



Preliminary Economic Assessment of the Springer Tungsten Mine, Pershing County, Nevada, USA.

Pursuant to the Canadian Securities
Administrator's NI 43-101

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Prepared for

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List of Selected Abbreviations

A	ampere	L	liter
AA	atomic absorption	L/sec	liters per second
A/m ²	amperes per square meter	L/sec/m	liters per second per meter
ANFO	ammonium nitrate fuel oil	lb	pound
Ag	silver	LHD	Long-Haul Dump truck
Au	gold	LLDDP	Linear Low Density Polyethylene Plastic
AuEq	gold equivalent grade	LOI	Loss On Ignition
°C	degrees Centigrade	LoM	Life-of-Mine
CCD	counter-current decantation	m	meter
CIL	carbon-in-leach	m ²	square meter
CoG	cut-off grade	m ³	cubic meter
cm	centimeter	masl	meters above sea level
cm ²	square centimeter	mg/L	milligrams/liter
cm ³	cubic centimeter	mm	millimeter
cfm	cubic feet per minute	mm ²	square millimeter
ConfC	confidence code	mm ³	cubic millimeter
CRec	core recovery	MME	Mine & Mill Engineering
CSS	closed-side setting	Moz	million troy ounces
CTW	calculated true width	Mt	million tons
°	degree (degrees)	MTW	measured true width
dia.	diameter	MW	million watts
EIS	Environmental Impact Statement	m.y.	million years
EMP	Environmental Management Plan	NGO	non-governmental organization
FA	fire assay	NI 43-101	Canadian National Instrument 43-101
ft.	foot (feet)	OSC	Ontario Securities Commission
ft ²	square foot (feet)	oz	troy ounce
ft ³	cubic foot (feet)	%	percent
g	gram	PLC	Programmable Logic Controller
gal	US gallon	PLS	Pregnant Leach Solution
g/L	gram per liter	PMF	probable maximum flood
g-mol	gram-mole	ppb	parts per billion
gpm	gallons per minute	ppm	parts per million
g/t	grams per ton	QA/QC	Quality Assurance/Quality Control
ha	hectares	RC	rotary circulation drilling
HDPE	Height Density Polyethylene	RoM	Run-of-Mine
hp	horsepower	RQD	Rock Quality Description
HTW	horizontal true width	SEC	U.S. Securities & Exchange Commission
ICP	induced couple plasma	sec	second
ID ²	inverse-distance squared	sf	square foot (feet)
ID ³	inverse-distance cubed	SG	specific gravity
ILS	Intermediate Leach Solution	SPT	standard penetration testing
kA	kiloamperes	t	ton (2,000 pounds)
kg	kilograms	t/h	tons per hour
km	kilometer	tpd	tons per day
km ²	square kilometer	tpy	tons per year
koz	thousand troy ounce	TSF	tailings storage facility
kt	thousand tons	TSP	total suspended particulates
ktpd	thousand tons per day	µm	micron or microns, micrometer or micrometers
ktpy	thousand tons per year	V	volts
kV	kilovolt	VFD	variable frequency drive
kW	kilowatt	W	watt
kWh	kilowatt-hour	XRD	x-ray diffraction
kWh/t	kilowatt-hour per ton	y	year

Selected Glossary

Assay	The chemical analysis of mineral samples to determine the metal content.
Composite	Combining more than one sample result to give an average result over a larger distance.
Concentrate	A metal-rich product resulting from a mineral enrichment process such as gravity concentration or flotation, in which most of the desired mineral has been separated from the waste material in the ore.
Crushing	Initial process of reducing ore particle size to render it more amenable for further processing.
Cut-off Grade (CoG)	The grade of mineralized rock, which determines as to whether or not it is economic to recover its gold content by further concentration.
Dilution	Waste, which is unavoidably mined with ore.
Dip	Angle of inclination of a geological feature/rock from the horizontal.
Fault	The surface of a fracture along which movement has occurred.
Footwall	The underlying side of an orebody or stope.
Grade	The measure of concentration within mineralized rock.
Hangingwall	The overlying side of an orebody or slope.
Igneous	Primary crystalline rock formed by the solidification of magma.
Kriging	An interpolation method of assigning values from samples to blocks that minimizes the estimation error.
Level	Horizontal tunnel the primary purpose of which is the transportation of personnel and materials.
Lithological	Geological description pertaining to different rock types.
LoM Plans	Life-of-Mine plans.
LRP	Long Range Plan.
Material Properties	Mine properties.
Milling	A general term used to describe the process in which the ore is crushed and ground and subjected to physical or chemical treatment to extract the valuable metals to a concentrate or finished product.
Mineral/Mining Lease	A lease area for which mineral rights are held.
Mining Assets	The Material Properties and Significant Exploration Properties.
Pillar	Rock left behind to help support the excavations in an underground mine.
RoM	Run-of-Mine.
Sedimentary	Pertaining to rocks formed by the accumulation of sediments, formed by the erosion of other rocks.
Shaft	An opening cut downwards from the surface for transporting personnel, equipment, supplies, ore and waste.
Sill	A thin, tabular, horizontal to sub-horizontal body of igneous rock formed by the injection of magma into planar zones of weakness.
Stope	Underground void created by mining.
Stratigraphy	The study of stratified rocks in terms of time and space.
Strike	Direction of line formed by the intersection of strata surfaces with the horizontal plane, always perpendicular to the dip direction.
Sulfide	A sulfur bearing mineral.
Tailings	Finely ground waste rock from which valuable minerals or metals have been extracted.
Variogram	A statistical representation of the characteristics (usually grade).

1.0 SUMMARY

The preliminary economic analysis is preliminary in nature and includes inferred mineral resources that are considered to be too speculative, geologically, to have the economic considerations applied to them that would enable them to be categorized as a mineral reserve and there is no certainty that the preliminary economic analysis will be realized.

This Technical Report on the Springer Tungsten Project in Imlay, Nevada, USA, has been prepared for EMC Metals Corp. (EMC), a Canadian TSX-listed mining company, headquartered in Reno, Nevada, USA. EMC's wholly owned subsidiary, Springer Mining Company (SMC), is the 100% owner of the Springer asset.

This Technical Report has been independently prepared for EMC as an NI 43-101 *compliant* Technical Report by Associated Geosciences Limited (AGL), of Calgary, Alberta, Canada, with contributions in numerous areas from Practical Mining LLC (PM), of Elko, Nevada, USA (the Report, or the Technical Report).

This Technical Report represents a resource update on the Springer property, where resources were previously reported in NI 43-101 compliant technical reports prepared for EMC by Simpson (2008) and by SRK (2009):

“Technical Report on the Springer Mine Property Pershing County, Nevada, USA” prepared by Discovery Consultants, Vernon, BC for Golden Predator Mines Inc., Vancouver, BC., Effective Date January 28, 2008.

“NI 43-101 Technical Report on Resources, EMC Metals Corp., Springer Facility- Sutton Beds, Nevada, USA” prepared by SRK Consulting of Lakewood, CO. for EMC Metals Corp., Effective Date May 15, 2009.

Where there has been no change in the previously disclosed status, AGL has drawn freely from these reports, which are available from EMC and from the SEDAR website at www.sedar.com. AGL summarized information from these earlier technical reports where appropriate, and quoted directly on other occasions. Quoted text is indented, but may not be otherwise referenced.

This Technical Report also represents an initial Preliminary Economic Assessment (PEA) on the economics of the restart of the Springer Tungsten mine and mill facility.

This Technical Report was also prepared in an attempt to establish the following objectives for EMC management and investors:

- Define the feasibility of an economic restart of the existing facilities and mine,

- Revise resource estimates to reflect current tungsten market prices, market demand, and new resource data on the western side of the property not included in previous resource estimates,
- Review and define the opportunities to develop mine production from areas mined historically, but not incorporated in the existing mine/mill infrastructure developed by the last owner/operator on the property (General Electric Company), and
- Establish a base line for both Project restart and operations.

1.1 Property Description and Location

The Springer Facility is located approximately 30 miles southwest of the city of Winnemucca, in Pershing County, Nevada, and approximately 130 miles northeast of Reno, Nevada. The drive from Interstate 80 near Mill City, is approximately 15 minutes north. The mine has year around access by a gravel road in fair condition. The mine site is located at geographic coordinate's 40°46'56"N latitude and 118°07'58"W longitude, (UTM coordinates are 404,438E, 4,515,212N, Zone 11T, WGS84).

1.2 Ownership

The Springer Facility is 100% owned by Springer Mining Company, a wholly owned subsidiary of EMC Metals Corp. It is comprised of 340 lode mineral claims totaling approximately 7,024 acres, 25 placer claims totaling approximately 500 acres and fee lands totaling approximately 3,756 acres. The total area of the Springer Facility is approximately 11,280 acres, including all mineral claims and fee lands. The mineral resources described in this report are located entirely on private fee lands.

1.3 Geology and Mineralisation

The Springer facility is located on the eastern flank of the Eugene Mountains, a block-faulted horst of the Basin and Range tectonic province. The area is underlain by Mesozoic, meta- sedimentary rocks intruded by Cretaceous granitic rocks, which were later overlain by Tertiary volcanic rocks. The meta-sedimentary rocks are composed of pelitic sediments with thin beds of micritic limestone. These limestone beds host scheelite-bearing, contact metasomatic skarn deposits. These are arranged in two general horizons each with several individual beds. The horizons strike north-northeast and dip steeply to the northwest and to the southeast. Scheelite is the only tungsten mineral identified in the skarns. It occurs in early veins and as finely disseminated grains along localized marble fronts. It is also associated with later alteration of garnet and

pyroxene, where it occurs as coarse-grained aggregates and fine to medium-grained, euhedral dipyramidal crystals.

