformity of these tabular giants that can host billions of tons of ore is attributed to averaged basinal sedimentation with vertical variations as a consequence of the deposits can host vast amounts of low-grade metal ores, which if close to the surface, are great bulk mining targets. The Alberta black shales can be thought of as the metallic version of the oil sands due to their high tonnage, lateral continuity, expansiveness, and lack of consolidation. Therefore, their exploration and mining is more akin to the respective oil sands operation than it is to the conventional open pit mine.

#### **BIOLEACHING**

Bioleaching is a biohydrometallurgical process in which metals are dissolved in the waste products of bacterial metabolic reactions. These reactions are responsible for the natural weathering of sulfide minerals. A number of chemical and electrochemical methods are then applied to selectively precipitate economic metals from solution and convert the remaining material into inert waste. The microbes eat iron (Fe 2+) and sulphur. The iron is converted into ferric iron (Fe 3+), a powerful oxidizing agent capable of corroding metal sulfide minerals, and the sulphur is converted into sulphuric acid. Metals like copper, zinc, and more iron, which is the bacteria's food source, are dissolved in the acid and are later recovered from the solution, precipitated with H2S or by electrochemical means.

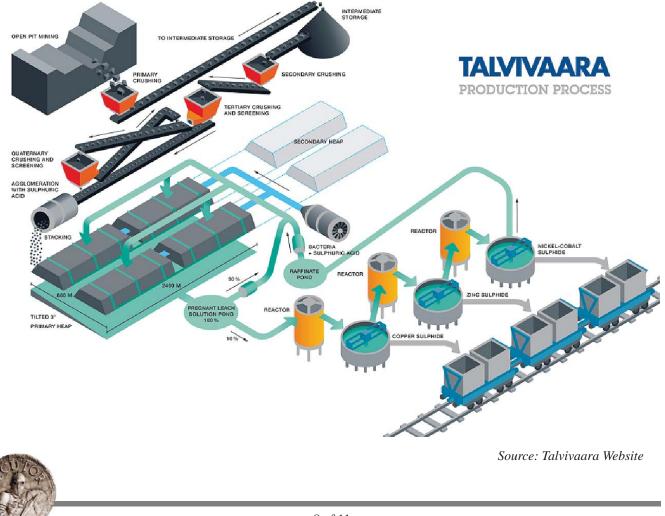
Bioleaching is a very slow process, requiring years for good recovery rates. The process has far less of an environmental impact than conventional smelting techniques and is widely use in the processing of lowgrade ores, especially those containing copper and uranium. There are four different engineered bioleaching processes that are in current commercial use: heap minerals biooxidation, stirred-tank minerals biooxidation, dump bioleaching, and heap bioleaching.

Heap bioleaching, the process proposed for the Alberta Black Shale Project, is globally practiced for extracting copper from secondary copper ores like chalcocite and covellite. TeckCominco utalized the application of the process for zinc and nickel extraction from sulphide minerals in pilot tests. The extraction of nickel from sulfides is currently used at Talivaara in Finland. *Source: Brierley, BRGM, Spaceship Earth article, R. Naveke*)



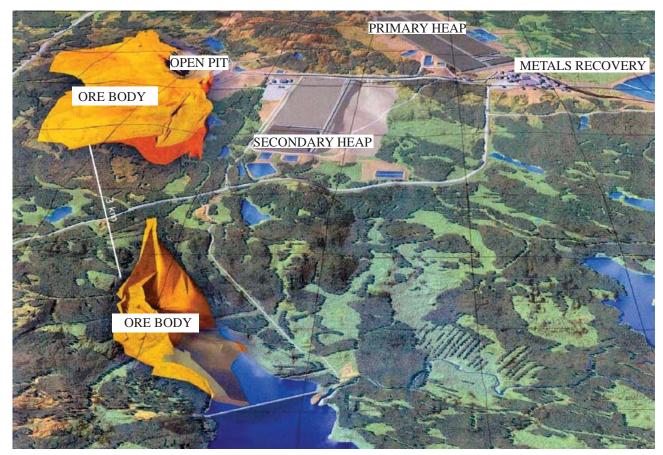
The process is basically four steps: mining, crushing, bioheapleaching, and metal recovery. Simplified below is the process used by Talvivaara:

- 1) The ore is crushed to about <sup>3</sup>/<sub>4</sub> of an inch or less and collected in rotating drums containing water and dilute sulfuric acid
- 2) The ore is then stacked on pads (6-10 m high), engineered to optimize drainage of metal solutions and containing air lines
- 3) Air is directed to the bacteria in the heap by external blowers
- 4) The ore is irrigated with acidic leach solution, with is recycled through the heap until it reaches optimum metal levels for recovery
- 5) After leaching for 1 and a half years on the primary pad, the leached ore is moved to the secondary heap pad where it will continue to be leached to maximize metal recovery
- 6) Upon closure, all the heaps are rinsed with water to remove residual dissolved metals and drained
- 7) After secondary leaching, the barren ore remains permanently on the secondary heaps
- 8) The heaps are recontoured, capped with a barrier material (like clay) to minimize exposure to air and water, covered with soil and seeded (the bioorganisms die without oxygen)



The acidic conditions and excess of sulphide minerals and iron allow the naturally occurring bacteria to multiply within the ore heap with numbers exceeding one million per gram of ore, thereby allowing efficient metal extraction. The process offers many advantages including rapid start-up, low capital and operating costs, no toxic emissions, and minimization or elimination of waste discharge because all the solutions are recycled.

