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Evaluating the Kemess Stream sold by Centerra Gold in 2018

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Abstract

In a streaming contract, a mining company sells future revenues derived from a mine. Typically, the mining company sells the revenue for a secondary metal rather than the primary economic driver of the project. This paper considers a particular stream known as the “Kemess Stream”, where a public company called Centerra Gold Inc. sold future silver production from the Kemess Project to a private financial company. The Kemess Stream represents a typical streaming contract and provides an instructive example as a modelling exercise. This paper shows how to calculate the economics of the stream in detail based on economic reports published by Centerra Gold and discusses general principles reflected in the deal terms.

Keywords: Engineering Economics, Mining, Streaming, Finance

JEL Codes: C00 General; G00 General; L72 Mining, Extraction, and Refining

Evaluating the Kemess Stream sold by Centerra Gold in 2018

Recent news that Centerra Gold (2018) was selling a royalty portfolio for US$200 million caught my attention for the large price tag overall and the fact that the deal included US$45 million for the royalty on a single project called the "Kemess Stream". This Kemess Stream refers to a streaming contract that Centerra sold to Triple Flag Mining Finance for the Kemess Project, which includes the Kemess Underground project and other mineral deposits. The Kemess Stream is generally similar to streaming contracts arranged by Silver Wheaton, now Wheaton Precious Metals, and described in the Masters Thesis by DiFilippo (2015). As noted in the thesis, streaming contracts are an important source of funding for mining companies.

A stream allows a mining company to sell off an interest in future revenues from certain metals. In the case of the Kemess Stream, Centerra Gold sold revenues associated with silver production from Kemess Project. This provides an interesting case study to assess the economics of the Kemess Stream from first principles based on a recent Feasibility Study (FS) for the Kemess Underground project.

This paper explores the valuation of the Kemess Stream. Prior research by Bell (2014) describes how streaming contract reduce volatility of revenues for the mining company or farmer selling the stream when facing uncertainty, but the FS for Kemess Underground does not have any formal random variables because a FS is meant to reduce uncertainty by providing a comprehensive description of the economics of the project based on detailed engineering assessments. Whereas Bell had little to say about the valuation of a streaming contract itself, other than a criteria based on “equating expected values”, this paper takes a different approach to assess the valuation of a streaming contract using the Kemess Stream as a live example.

Background Info on Project

The Kemess Stream is a classic example of a stream where Centerra was able to sell 100% of their silver production from the Kemess project before the mine even started production. Silver is a secondary metal for the Kemess project, so it is not an impediment to profitable operation of the mine. In fact, the stream may actually help Centerra secure funding necessary to start the mine or provide working capital during operations.

The private company Triple Flag Mining Finance bought the Kemess Stream from Centerra. Triple Flag bought itself a dedicated source of silver revenue over the life of the mine, whereas Centerra stands to receive the following:

"US$45 million as an advance payment, payable in tranches of US$10 million, US$10 million, US$12.5 million and US$12.5 million on the public announcement by Centerra that its board of directors has approved a construction decision with respect to the Kemess underground development project and the three succeeding anniversaries of such date, respectively."

Note that the total revenue over the life of mine for the Kemess Underground project is approximately C$1.9 billion from copper, C$2.1 billion from gold, and C$95 million from silver. Why would Centerra sell C$95 million worth of copper for US$45 million? Part of the answer is the time value of money.

Although this stream doesn't give Centerra a large amount of money on signing, it is clearly an important part of a mine financing program. Note that the sale of the Kemess Stream for US$45 million was part of a larger sale that will provide Centerra with "combined aggregate proceeds" of US$200 million from the sale of royalties, which may go a long way towards funding the initial capital expenditure of C$205 million estimated for mine development prior to starting production at Kemess Underground.

Assumptions for Project Economics

The FS includes a lot of detailed information, such as the capital expenditures required to reach first production at Kemess Underground and ongoing operating expenditures, but it doesn't give any information on the possible value of a silver stream on the mine. Thankfully, the Feasibility study does give a production schedule for amounts of each metal produced per year over the life of mine. Combining this estimate for mine production with estimates for metals prices, it is possible to calculate the annual revenue for the Kemess Underground mine by metal. See the production schedule and price assumptions from the FS for all metals as follows:

ASSUMPTIONS	Name	Units	Total	-4	-3	-2	-1	1	2	3	4	5	6	7	8	9	10	11	12	13
	Cu	t	285,660	0	0	319	2,701	11,632	19,842	30,634	29,021	26,250	23,823	22,703	22,387	22,112	21,449	20,300	19,126	13,363
	Au	oz	1,867,859	0	0	1,568	15,312	72,879	137,109	220,437	202,271	176,785	158,444	148,229	140,436	136,271	133,306	125,684	117,394	81,732
	Ag	oz	6,878,658	0	0	9,055	58,937	231,930	422,864	666,481	667,084	622,465	595,442	575,998	569,043	560,905	544,918	517,633	490,921	344,982
		Price	Currency	Units			Conversion			C$/t	Recovery									
	Cu	2.5	US$	pound		Pounds/Tonnes	2204.623		Cu	7348.74	91%									
	Au	1,200	US$	ounce					Au	1600.00	72%									
	Ag	16	US$	ounce		CAD/USD	0.75		Ag	21.33	65%									

Note: Full data file available here http://cdn.ceo.ca/1dgf6fg-2018-05-23-CG-Kemess-NewtonWorkfile.xlsx

Based on these prices and quantities of metal production over the life of mine, it is possible to calculate revenue attributable to silver and work out the NPV of silver production. Will it get us in the ball park for the US$45 million valuation of the Kemess Stream?