1.4 Exploration

There were three main phases of exploration work conducted on the Springer Facility by three different owner/operators. These exploration periods include:

- Exploration drilling and underground sampling by Nevada-Massachusetts Corporation (NMC) between 1925 and 1958,
- Exploration drilling and underground channel sampling completed by General Electric Company (GE) and Utah International Inc (UII) between 1973 and 1982, and
- Diamond drilling and reverse circulation drilling completed by EMC in 2007 and 2008.

The NMC exploration work focused mainly within the mineralized beds located at the Stank and Springer-Humboldt Mines. No specific NMC sample or assay data of from any of the drifting, mining or drilling is available for any of these areas.

The exploration drilling and sampling completed by GE and UII focused primarily on the Sutton I and Sutton II areas. The vast majority of the modern exploration data was collected during this phase of work. GE and UII compiled most of the older NMC data, rehabilitated the historic underground workings, drilled 119 diamond core holes from surface and underground, extended the underground workings and analyzed approximately 3,200 samples.

EMC completed the most recent exploration work in 2007 and 2008. During this time, seven diamond core and 251 reverse circulation (RC) drill holes were completed in three main areas. EMC drilled 81 holes in the George beds, 79 holes in the Mill Beds and 51 holes in the Sutton I Beds. All of this drilling focused on near surface mineralization in order to evaluate the open pit potential. A few diamond core holes were located in the Sutton II areas for confirmation and expansion of the historical resources.

1.5 Mineral Resource Estimate

AGL has audited the Sutton I and Sutton II resource estimates prepared by SRK and detailed in their 2009 Technical Report on Resources (*op. cit.*). AGL considers that the SRK estimate has been reported in accordance with the National Instrument 43-101 Standards for Disclosure for Mineral Projects and prepared according to the Canadian Institute of Mining, Metallurgy and Petroleum “Best Practices and Reporting Guidelines”.

The 2009 SRK resource estimates were based on a cut-off grade for WO₃ of 0.3%. Stronger current prices (2009 was a tungsten price low-point for the last 7.5 years) since the time of the last resource estimate now support a lower cut-off level in the resource calculations. AGL has applied a 0.2%, cut-off over all resources in this updated estimate.

The Sutton I and Sutton II resource estimates, as prepared by SRK, are summarized in Table 1-1 below.

Table 1-1: Sutton I & II Mineral Resource Statement of Resources

Sutton I & II Mineral Resource Statement of Resources					
Resource Category	Cut-Off Grade	Resource	Grade	Contained Tungsten Units	
	WO ₃	Tons	WO ₃	STU's	MTU's
Indicated	0.20%	355,000	0.537%	190,635	172,990
Inferred	0.20%	1,616,000	0.459%	741,744	673,089
Note: a short ton unit (STU) = 20 lbs. WO ₃ ; a metric ton unit (MTU) = 22.04 lbs. WO ₃					

In addition to the Sutton resources, AGL has prepared a resource estimate on Springer project areas west of the Springer Stock, summarized in Table 1-2 below.

Table 1-2: Springer West Mineral Resource Statement

Springer West Mineral Resource Statement of Resources					
Resource Category	Cut-Off Grade	Resource	Grade	Contained Tungsten Units	
	WO ₃	Tons	WO ₃	STU's	MTU's
Inferred	0.20%	318,600	0.663%	211,232	191,680
Note: a short ton unit (STU) = 20 lbs. WO ₃ ; a metric ton unit (MTU) = 22.04 lbs. WO ₃					

1.6 Financial Analysis

The economic evaluation on the Project considered all capital and development costs to re-establish Springer Tungsten Mine as a modern long-hole mine (also referred to as end slicing). This includes capital and capitalized development costs to establish ramp connected levels, and adit access for both mining operations, and to complete a refurbishment of the mill facility which

has been partially refurbished, along with contemplated new mill circuits to produce scheelite concentrates for world markets.

The mine plan calls for two separate mining operations:

- The primary mine operation at Sutton (the existing GE mine) on the eastern side of the property, and
- A new, smaller, adit-access high grade mine at O'Byrne, on the western side of the property.

The mine life presented in all economics is defined by the NI 43-101 resource estimate, and limited to approximately 5 years (4.8 years) of production.

A summary of key financial and operating parameters is included in the following two tables, Table 1.3, and Table 1.4, below.

Table 1-3: Project Performance Summary

Key Performance Measures Summary	Financial Result (US\$)
Capital Cost (millions)*	\$29.8
Average Annual Revenue (millions)	\$43.2
Average Annual Operating Cost (millions)	\$25.0
Average Operating Cost (\$/MTU)	\$186
Average Annual EBITDA (millions)	\$17.8
Constant Dollar NPV (8%)	\$22.8
Constant Dollar NPV (10%)	\$20.1
Internal Rate of Return (IRR)	47%
Price Assumption - APT Equivalent/MTU (Euro Quote)	\$400
*NOTE: Includes working capital and contingency	

NOTE: A metric ton unit (MTU) is the standard unit of measure for tungsten in trading markets.
One MTU equals 22.04 pounds of contained WO₃, or 100th of a tonne of WO₃

Table 1-4: Key Operating Parameters

Key Operating Parameters and Assumptions	PEA Assumption/Result
General	
Life of Mine (limited by NI 43-101 Resource)	5 years
Tungsten Ore Grade (5 year average)	
Sutton Mine	0.40%
O'Byrne Mine	0.76%
Combined Mine Average	0.43%
PEA APT Price Assumption (US\$/MTU)	\$400
PEA WO ₃ Concentrate Price Assumption (US\$/MTU)	\$320
Tax Rate-Nevada Resource Tax	5%
Tax Rate-Federal Income Tax	34%
Production Assumptions	
Ore Throughput -Springer Mill (tpa)	422,600
Ore Throughput -Springer Mill (tpd)	1,200
WO ₃ Average Annual Production (contained WO ₃ tons)	1,488
WO ₃ Average Annual Production (MTU)	134,960
Mining Cost/ton Ore (US\$)	\$39.87
Total Cost/ton Ore (US\$) (inc. milled stockpiles)	\$59.19
Mill Recovery Assumption (year 2 onwards)	82%
Mill Availability Assumption (year 2 onwards)	89%
Cash Modeling Assumptions	
CapEx in discount year #	1 and 2
Production in discount year #	2
Working Capital/Sustaining Capital	yes
Contingency	10%
Escalation of Costs or Prices	none
First Discount Year	2013

2.0 INTRODUCTION AND TERMS OF REFERENCE

2.1 Description of the Issuer

EMC was formed on March 6, 2009, when the parent company, Golden Predator Mines, Inc., spun off its precious metal assets as Golden Predator Royalty and Development Corp. and was then renamed EMC Metals Corp. The company's principal asset and operational focus is the Springer Tungsten Mine. This project includes an historic underground tungsten mine, a previously operated tungsten ore milling facility, all support infrastructure and approximately 11,280 acres of mineral claims and fee lands.

EMC is a specialty metals mining group. In addition to its tungsten project, the Company is focused on developing high-value specialty metal and mineral projects by applying world-class extraction and recovery techniques. Current projects include properties associated with scandium and accompanying metals.

EMC's Springer tungsten mine, located in Nevada, holds significant value to be captured via recently announced plans to restart operations. Increasing global tungsten demand and declining tungsten exports from China - a key supplier - are currently driving the metal's price upward, creating considerable opportunity and economic viability.

The company is listed on the Toronto stock exchange, ticker symbol (TSX:EMC).

2.2 Terms of Reference and Purpose of the Report

Associated Geosciences Ltd (AGL) of Calgary, AB. has been commissioned by EMC Metals Corp. of Reno, Nevada USA to prepare a Canadian National Instrument 43-101 (NI 43-101) Compliant Technical Report on the Mineral Resources for the Springer Tungsten Mine, Pershing County, NV, USA located near the town of Winnemucca.

The current document provides an updated Technical Report describing the resources of the Springer Tungsten Mine and Preliminary Economic Assessment (PEA) costs for the restart of mining operations proposed by EMC. The report has been prepared according to the June, 2011 revised NI-43-101 guidelines. The revised Form NI 43-101(F1) was used as the format for this report.

2.3 Sources of Information

A significant amount of the information included in this technical report was originally reported in NI 43-101 compliant technical reports prepared for EMC by Simpson (2008) and by SRK (2009):

“Technical Report on the Springer Mine Property Pershing County, Nevada, USA” prepared by Discovery Consultants, Vernon, BC for Golden Predator Mines Inc., Vancouver, BC., Effective Date January 28, 2008.

“NI 43-101 Technical Report on Resources, EMC Metals Corp., Springer Facility- Sutton Beds, Nevada, USA” prepared by SRK Consulting of Lakewood, CO. for EMC Metals Corp., Effective Date May 15, 2009.

Where there has been no change in the previously disclosed status, AGL has drawn freely from these reports, which are available from EMC and from the SEDAR website at www.sedar.com. We have summarised them where appropriate and quoted directly on other occasions. Quoted text is indented but may not be otherwise referenced.

2.4 Details of the Site Visit

A site visit to the Springer Project was conducted between April 11, 2012 and April 13, 2012. Participating in the visit were:

- Mr. Keith McCandlish, P.Geology, of AGL, Managing Director and the qualified geologist responsible for this technical report
- Mr. Peter Cain, Ph.D., P.Eng. of AGL, Head of Mining Engineering.
- Ms. Susan O'Donnell, P.Geology of AGL, Geologist, who assisted Mr. McCandlish in the review of the geological model and was responsible for writing some sections of this report under his direction.
- Mr. Mark Odell, P.E. of Practical Mining LLC of Elko, NV who was retained separately by EMC to prepare the mine plans and preliminary economic assessment based on the geological model and this work is reported in this technical report.