# **TALVIVAARA**



Source: Talvivaara Website Adjusted by Secutor Capital Management Corp



Category	Year	Million tonnes	Nickel (%)	Zinc (%)	Cobalt (%)	Copper (%)
Measured	2010	432	0.23	0.50	0.02	0.13
	2008	364	0.23	0.51	0.02	0.13
Indicated	2010	689	0.23	0.50	0.02	0.13
	2008	278	0.22	0.49	0.02	0.13
Subtotal	2010	1 121	0.23	0.50	0.02	0.13
	2008	642	0.23	0.50	0.02	0.13
Inferred	2010	429	0.20	0.47	0.02	0.12
	2008	363	0.20	0.49	0.02	0.12
Total	2010	1 550	0.22	0.49	0.02	0.13
	2008	1 004	0.22	0.50	0.02	0.13

#### Source: Company Filings

Talvivaara (LSE: TALV.L), Finland, is a significant base metals producer of Ni-Co-Zn-Cu-(Mn)-(U) with a focus on nickel. The company pioneered the application of bioleaching for copper ores to low grade nickel sulphides. In 2008, it became the first polymetallic black shale bioheapleaching mine. The project consists of two orebodies, three km apart, with excellent exploration potential in between the two pits. The resource is currently 1.5 B tonnes and continues to expand. Talvivaara has an estimated mine life of over 45 years and a targeted full scale production for 2012 of 50,000 tpa nickel, 90,000 tpa zinc, 15,000 tpa copper, 1800 tpa cobalt, and 350 tpa uranium. The resource is mined by open pit methods. The main processing is divided into a primary heap, processing Ni in 14 to 18 months with 85% recovery, and a secondary heap, processing a balance of Ni, Cu+Co in 18 to 60 months. Talvivaara reported an operating profit of 25.5 million EUR for 2010. All of the metal produced at Talvivaara is pre-sold through off-take agreements. In February, the company announced an agreement with Cameco for the off-take of uranium that is produced as a by-product at the Talvivaara mine, with a concentration of about 15 ppm. Cameco will provide USD 60 million upfront to cover construction costs for the uranium extraction circuit. The 60 million will be repaid by Talvivaara through uranium deliveries.



Project	Talvivaara	Kainuu	Viken	Storsjon	SBH
Company	Talvivaara	Western	Continental	Aura	DNI
	Mining Co.	Areas NL &	Precious	Energy	Metals Inc.
	(Talv:LSE)	Magnus	Minerals	Ltd	(DNI:TSX-
		Minerals	(CZQ:TSX)	(ASX:AEE)	V)
		(WSA:TSX)			
Country	Finland	Finland	Sweden	Sweden	Canada
Metals of Focus	Ni, Co, Zn,	Ni, Co, Zn,	U, Mo, V	U, (Mo,	Mo, Ni, U,
	Cu (Mn,	Cu	(oil, Ni)	V, Ni)	V, Zn, Cu,
	U)				Co, Cd, Ag
					(Au, Li)
Started	2003	2010	2006	2006	2008
Development	Producing	Exploration	Recovery	Resources	Recovery
Stage	and		& PEA		and
	Expanding				Resources
<b>Base Resource*</b>	1.5 B		2.8 B	1 B tonnes	1.3-1.5 B
	tonnes		tonnes		tonnes
					blocked
Mining/Envisioned	164,000 tpd		40,000 tpd		100,000-
Mining Rate			_		500,000
-					tpd
Market Cap (C\$M)	1613	1034	16.30	29.36	16.15

# **OTHER POLYMETALLIC SHALE PROJECTS**

*\*includes compliant resource and potential mineral deposits Source: Company Filings* 

DNI Metals Inc continues to develop their Alberta Black Shale Project with both an updated NI 43-101 and PEM due out in the fall. Metallurgical testwork to optimize recoveries at increasingly large scales will continue. Management believes the project has the potential to be huge because of the sheer expanse of the shales. The company is envisioning a mine life of 100-200 years with mining at a scale of 100,000-500,000 tpd. The bioleaching processing method could make long-term extraction a reality with a minimum eco-footprint, halving mining nightmares. With a proven development path already tested by Talvivaara, DNI Metals is on its way to progressing its Alberta Black Shale Project.



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