Calculation of Valuation for Stream

To calculate the silver revenues over the life of mine, start with metal production profile, metal prices, and recovery rates used in FS to get a "Net Smelter Return" or NSR for each metal produced.

CALCULATIONS 1	Name	Units	Total	-4	-3	-2	-1	1	2	3	4	5	6	7	8	9	10	11	12	13
	Cu-NSR	C$	1,910,310,239	-	-	2,133,267	18,062,550	77,787,330	132,690,526	204,860,477	194,073,771	175,543,106	159,312,892	151,823,053	149,709,848	147,870,825	143,437,108	135,753,336	127,902,379	89,363,144
	Au-NSR	C$	2,151,773,568	-	-	1,806,336	17,639,424	83,956,608	157,949,568	253,943,424	233,016,192	203,656,320	182,527,488	170,759,808	161,782,272	156,984,192	153,568,512	144,787,968	135,237,888	94,155,264
	Ag-NSR	C$	95,384,058	-	-	125,563	817,260	3,216,096	5,863,714	9,241,870	9,250,231	8,631,515	8,256,796	7,987,172	7,890,730	7,777,883	7,556,196	7,177,844	6,807,438	4,783,750
	Total NSR	C$	4,157,467,864	-	-	4,065,165	36,519,233	164,960,034	296,503,808	468,045,771	436,340,195	387,830,941	350,097,176	330,570,033	319,382,850	312,632,900	304,561,816	287,719,148	269,947,705	188,302,158
	Total Ore	t	107,381,498	-	-	223,802	1,035,413	3,437,736	5,839,693	9,019,675	9,007,581	9,001,181	9,015,093	9,011,443	9,011,075	9,003,991	9,014,949	8,999,986	9,021,130	6,738,749
	NSR	C$/t	38.72	-	-	18.16	35.27	47.99	50.77	51.89	48.44	43.09	38.83	36.68	35.44	34.72	33.78	31.97	29.92	27.94

It is important to compare these calculated values with the ones reported in FS as sanity check. The careful reader will note a discrepancy where I calculate Total NSR (C$/t) over the

life of mine for all metals as $38.72, whereas the FS reports it as $35.1. The difference is likely due to TC/RC charges, which are included in FS but not my calculations.

In addition to the details described above, it is important to be careful about several important aspects of the stream. For one, make sure to match the timeline for production against the stream payments. For another, note that the Kemess Stream specifies that "Triple Flag will make ongoing payments of 10% of the then current market price for each ounce of silver delivered." You could calculate many different things here, but it's important to focus on estimated revenues from silver production.

The key to evaluating the Kemess Stream is thinking about it in terms of *costs versus benefits*: What is Triple Flag Mining Finance paying for the Kemess Stream and what are they receiving? These two cash flow profiles effectively split the total silver revenues according to a formula described in the news release from Centerra (2018). Stating those series of cash flows explicitly is essential, as they are two sides of the same coin.

The "cost" of the Kemess Stream to Triple Flag is a series of 4 annual payments starting in the first year after Centerra makes a production decision and a residual payment of 10% of silver revenue over the life of mine to Centerra. The "benefit" of the Kemess Stream is 90% of annual silver revenue over the life of mine.

It is possible to calculate these cost and benefit numbers based on the annual silver revenues as follows:

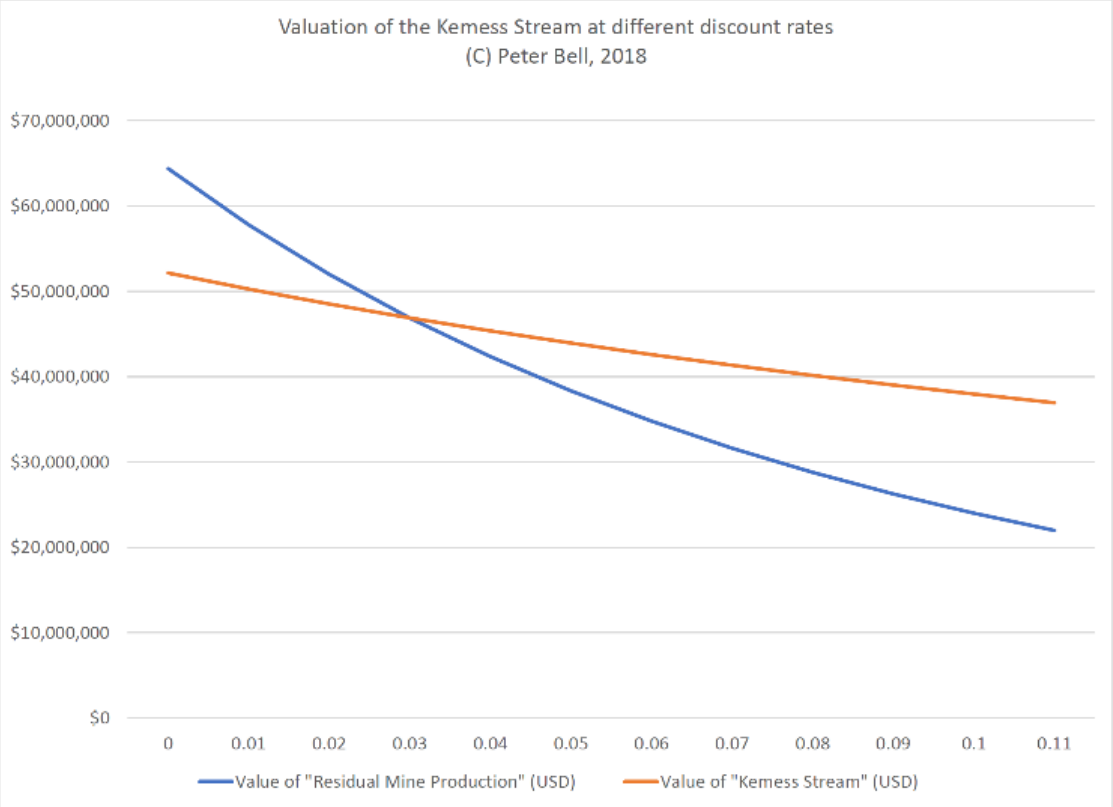
CALCULATIONS 2	Name	Units	Total	-4	-3	-2	-1	1	2	3	4	5	6	7	8	9	10	11	12	13
	Ag-NSR	C$	95,384,058	-	-	125,563	817,260	3,216,096	5,863,714	9,241,870	9,250,231	8,631,515	8,256,796	7,987,172	7,890,730	7,777,883	7,556,196	7,177,844	6,807,438	4,783,750
	RESIDUAL MINE C$			-	-	113,006	735,534	2,894,486	5,277,343	8,317,683	8,325,208	7,768,363	7,431,116	7,188,455	7,101,657	7,000,094	6,800,577	6,460,060	6,126,694	4,305,375
	(90% of Silver Revenues)																			
	Stream -- Initial Payments US$			10,000,000	10,000,000	12,500,000	12,500,000	-	-	-	-	-	-	-	-	-	-	-	-	-
	KEMESS STREAM C$			13,333,333	13,333,333	16,679,223	16,748,393	321,610	586,371	924,187	925,023	863,151	825,680	798,717	789,073	777,788	755,620	717,784	680,744	478,375
	(10% of Silver + Payments)																			

After estimating the cash flow associated with the stream, it is possible to calculate the Net Present Value (NPV) for both sides of the Kemess Stream at different discount rates to identify the rate that makes the two streams equal and consider what happens at other rates.

Discussion

The NPV3 of the mine production is US$46.8 million and the NPV3 of the stream is US$46.4 million. It is noteworthy that these two numbers are so close to official valuation for the Kemess Stream of US$45 million as it suggests the two companies may have used similar NPV calculations in the negotiation of the deal. There may be something else going on here, but it is reasonable to assume that the valuation of the Kemess Stream based on the point where the costs and benefits were equal.

Stepping back to consider different discount rates, the following graph shows that somewhere between 3-4%, the two NPV are equal. At lower rates, the mine production is worth more than stream. At higher rates, the stream is worth more.



Consider the implications of this graphic in relation to the financial profile of the two counterparties for this deal, Centerra Gold and Triple Flag Mining Finance. Mining companies, such as Centerra, are typically high-risk businesses who face high discount rates or high costs of capital. If Centerra was facing a 10% rate, then they would find the stream more valuable than the mine production as in the graph above.

In contrast, financial companies such as Triple Flag may have access to vast amounts of liquidity available in global financial markets and face much lower discount rates or cost of capital. I don't know anything about Triple Flag Mining Finance Ltd., but I suspect that it has access to capital at low cost. Maybe even as low as 2% alongside short-term government bonds? If that is the case, then they would find the mine production more valuable than the stream as in the graph above.

It is important to note that the companies who buy streams are typically financial companies, whereas the companies who sell them are mining companies. While that is obvious enough by virtue of the fundamentals of the two businesses, it is encouraging to see that this market segmentation is supported by the mathematical analysis this example.

See full workfile here: http://cdn.ceo.ca/1dgf6fg-2018-05-23-CG-Kemess-NewtonWorkfile.xlsx

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