All of the above consultants meet the standards for independence of the issuer as set out in the NI 43-101 guidelines. Detailed qualifications are set out in Section 28 of this report.

In attendance from EMC were:

- Mr. George Putnam (President & CEO)
- Mr. Ed Dickenson (Chief Financial Officer)
- Mr. Mark Beaman (Consulting Geologist)
- Mr. Jim Park (Consulting Geologist)

The following were available for part of AGL's visit:

- Mr. Willem Duyvesteyn (Chief Technical Officer and Director)

- Ms. Nancy McMillen (Environmental Consultant)

The site visit included extensive discussions with all participants, a tour of the project properties, including a small portion of the accessible underground mine, review of core and tours of the existing facilities and infrastructure.

3.0 RELIANCE ON OTHER EXPERTS AND ON OTHER DISCLOSED MATERIAL

3.1 Reliance on other Experts

A significant amount of the information included in this technical report was originally reported in NI 43-101 compliant technical reports prepared for EMC by Simpson (2008) and by SRK (2009):

“Technical Report on the Springer Mine Property Pershing County, Nevada, USA” prepared by Discovery Consultants, Vernon, BC for Golden Predator Mines Inc., Vancouver, BC., Effective Date January 28, 2008.

“NI 43-101 Technical Report on Resources, EMC Metals Corp., Springer Facility- Sutton Beds, Nevada, USA” prepared by SRK Consulting of Lakewood, CO. for EMC Metals Corp., Effective Date May 15, 2009.

No additional exploration has been conducted on the property since the May 15 effective date of the SRK report, although additional work has been completed on the processing method and the land position has been maintained in good standing. Some additional work has been completed towards permitting requirements.

Where the status at the property is unchanged since the 2009 report, AGL has drawn freely from these reports, which are available from EMC and from the SEDAR website at www.sedar.com. We have summarised them where appropriate and quoted directly on other occasions. Quoted text is indented but may not be otherwise referenced.

Other than information from previous reports as stated below, this report has been prepared by AGL relying on information provided by experts employed by or associated with EMC as follows:

- Mining design, schedules and costs were prepared by Practical Mining LLC of Elko NV. AGL has reviewed these designs and costs and has compared them to our own experience. We have found them to be a reasonable basis for the evaluation of a preliminary economic assessment of the project.

In addition to the previously disclosed information contained in the previously referenced technical reports, AGL has relied on information provided by EMC staff obtained during the above-referenced site visit during the preparation of this report. AGL's reliance on this information is as follows:

- AGL has relied on EMC staff for verification of the status of lands and mineral claims.

- AGL has relied on EMC documents for descriptions of the proposed beneficiation process and their laboratory tests leading to recovery efficiencies.
- AGL has relied on EMC staff and documents for descriptions of the permitting stats and additional permits required to begin operations.
- AGL has relied on EMC staff for information pertaining to markets, off-take agreements and revenues.

4.0 PROPERTY DESCRIPTION AND LOCATION

The property description and location is as previously reported by SRK (2009). There has been no change in the mineral title, other than maintaining them in good standing, nor has there been any change in the land-holding. The following paragraphs are extracted from SRK (*op cit.*).

4.1 Property Area and Location

The Springer Facility, comprising 11,280 acres of lode and placer claims and fee lands, is located approximately 30 mi. southwest of the city of Winnemucca, in Pershing County, Nevada, and approximately 130 mi. northeast of Reno, Nevada (Figure 4-1). The north-bound drive from Interstate 80 near Mill City takes approximately 15 minutes. The mine has year around access by an excellent gravel road. The mine site is located at geographic coordinate's 40°46'56"N. latitude and 118°07'58"W longitude, (UTM coordinate is 404,438E, 4,515,212N, Zone 11T, WGS84).

4.2 Mineral Tenure

The Springer Facility is composed of two types of mineral titles. These include; private fee lands for which EMC Metals Corp. owns both the surface and mineral rights and lode mineral claims for which only the mineral rights are owned. Surface ownership of the lode mineral claims is retained by the federal government and administered by the Winnemucca field office of the Bureau of Land Management (BLM). The fee land property boundaries are located by standard land survey monuments composed of cement or rebar corner markers. The lode mineral claims are marked by 2 x 2 inch wooden posts each 4 ft. high, hammered into the ground and labeled with an aluminum tag describing the mineral claim number corner description and bearings to the adjacent corners.

The Springer Facility is comprised of 340 lode mineral claims totaling approximately 7,024 acres, 25 placer claims totaling approximately 500 acres and fee lands totaling approximately 3,756 acres as listed in

Table 4-1 and Table 4-2 below. The total area of the Property is approximately 11,280 acres, including all mineral claims and fee lands (Figure 4-2). The lode mining claims are unpatented and un-surveyed.



Figure 4-1: Location of the Springer Mine

Table 4-1: Springer Facility Fee Lands (after Simpson and Sandberg, 2008)

Township and Range	Section #	Section Portion	Aproximate Acreage
T33N, R 34E	1	All	640
	3	All	640
	11	All	640
T33N, R 35E	6	W 1/2 of NE ¼	80
T 34N, R34E	23	S 1/2	320
	27	All	640
	35	All	640
T 34N R 35E	31	Lot 2	36
		SE ¼ of NW ¼	40
	33	S ½ of NW ¼	80
Total			3,756+-

Table 4-2: Springer Facility Lode and Placer Claims

Claim Name	Location Date	County Recording	BLM Serial Number	Location
TN-1 through TN-174	October 24-26, 2006	Roll 418, Pages 697-870	NMC 944260 through NMC 944433	T33N, R34 E, Sec. 2,4-9,10,12,35,36-42, 44; T33N, R34E, Sec. 1,2,11-14;
TN-175 through TN-210	April 19-25, 2007	Roll 425, Pages 716-751	NMC 960922 through NMC960957	T34N, R34E, Sec. 16,26,34; T33N, R35E, Sec. 6
TN-211 through TN-331	Sept 1, 2007	Roll 430, Pages 4-124	NMC 970031 through NMC 970151	T34N, R34E, Sec. 35,36; T33N, R34E, Sec. 1,2,37,38; T33N, R34E, Sec. 6
SMC 1 through SMC 25	Sept 1, 2007	Roll 430, Pages 125-149	NMC 970152 through NMC 970176	T34N, R34E, Sec. 26
WO-134 through WO-136, WO-142 through WO-145; WO 155 through WO-156	Sept 4, 2001	Roll 361, Pages 516-525	NMC 825370 through NMC825378	

Source: Simpson and Sandberg, 2008

4.3 Title, Access and Obligations

AGL has had sight of both the tax and minerals title fee payment records and has confirmed that the titles are in good standing at the time of the site visit.

EMC has unfettered access to their property over their access road and is subject to the usual statutory and regulatory provisions regarding exploration permits and construction. AGL believes that there are no hindrances to the operation of the Springer Mine Project in this regard.

The fee lands are subject to county property taxes to retain ownership. The lode mineral claims are subject to annual assessment fees of \$125 per claim paid at the Reno office of the Department of the Interior on or before October 31st each year. Additionally, EMC must file a Notice of Intent to Hold with the Pershing County Recorder on or before October 31st of each year. These filing fees are \$8.50 per claim. The filing details of each lode mineral claim can be found in Appendix 1 of Simpson and Sandberg 2008 Report.

4.4 Agreements and Encumbrances

On December 5, 2006, EMC announced that Golden Predator Mines Inc. had completed the acquisition of Springer Mining Company from GE. Total consideration consisted of \$4.5 million dollars as well as the assumption of certain reclamation obligations in the amount of \$981,411. The reclamation obligations are secured by way of escrowed funds, which will be released periodically upon completion of various stages of reclamation work. The fee lands that constitute the eastern one-half of Section 1, T.30N., R.34E. are subject to a royalty in favor of Nevada Land and Resource Company, LLC. The production royalty is 5% of the net smelter returns (NSR).

The WO claims are subject to a royalty in favor of Geological Services Inc., a Utah corporation, as follows: “A mineral production royalty on the production of tungsten minerals equal to a percentage of the average daily price of a tungsten trioxide short ton unit, ranging from 3 % if the price per unit is less than \$200.00, 4% if the price per unit is more than \$200.00, but less than \$320.00, and 5% if the price per unit is \$320.00 or more. The royalty percentage applicable to all other minerals is 3% of the net smelter returns. Springer Mining Company has the option to purchase one-half of the royalty for the price of \$2,000,000. The royalty also obligates Springer Mining Company to pay a minimum royalty payment of \$30,000 on the first anniversary, \$40,000 on the second anniversary and \$50,000 on the third and each subsequent anniversary of the Effective Date of the Deed with Reservation of Royalty.

4.5 Environmental Liabilities

The Springer tungsten property has a long history of mining and milling with substantial surface and underground impacts. The historic mine and mill will be re-opened and refurbished for near term production. Both of these aspects are subject to environmental liabilities. All of the environmental liabilities pertaining to EMC's operation of the mine or mill have been or will be bonded with the appropriate authority. Environmental liabilities outside of EMC's title properties and not reactivated by mining operations are not the responsibility of EMC under current statutes and regulations.

4.6 Permitting

The mineral resources discussed in this report are all located on private fee land. Exploration drilling required for their delineation is governed under Nevada Administrative Code Chapter 519a. This regulatory code is defined as a plan of operation and reclamation permit for an exploration project. It is a simple, seven-page application describing the project ownership and proposed exploration activities. The terms of the permit define specific requirements for reclamation and drillhole abandonment.

EMC Metals Corp. conducted exploration drilling in 2007 and 2008 under an NAC-519a permit. All the terms and conditions of this permit were met, and there are no outstanding obligations.

The Springer facility holds all permits necessary to operate at its full production capacity.

AGL reviewed a list of all of the environmental permits required for the restart of the mine and mill and discussed the details of permits, costs, action items and schedules with Springer staff during the site visit in April, 2012. At that time, AGL was of the opinion that permitting presented no significant obstacle to the re-opening of the mine and mill, subject to usual due diligence from EMC. Environmental permits are discussed in more detail in Section 20.

4.7 Other Significant Factors

After review of the information available, AGL is of the opinion that there are no other significant factors to be disclosed.

5.0 ACCESSIBILITY, CLIMATE, LOCAL RESOURCES, INFRASTRUCTURE AND PHYSIOGRAPHY

As of AGL's site visit there have been no major changes under this heading since the previous technical report was published in 2008 (Sandberg, *op. cit.*) and 2009 (SRK, *op. cit.*). The following sections are reproduced from that report, modified for the 2011 reporting format.

5.1 Topography, Elevation and Vegetation

The Springer property lies within the 'Basin and Range' physiographic province of the southwestern United States. The topography comprises moderate to high relief, northerly trending mountain ranges typically 5 to 15 miles wide, and intervening broad, alluvium-filled valleys or basins from 10 to 20 miles wide. The mountain ranges are drained by short perennial, intermittent and ephemeral streams that disappear into broad alluvial fans at the foot of the mountain ranges. Many of the intervening basins are closed and not drained by outlet rivers. The only major waterway within Pershing County is the Humboldt River, flowing southwesterly from Humboldt County, through Pershing County, terminating at the Humboldt Sink, on the boundary with Churchill County.

Elevations range from 3,500 to 4,500 ft. above sea level in the valley bottoms to 5,000 to 9,800 ft. in the ranges. Relief of 3,500 to 4,000 ft. within a distance of a few miles is common.

Most of the Springer facility is desert shrub land, with sufficient grass forage to allow livestock grazing. Vegetation is typical of the 'Basin and Range' province, varying locally between none and sparse desert vegetation. The north facing slopes are slightly more vegetated than the south facing slopes. Typical vegetation found at the site includes Pinion Pine, Juniper, Creosote bush, Sagebrush and a variety of desert grasses and flowers.

5.2 Accessibility

The Springer facility is located approximately 30 miles southwest of the city of Winnemucca, in Pershing County, Nevada, and approximately 130 miles northeast of Reno, Nevada. The drive from Interstate 80 near Mill City is approximately 15 minutes north. The mine has year around access by an excellent gravel road. Numerous roads and bulldozer trails cross the mine property providing good access within it.

5.3 Local Resources

The Property is serviced by Interstate Highway 80 and by eight miles of gravel surfaced State Road 400. The Southern Pacific railway parallels Interstate Highway 80 and the Cosgrave Siding is located 18 miles from the mine site.

5.4 Climate

The climate of the Basin and Range is typically arid with annual rainfall of about 4.0 in. in the valleys and 20 in. or more in the mountains. Winter snowfall may total up to 22 in., mainly in the mountains. Valley bottoms are hot and dry in the summer months, while cooler temperatures prevail at higher elevations. Temperatures range from below freezing during the winter to over 100°F in the summertime. Mineral exploration and mining activities can be conducted year round.

5.5 Infrastructure

For a detailed review of infrastructure associated with the Project, please refer to Section 20.

6.0 HISTORY

The following sections are repeated from the previous reports by Sandberg (2008, *op. cit.*) and SRK (2009, *op. cit.*).

A short ton unit (STU) is equivalent to 20 lb of WO₃.

6.1 Ownership

Tungsten was first discovered in the Eugene Mountains in 1914 by prospector Emil Stank (Segerstrom, 1971). Stank returned to the Eugene Mountains in 1917 and staked claims in the area now known as Stank Hill. Numerous other claims were staked in the area, and by 1918, three companies were mining tungsten within the present boundaries of the Springer Property: the Humboldt Corp., the Pacific Tungsten Co., and the Mill City Tungsten Mining Co. The district was renamed the "Mill City District". In 1925, the Nevada-Massachusetts Co. (NMC), under Charles H. Segerstrom, Sr., purchased the holdings of the Pacific and Mill City companies, and in 1928, those of the Humboldt Corp. In 1958, NMC closed the mine and in 1962, they decided to allow the mine to flood. The mill and other facilities were dismantled and sold at auction. In 1969, NMC was dissolved and the claims were acquired by Tungsten Properties Ltd. (TPL), a partnership composed of the survivors of the late Charles H. Segerstrom, Sr. General Electric appears to have become involved in what was then known as the Nevada-Massachusetts property in 1969, and optioned the property from TPL in 1970. GE held ownership of the property until December 2006, when it was purchased by EMC Metal's parent company, Golden Predator Mines.

EMC Metals Corp. was formed on March 6, 2009, when the parent company, Golden Predator Mines, Inc., spun off its precious metal assets as Golden Predator Royalty and Development Corp. and was then renamed, EMC Metals Corp.. EMC has since expanded, acquiring other mineral properties mainly associated with scandium and co-occurring metals. EMC currently holds 100% of the Springer Mine Project.

6.2 Past Exploration and Development

The record of modern exploration begins in 1970, when Hazen Research Inc. (Hazen) of Golden, Colorado was retained by GE to examine the property and evaluate the potential as an exploration project. A preliminary report prepared by Hazen in 1971 reported encouraging results, and recommended expanding the exploration program (Perry and Hammond, 1971). In 1972, GE signed an option lease with TPL, which included certain work commitments. In 1973, Hazen issued a second report, which correlated geological records of the different historical operations within the property to assist in locating new exploration

targets. They summarized the potential of each mineralized zone based on production records and geological potential then made exploration recommendations. Hazen concluded that the Sutton I and Sutton II areas had the most potential for tungsten mining. In particular, Hazen recommended the down dip extensions of the Sutton I and Sutton II beds that were in production when the mine shut down in 1958 as the most promising areas for resource development. Hazen recommended a program of dewatering, underground rehabilitation, surface and underground diamond drilling, drifting and underground sampling (Tingley and Hamling, 1973).

GE's exploration program began in 1973 with surface diamond drilling and rehabilitation of the Sutton II underground workings. By June 1975, the Sutton II shaft (actually a winze internal to the Sutton II adit) was dewatered and rehabilitated. Exploratory drifts were developed to the north and south of the existing workings. Underground drilling, chip sampling and bulk sampling continued throughout 1978. Surface diamond drilling continued to extend mineralization beyond the limits of the underground development. In 1977, Utah International Inc. (UII) signed an exploration agreement with GE and became the operator of the project. Around this time, the property was renamed Springer, after the Springer Stock in the central portion of the Property.

The following discussion of exploration and development of the Springer Mine by UII and GE is from Park (1978):

"After the mine rehabilitation was complete, drifting began in early June of 1977. Horizontal face chip samples were taken after every drift round on the bed. Grab samples were taken off the muck in the development headings to assist in determining grade dilution and moisture content. Nine, approximately 30 t, full-round bulk samples were taken at 45-50 m intervals along the drift for a more accurate grade determination and to supply metallurgical testing material to the Sunnyvale lab facility. Two additional hanging wall bed bulk samples were taken from the 500 level north and south of the shaft. To date, more than 2,000 highly-reproducible samples have been generated from the program. The underground diamond drilling program generated 4,800 m of core (approximately three miles) from 6 hanging wall cross-cut drill stations. To make the most efficient use of the stations, a series of 3, 3-hole fans were designed from each station. The drilling explored the ore body at intervals 45 m above and below the exploratory drift and at 90 m below. To establish greater depth potential, Station No.5 was placed 122 m into the hanging wall. Additional surface drilling augmented the underground by covering areas along the Sutton zone not reached by the exploratory drift. Two holes were drilled in the Uncle Sam area (North Sutton No. II) and four in the Sutton II. Five relatively deep holes were completed in the Sutton I mine area which resulted in the largest single reserve tonnage for the entire zone. Since the project began 6,064 m (nearly four miles) of core have

been logged. The initial task in the sampling program was to set-up standard sampling and preparation techniques to assure consistent results. Tungsten ore standards were carefully prepared and sent out in a round robin to several well-known analytical labs to determine standard grades to be used in X-ray fluorescence (XRF) analysis. A sample preparation facility was designed and built to accommodate several practical size reduction steps recommended for ores with high "nugget-effects". Both G.E. (Cleveland) and UII (Sunnyvale) analytical labs were used to insure consistent results. Underground sampling of the levels during the mine dewatering phase called for confirming the ore grade in the drifts and the amount of broken ore remaining in the stopes. This was done by collecting chip samples from the back and pillars of the old drifts and stope ore from chute lips."

6.3 Historic Mineral Resource and Reserve Estimates

During the period of GE and UII exploration activity, several "reserve estimates" were completed by various parties. The estimates were used historically as a guide for exploration guidance and planning for further project development. The significant historical reserve estimations are summarized in Table 6-1.

These estimates are historic in nature and do not meet current reporting standards; they are provided solely for project historical recounting and should not be used as an indication of current or future potential.

Table 6-1: Historical Reserve Estimates of the Springer Facility

Reserve Category	Hazen- Feb 1973		GE- Dec 1973		Utah Int.-Sept 1977		GE- April 1978	
Cut-off Grade WO ₃ %	0.20		0.20		0.10		0.20	
Dilution Factor	None		None		Grade diluted 15%		Tons and Grade Diluted to 2.5ft width	
Category	Tons ('000)	Grade (WO ₃ %)	Tons ('000)	Grade (WO ₃ %)	Tons ('000)	Grade (WO ₃ %)	Tons ('000)	Grade (WO ₃ %)
Broken	300	0.46	167	0.42	184	0.41	176	0.41
Proven	1,352	0.46	669	0.41	1,256	0.50	914	0.50
Probable	825	0.45	887	0.48			552	0.49
Possible	1,316	0.44	1,288	0.55	2,325	0.37	1,941	0.42
Total All Categories	3,793	0.45	3,010	0.43	3,765	0.42	3,583	0.45

In 2009, SRK (*op. cit.*) produced an NI 43-101 compliant resource estimate for the Sutton I and Sutton II areas of the property (Table 6-2). The estimate was based on a 0.30 WO₃% cutoff grade, chosen for resource reporting based on an approximated mining cost of \$40/ton, processing cost of \$17/ton, administration cost of \$13/ton, mill recovery of 82% and a WO₃ price of \$11.50/lb. The results reported in the resource statement were rounded to reflect the approximation of grade and quantity which can be achieved at this level of resource estimation.

Table 6-2: Sutton I and II Mineral Resource Statement

Resource Category	WO ₃ % Cut-off	Total Tons ('000)	WO ₃ %Average Grade	Contained STUs ⁽¹⁾ WO ₃
Indicated	0.30	274	0.619	169,606
Inferred	0.30	1,097	0.562	616,514

(1) A short ton unit (STU) is equal to 20 lb of WO₃

A reserve estimate was not made because a prefeasibility study had not been completed on the property.

6.4 Historic Production

In 1918, resulting from the original claim staking and subsequent tungsten rush, three companies were mining within the present boundaries of the Springer Property. Operations ceased in 1919 when the price of tungsten dropped following the end of World War I (Stager and Tingley, 1988). Limited activity re-commenced in 1924 and by 1928, all of the mines had been consolidated by NMC. Under the consolidated ownership, operations were continuous until 1958, except for 4 months in 1932. During the Korean War, the US government started a policy of stockpiling tungsten, but when this program was terminated in 1956, a collapse in tungsten prices occurred (Stager and Tingley, *op. cit.*). As a result, NMC closed the mine in 1958, and placed the operation on a care and maintenance basis until 1962 when they abandoned the operation and let it flood.

Records indicate that total production from 1925 through 1958 was 3,100,000 tons of material from which 1,786,138 short ton units (STU) of WO₃ were recovered. The average grade of mill feed prior to 1944 was 1.17% WO₃. After 1944, the production tonnage increased and the average mill feed grade dropped to about 0.42% WO₃ (Perry and Hammond, 1971). According to Stager and Tingley (*op. cit.*), this change was related to a shift in production from the Stank and Humboldt Mines to the lower grade Sutton Mines, with contributions from a number of open pits. Underground operations include the Sutton I, Sutton II, Humboldt-Springer and the Stank. Open pit operations include the George Pit, Sutton I North Pit, Sutton I South Pit, Sutton II Pit, Humboldt North Pit,

Humboldt South Pit, Springer Pit and the Uncle Sam Pit (Perry and Hammond, 1971).

GE optioned the property from TPL in 1970. In 1971, a pilot mill was constructed to test re-treatment of some 3,000,000 tons of accumulated tailings (Segerstrom, 1971). From 1973 to 1982, GE rehabilitated and expanded the underground workings, constructed a new mill and a new tailings impoundment. During this time, tungsten prices increased to a peak of \$160 per STU in 1977. The mine went into production in March 1982 and closed in October 1982 as prices plummeted. Tungsten prices bottomed out at \$28 per STU in 1986 but production was never resumed. Company records (Park, 1984) indicate that between March and October of 1982, the Springer Mine produced 74,253 tons of ore with an average grade of 0.484% WO₃.

There has been no production from the property since October 1982.

7.0 GEOLOGICAL SETTING AND MINERALISATION

7.1 Regional Geology and Geologic Setting

The Springer Mine & Mill Facility is located on the eastern flank of the Eugene Mountains in the Basin and Range tectonic province (Figure 7-1). A thick sequence of Late Triassic marine sedimentary rocks was deposited in a subsiding slope to lower slope back-arc basin. The Triassic Raspberry Formation consist of up to 7,000 ft. of grey-green, lavender and black pelitic strata intercalated with thin (3-50 ft.) lenses of grey-black, slightly carbonaceous, micritic limestone. The limestone beds serve as marker horizons within the sedimentary sequence.

The sediments were intruded during the Cretaceous Period by differentiated granodiorite stocks which have been cut by associated andesitic and porphyritic andesite sills and dikes. Two metamorphic events have been identified. The first is a low-grade regional event that resulted in pervasive re-crystallization and the development of a strong foliation due to co-incident compressional tectonics. The pelitic rocks were transformed to slates and phyllites, however the limestones appear to have been largely unaffected. The second event is localized, contact thermal metamorphism and metasomatism associated with the emplacement of the granodiorite stocks resulting in the formation of hornfels, calc-silicates and marbles. Contact metasomatism proximal to the limestone beds have replaced them with skarn and contain scheelite (CaWO_4), pyrite (FeS_2) and molybdenite (MoS_2). Tungsten within the scheelite is the primary economic mineral of interest.

The meta-sedimentary rocks are preserved in a complex package of south-east directed thrust plates. The deformational history of the Eugene Mountains is complex. During the Tertiary Period the structural regime changed from a compressional one to an extensional one resulting in a horst like structure typical of the Basin and Range Province.

7.2 Local Geology

At the Springer Mine, skarn formation and the tungsten mineralization is associated with the emplacement of the Springer Stock and nearby Olsen Stock (Figure 7-2). Superimposed on the north-northeast trending structural fabric are folds associated with the emplacement of the granodiorite. The Springer Stock has intruded the meta-sediments in a fairly passive manner with the skarn beds clearly truncated. Northeast of the Springer Stock skarn beds outline a broad fold that conforms to the shape of the Olsen Stock suggesting a more forceful intrusion. Some faulting is associated with de-volatilization of the stocks.

A major normal fault (Stank Fault) has been identified at the Springer Mine with up to 1,000 ft. of throw (vertical displacement). The fault cuts the skarn beds as well as the granodiorite but with only a few feet of displacement. This suggests that the majority of the displacement occurred prior to the intrusive event. The Stank Fault is part of a series of anastomosing curvilinear normal faults centred over the Eugene Mountains. It has been postulated that these faults may be the result of the intrusion of a large, regional granodiorite batholith.

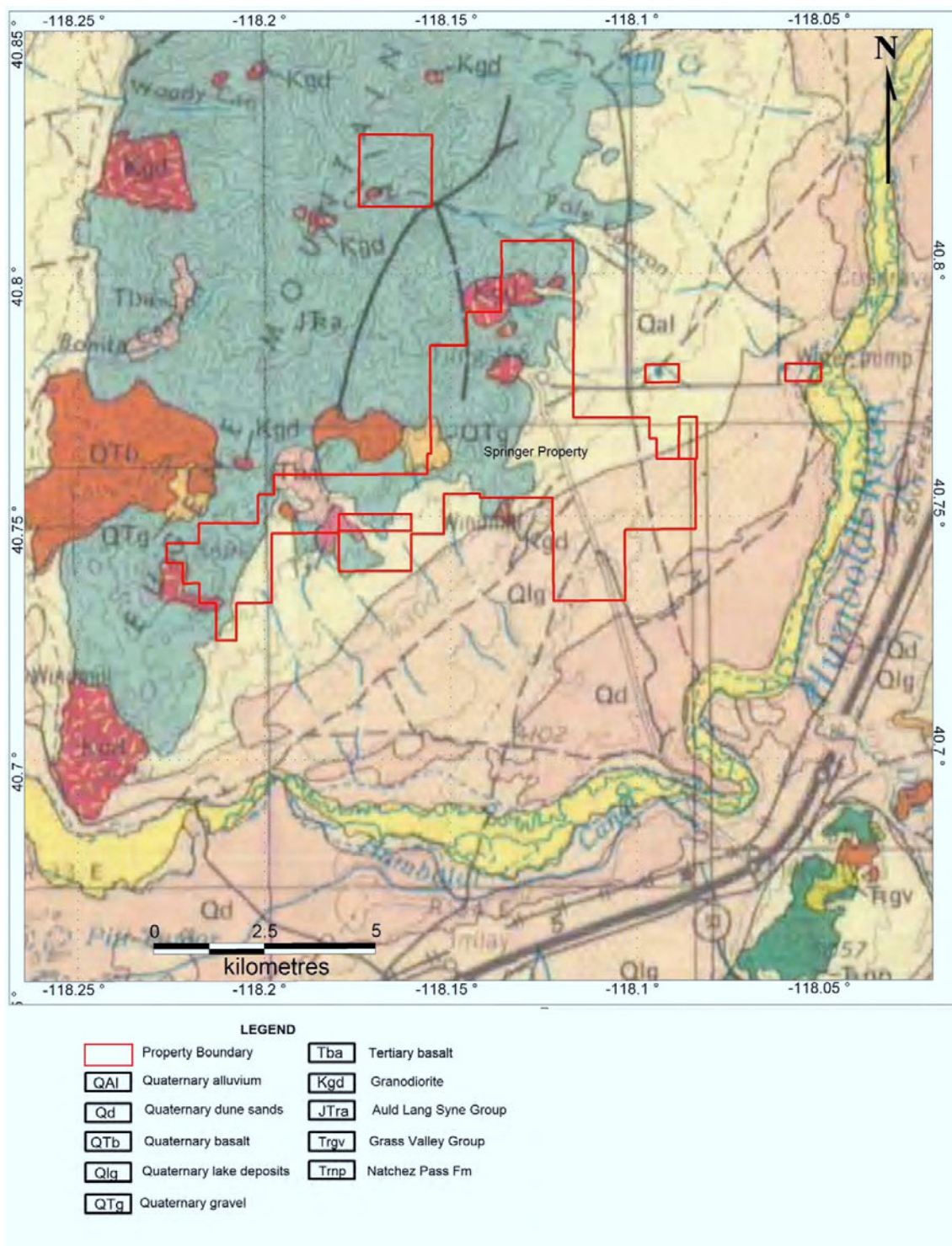


Figure 7-1: Regional Geology, Springer Project

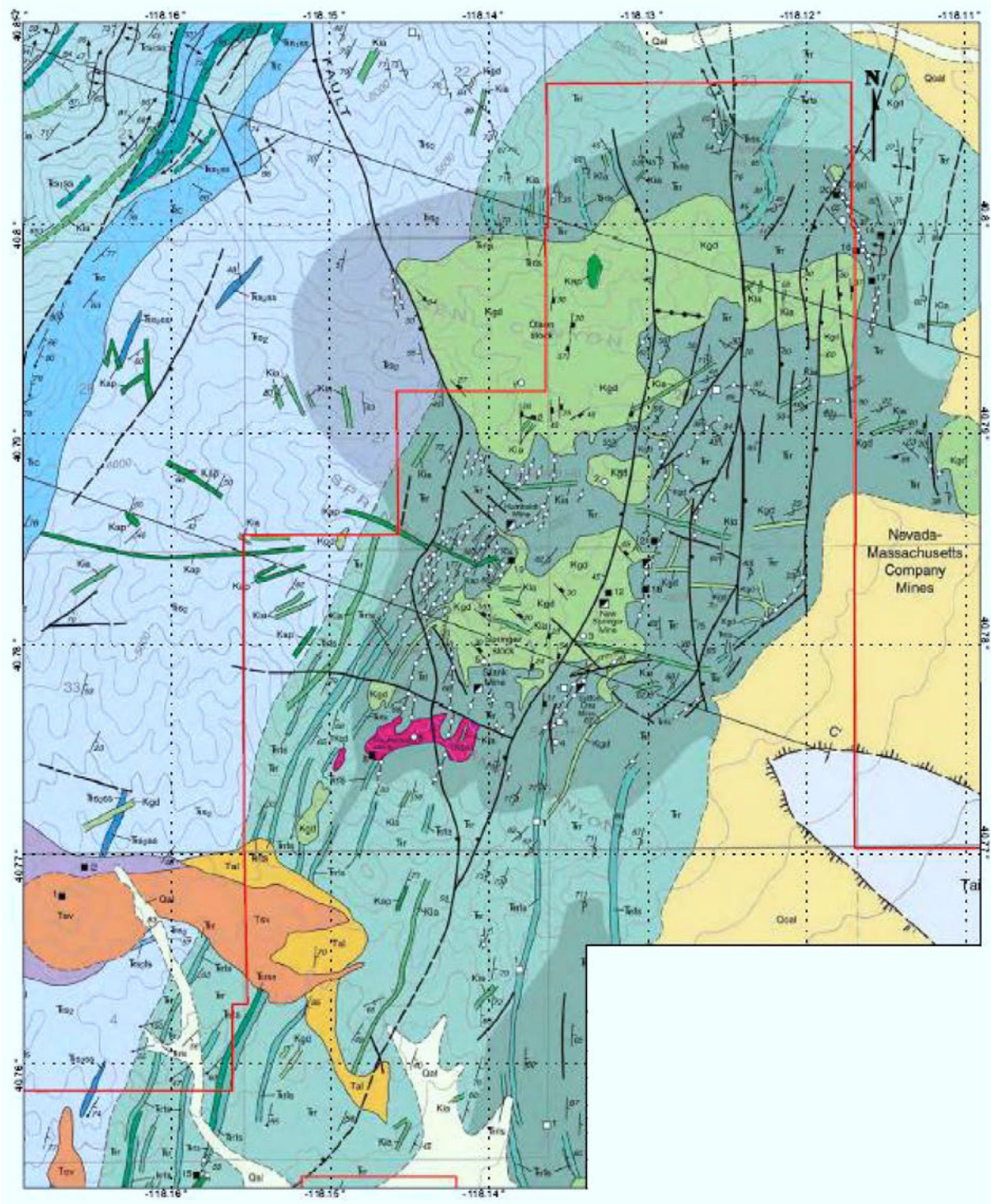
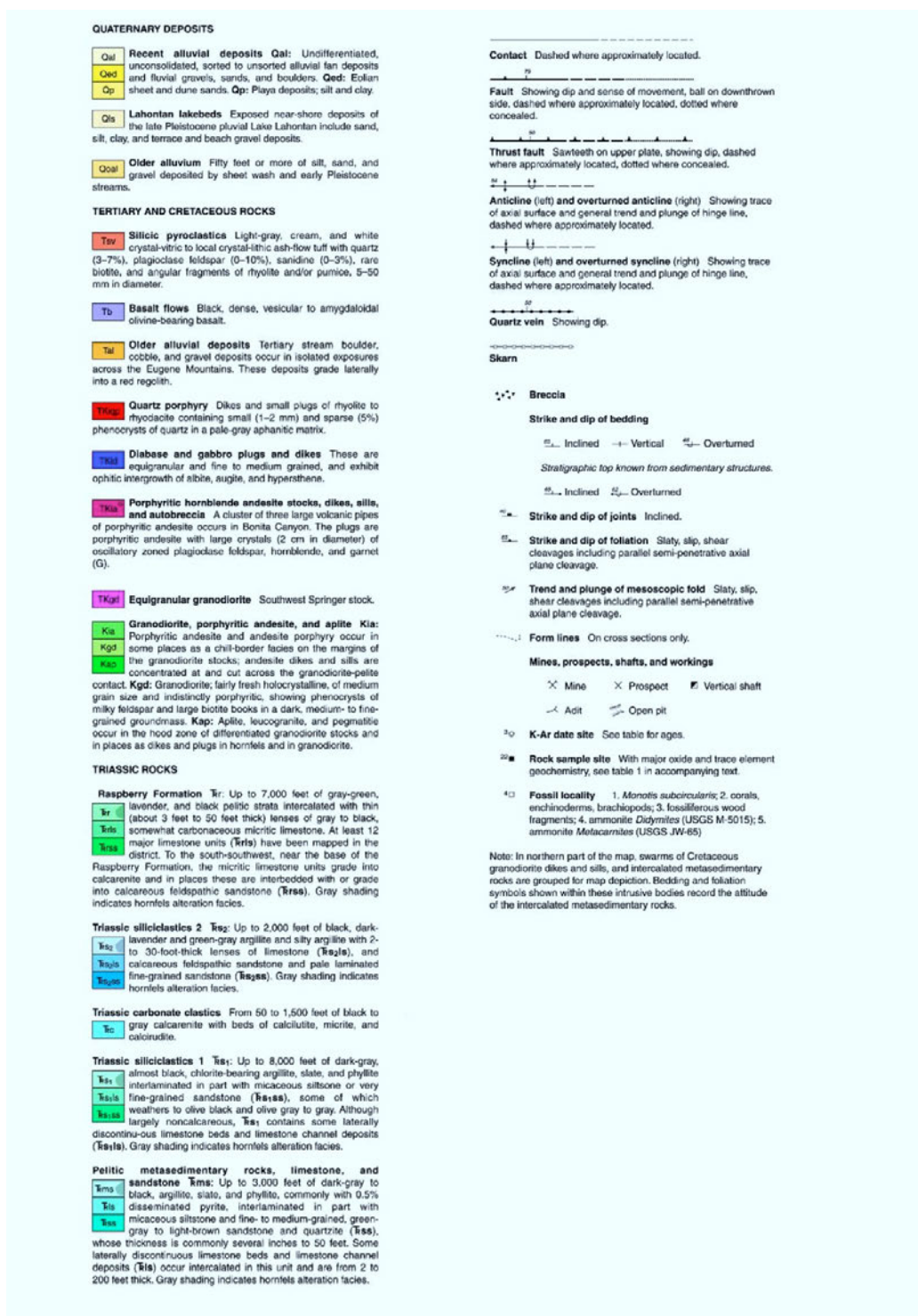


Figure 7-2: Local Geology, Springer Project



Legend to Figure 7-2

A number of post-intrusive faults with throws ranging from 100-500 ft. with a north-south strike have resulted in minor displacements of the Springer ore bodies.

7.3 Mineralization

Mineral deposits within the Eugene Mountains consist of tungsten-bearing skarns, base-metal veins and replacement deposits and small, epithermal gold-silver deposits. The mineralization of economic interest at the Springer Mine is the tungsten-bearing ($\pm$ Mo) skarns, although some low-grade sphalerite (ZnS) occurrences have been noted.

Up to twelve limestone horizons with varying degrees of skarn development have been identified. The most important beds or groups of beds are listed in stratigraphic order from oldest to youngest are:

- West Beds,
- Seel Bed,
- Ribbon Beds,
- Stank Bed,
- Sutton Beds,
- West Mill Beds,
- East Mill Beds
- Forge Beds

The early stage of skarn formation is characterized by very high temperature anhydrous Mg-Al metasomatism resulting in fine grained marble being replaced by coarse grossular garnet-quartz-calcite for a strike distance of approximately 2,000 ft. from the intrusion. As temperatures increased anhydrous Fe metasomatism occurred. It is during this stage that tungsten (scheelite), pyrite, chalcopyrite and molybdenite were emplaced proximal to the stock. Sphalerite was deposited in the more distal margins of the limestone beds. The deposition of sulphides continued for some time.

7.4 Alteration

Exposed granodiorite exhibits argillic and quartz-sericite alteration. Skarn beds are typically cut by small adularia rich quartz veins. Around the contact between the granodiorite and the pelitic meta-sediments two different metamorphic facies have been identified. An albite-epidote-hornfels facies has developed in the outer margins of the contact aureole. Lower temperatures have resulted in incomplete re-crystallization and the regional foliation in the slates and phyllites

has been preserved. This facies passes inward to a more intensely altered zone of hornblende-hornfels where re-crystallization is complete and the foliation obliterated. These facies are generally fine grained and can only be identified by thin-section work.

Where the limestone beds have been replaced by skarn the mineral assemblages are quite coarse. A quartz-grossular granite-diopside-calcite assemblage has developed in the hornblende-hornfels facies and a quartz-epidote-actinolite/tremolite-calcite assemblage in the albite-epidote-hornfels facies. Transitional assemblages have been observed. Along the intrusive contact, in addition to hornfels, a spotted schist can be observed which has developed a foliation resulting from forceful emplacement of the granodiorite.

A final stage of low temperature hydrous retrograde alteration has resulted in garnet being altered to calcite, quartz-chalcedony, epidote and pyrite with diopside being altered to calcite, quartz, tremolite-actinolite, chlorite and talc. This alteration is associated with the formation of scheelite-quartz-sulfide veinlets.

8.0 DEPOSIT TYPES

At the Springer Mine scheelite (tungsten) bearing calc-silicate assemblages have been formed by contact metasomatism. Following the intrusion of the Springer Stock and concurrent thermal event, hydrothermal fluids were released from the differentiating granodiorite magma that resulted in the formation of new mineral assemblages at the contact of the intrusion with the meta-sedimentary strata.

Skarn formed by the replacement of the micritic limestone beds. Tungsten-bearing skarns form at depths of 5-15km and at temperatures in excess of 500°C. Skarn occurrences typically display quite a degree of variability resulting from the composition and structure (effective permeability) of the original sedimentary bed. In some cases, locally, observable skarn grades into altered limestone. Mineralised material typically extends out about 2,000 ft. from the granodiorite.

9.0 EXPLORATION

All of the exploration conducted on the property was completed before and reported in the SRK (2009) Technical Report. AGL has relied on this information, as provided below in its entirety, for the purposes of this updated technical report.

There were three main phases of exploration work conducted on the Springer Facility by three different owner/operators. These exploration periods include:

- Exploration drilling and underground sampling by Nevada-Massachusetts Corporation (NMC) between 1925 and 1958;
- Exploration drilling and underground channel sampling completed by General Electric (GE) and Utah International Inc (UII) between 1973 and 1982; and
- Diamond drilling and reverse circulation drilling completed by EMC Metals in 2007 and 2008.

The NMC exploration work focused mainly within the mineralized beds located at the Stank and Springer-Humboldt Mines. No specific NMC sample or assay data of from any of the drifting, mining or drilling is available for any of these areas.

The exploration drilling and sampling completed by GE and UII focused primarily on the Sutton I and Sutton II areas. The vast majority of the modern exploration data was collected during this phase of work. GE and UII compiled most of the older NMC data, rehabilitated the historic underground workings, drilled 119 diamond core holes from surface and underground, extended the underground workings and analyzed approximately 3,200 samples.

EMC Metals Corp. completed the most recent exploration work in 2007 and 2008. During this time, seven diamond core and 251 reverse circulation (RC) drillholes were completed in three main areas. EMC Metals Corp. drilled 81 holes in the George beds, 79 holes in the Mill Beds and 51 holes in the Sutton I Beds. All of this drilling focused on near surface mineralization in order to evaluate the open pit potential. A few diamond core holes were located in the Sutton II areas for confirmation and expansion of the historical resources.

The 1976 to 1978 exploration drilling and sampling programs were responsible for advancing the property from a historic mining camp to a producing mine. These programs focused primarily on the Sutton I and Sutton II skarn units. Extensive documentation of this work illustrates that it was conducted in a careful and professional manner. All of the drill collars were located by a professional surveyor and the majority of them were surveyed for down hole deviation. The

core was logged, split and sampled properly as described below. All samples were analyzed using appropriate assay procedures of the time. The drill logging and assay results were correctly compiled onto cross-sections and level plans. The exploration work described above resulted in the delineation of anomalous tungsten mineralization located within several west dipping beds, which average approximately 3ft in true thickness along 5,600ft of strike length and 1,500ft of down dip extent. In some locations, the tungsten mineralization thickens to a maximum true thickness of 10ft. The drilling and assay results of the exploration work described above were subsequently incorporated into historical resource estimates as discussed in Section 4.3. They also have provided much of the technical data supporting the resource estimation discussed in Section 15.

The exploration work conducted by EMC Metals Corp. has delineated two small areas of mineralization within the George beds, it has confirmed near surface mineralization at the Sutton I Beds, but has failed to find significant near surface mineralization within the Mill Beds. This exploration work was conducted according to current industry best practices. As described below, the holes were drilled and sampled by reputable contractors, the samples were analyzed using appropriate techniques and were accompanied by a proper QA/QA program.

10.0 DRILLING AND SAMPLING

All of the exploration conducted on the property was completed before and reported in the SRK (2009) Technical Report. AGL has relied on this information, as provided below in its entirety, for the purposes of this updated technical report.

10.1 Type and Extent of Drilling

Three major drilling campaigns were completed at the Springer facility. The Nevada Massachusetts Company completed approximately 115 diamond drillholes, mainly from underground, between 1939 and 1946. GE and UII drilled 119 diamond drillholes from surface and underground between 1976 to 1978. EMC Metals Corp. completed 7 diamond core drillholes and 251 RC drillholes from surface during 2007 and 2008.

10.2 Drilling Procedures

10.2.1 NMC Drilling

The NMC drillholes were located mainly in the Humboldt, Stank and Springer Mines all located within the western horizon of mineralized beds. The drillhole were all diamond core of unknown diameter. Drill logs consists of typed pages describing the drillhole ID, a generalized location, bearing, dip, target, date and logged by. The descriptive log consists of from-to intervals with notes on lithic types, mineralization and alteration. Some of the logs have notes describing assay results but most do not. All of the logs note core recovery. The general locations are referenced to the mine name, heading, level and drill station. No specific coordinates of assay data is available for any of the drillholes. None of these holes are located in the area of the current resource estimation described in this report.

10.2.2 GE and UII Diamond Drilling

The NM and SU Series of diamond drilling were both completed by GE and UII during the same phase of exploration from 1973 to 1978. The drill series notation was used only to differentiate the NM Series, which were drilled from surface, from the SU series drilled from underground. The NM series drillholes are designated NM-1 through NM-49. The current data set contains information from all 49 drillholes totaling 38,201 ft. Drillhole NM-49 was drilled as a geotechnical hole at the location of the Sutton III shaft adjacent to the Sutton II mineralization area. The SU series drillholes are designated SU-1 through SU-70. The current data set contains information from 66 drillholes totaling 16,408 ft. There is no collar or assay information from drillhole SU-69. Drillholes SU-60, SU-64 and SU-68 do have collar and survey information, but do not have any assays. These were all drilled at an unnamed prospect located approximately 2.0 miles

southwest of the Springer Stock. Based on the information contained in the current database there does not appear to be any material gaps in the NM and SU series drillholes.

Drill logs are available for all of the drillholes described above. These consist of hand written drill log forms containing the following: drillhole ID, property name, county, state, coordinate locations in local mine grid, bearing, dip, date started and completed, sheet # and logged by. They have designated columns including: from- depth, to- depth, recovery, alteration, structure mineralization, assay results and remarks. In general, the drill logs are completed in detail with all of the required information provided. The remarks sections provide excellent detail of the general rock types and characteristics of the mineralization. Some of the coordinates are not filled in on the individual logs, instead they are provided on a separate sheet.

The NM series holes were drilled by Boyles Brothers Drilling Company and were predominantly NQ size producing 1-7/8 in. diameter core. The SU Series were drilled by Longyear Drilling Company and were predominantly AX size producing 1-3/16 in. diameter core. Drilling reports indicate that a wire line core drill was used. The core recovery was excellent typically ranging between 95 to 100%.

The drillhole coordinates were surveyed by the mine surveyor in local mine grid. EMC Metals Corp. subsequently transposed the mine grid collar locations into State Plane Nevada West, NAD83 Conus Cors96 coordinates. The drillholes were surveyed down hole using a Single-Shot Kodak Directional Drilling Star Recordings. Down hole surveys are available for 62 of the 119 drillholes including most of the longer holes.

The core from all of the NM and SU series drilling remains on site at the Springer Facility arranged by drillhole and box number. Most of these drillholes are located in the Sutton I and Sutton II areas. Their data was used to support the current resource estimation described in Section 16 below. The drillholes were oriented at a wide range of bearings and dips in order to intercept the mineralization at regular intervals from a limited number of drill stations. Because many of the drillholes were arranged in a fan pattern from a single drill station or they were drilled at oblique angles to the mineralized beds, the sample length of most drillholes do not represent the true thickness of the mineralization. The geometry of the mineralization is however, well defined by the various drillhole intercepts and the underground sampling.

10.2.3 EMC Metals Corp. Drilling

During 2007 and 2008, EMC Metals Corp. completed 7 core and 251 RC holes on the Springer facility. The drilling program was designed to serve several purposes. The seven core holes were targeted on resource confirmation and expansion in the Sutton I and Sutton II areas. The RC holes were pre-collars for some core holes and general exploration drilling at several targets on the property.

The core drilling was all conducted from surface by Major Drilling Company. The core was HQ size producing 2-½ in. diameter core. A single drill rig was used and drilling was conducted during both day and night shifts. The holes were all drilled from the hanging wall side of the mineralization oriented along an east-southeast azimuth and dipping -45° to -75°. All of the holes were surveyed for down hole deviation, generally at 150 ft intervals. Seven drillholes were completed for 3,592 ft. The core was processed and logged on site. Paper drill logs were used to capture geotechnical and geological data including: from-to intervals, core recovery, rock type, alteration, mineralization and structures. In general, core recovery was excellent.

The RC drilling was all conducted by Eklund Drilling Company. A standard buggy-mounted drill was used to create 5-1/5 in diameter holes. The drilling was conducted at six different prospects including; Sutton I and II, George Beds, Mill Beds, Moly Pit, Orphan Pit and Uncle Sam. The majority of the drilling was conducted in the first three areas listed above. The holes were arranged in a wide variety of orientations, typically with at least two holes drilled in a fan pattern from the same location. The drilling crew at the drill rig sampled the drillholes on 2.0 ft intervals. For each interval, a chip tray sample was also taken. The chip trays were then logged by EMC Metals geologists to determine the rock types, mineralization and to define the horizons which were to be sent out for analysis.

For all of the EMC Metals Corp. drillholes, the collars were marked in the field with a permanent monument. The northing and easting of the collars were surveyed with a Trimble GeoXH GPS unit and post process to ±1.5 ft horizontal control. Once the northing and easting was established, the collars were located on the topographic surface model for determination of elevation. This provided elevation control to within ±1.0 ft.

10.3 Drilling Results

A total of 377 drillholes totaling 144,171 ft were completed in the two modern drilling campaigns. GE and UII completed 119 diamond core drillholes totaling to 58,046 ft. EMC Metals Corp. completed 7-diamond core and 251 RC holes totaling to 86,125 ft. The interpretation of all drilling results indicates that anomalous tungsten mineralization is located within several planar, west-dipping

beds, which average 3 ft. in true thickness along 5,600 ft. of strike length and 1,500 ft. of down dip extent. In some locations, the tungsten mineralization thickens to a maximum true thickness of 10 ft. The drillholes are arranged in a variety of orientations and most of the drill sample lengths do not represent true thickness of mineralization.

SRK is of the opinion that the drilling operations were conducted by professionals, the core or cuttings were handled, logged and sampled in an acceptable manner by professional geologists, and the results are suitable for support of a NI 43-101 compliant resource estimation.

10.4 Sampling Methods

There are three sample types of material importance to the current resource estimate of this report. These include; core drilling samples, underground channel samples and RC drilling samples.

10.4.1 Core Drilling samples

All drill core in the 2007 to 2008 drilling program, and in SRK's opinion likely for the prior 1973 to 1978 program, was first inspected under short-wave, ultra-violet light for scheelite mineralization. Observations on the nature of the scheelite mineralization occurrence and visual estimates of the percentage of WO₃ content were noted in drill logs. Mineralized core was marked with a marking pen for sampling in variable lengths. The original assay lengths range from 0.3 ft to 11.0 ft with an average of 3.6 ft. Typically, samples were collected only from the skarn-altered beds and not from the surrounding hornfels. The GE and UII core was first split with a mechanical splitter, whereas the EMC Metals core was sawn into halves. One-half of the core was then gathered into a pre-labeled sample bag. The sample bags were sent directly to the analytical laboratory for assay. The remaining half core and all un-sampled core was placed in core rack storage for future reference.

The chain of custody of the GE and UII core drilling is unknown. However, SRK is of the opinion that the Boyles Brothers and Longyear drilling staff and GE/UII geological staff ensured that all drill samples met GE/UII's and industry standards for production, delivery and security. The drilling samples collected by EMC Metals were handled only by authorized staff and were kept in a secured location until they were transported to the ALS Chemex sample preparation facility in Winnemucca, Nevada. The core samples were transported by EMC Metals Corp., whereas the RC samples were gathered onsite into bins supplied by ALS Chemex, and then transported by ALS Chemex to its Winnemucca, Nevada preparation facility.

10.4.2 Underground Channel Samples

The underground channel samples consist of two types, back samples from preexisting workings and face samples from active development. During GE's and UII's rehabilitation of the NMC underground workings they collected back samples from five levels of historic mining. These were taken from relatively widespread locations and were designed for general confirmation of grade. All of the samples are described by location and width.

As GE and UII expanded the underground workings in particularly on the 4,100 ft. elevation, an extensive sampling program was conducted. The sampling procedures are described by Koch and Link (1977) as follows:

- "1) Country rock without mineralization, i.e. hornfels of dike rock, will not be sampled.*
- 2) After each round, the face will be sampled in a horizontal band centered one meter above the sill. Chips of as uniform a size as possible will be taken with the air hammer, collected on the canvas, labeled and sacked.*
- 3) Individual samples will weigh at least 4.0 kg.*
- 4) Widths will be measured horizontally."*

The current database contains information for 684 channel samples. Approximately 600 of these channel samples are from the lower two levels of the mine where the majority of the current resource estimate described in Section 16 is located. The minimum sample length is 0.33 ft., the maximum is 10.8 ft. and the average is 3.1 ft. The chain of custody of the GE and UII channel sampling is unknown however, SRK is of the opinion that the GE geological staff ensured that all channel samples met client and industry standards for production, delivery and security.

10.4.3 RC Drill sampling

The EMC Metal Corp RC drilling was sampled by the drilling contractor at the drill rig. The drill cuttings were first passed through a wet splitter to reduce the sample size. After every 2.0 ft. of drilling advance, the hole was blown clean and a sample was taken. The sample was collected into a bag labeled with a blind sample number. A sample book tag was also placed into the sample bag and it was tied closed immediately after sampling. The interval distances were recorded in the sample books. After the drillhole was completed, EMC Metals Corp. staff would perform a quick logging and lumping of the sample cutting and select only the mineralized intervals to be sent out for analysis. The sample bags were stored at the drill pad until they were selected for analysis. The selected intervals were gathered by EMC Metals Corp. staff and transported by pick-up truck to transport

bins supplied by ALS Chemex. All the drill pads and the storage bins were located behind the project security gate, which is manned at all times. Of the 251 holes drilled by EMC Metals Corp., sample assays for only 140 holes were available at the time of this report.

10.5 Factors Affecting Accuracy

The sampling programs were conducted by professional geologists and drillers who performed to the standards of the mining industry. The core recovery as recorded on the drill logs, shows that nearly all of the mineralized intervals produce 90 to 100% core recovery assuring a good sample was collected. The underground channel sampling procedure as described above meets current industry standards for the method employed. With good core recovery and thorough channel sampling methods, factors affecting accuracy of results are positive.

10.6 Sample Quality

The core handling, logging and sampling procedures described above combined with good core recovery ensure that sample quality of the drilling is excellent. The method of channel sampling described above combined with the large sample size ensure that the sample quality of the channels is also very good. The drill and channel sample lengths are appropriate for the mineralization widths in order to accurately characterize the mineralization and to distinguish any zones internal to the mineralization, which may have anomalously high or low grades. The mineralized beds vary between 1.0 ft to 10 ft wide and average about 3.0 ft. The average lengths of the drilling, and channel samples is equal to the average width of the mineralization.

10.7 Relevant Samples

The relevant samples are the drill and channel samples of the skarn altered micritic limestone beds within the pelitic sediments of the Raspberry Formation.

11.0 SAMPLE PREPARATION, ANALYSIS AND SECURITY

All of the sample preparation, analysis and security information was reviewed and reported on in the SRK (2009) Technical Report. AGL has relied on this information, presented below in its entirety, for the purposes of this updated technical report.

11.1 Sample Preparation and Assaying Methods

None of the samples used to support the mineral resource estimate of this report were prepared by any employees or subcontract personnel of EMC Metals Corp. or its parent company Golden Predator Mines Inc.

The drilling and channel samples taken by GE and UII were prepared primarily on site in a facility designed and tested by GE under the direction of consultant Dr. George Koch of the University of Georgia. Sample preparation is described in a memorandum by Leonard (1977) as follows:

- Dry chip samples @ 212°F.
- Jaw Crush to ¼ inch.
- Gyratory crush to -28 mesh.
- Split down to about 2 lbs in Jones riffle.
- Disc pulverize.
- Split down to about 130 g;
- Shatterbox pulverize for 3 minutes.
- Split down to about 60 g.
- Shatterbox pulverize for 3 minutes.
- Halve and bag final assay pulps.

The samples were analyzed at three different labs including GE's Cleveland Ohio Laboratory, UII's Sunnyvale Minerals Lab, and the Rocky Mountain Geochemical Corp. Laboratory (RMGC) in West Jordan, Utah.

RMGC determined WO₃ colorimetrically. This procedure involves fusing of the material in a sodium peroxide solution followed by development of the tungsten thiocyanate complex using potassium thiocyanate. WO₃ content is then determined on a spectrophotometer.

GE and UII both experimented with colormetrical determination, but settled on XRF determination of WO_3 . The GE XRF procedures and apparatus are described by Smith (1978) as follows:

- Hydraulic pellet press with 1-1/4 in. diameter die.
- Aluminum sample cups, Spex Industries, Number 3619 or equivalent.
- X-ray Spectrometer, GE XRD 730, operated as follows:
 - Platinum X-ray target.
 - X-ray powder supply set at 50KVCP and 30mu.
 - 0.005 in. Soller slit.
 - LiF (220 crystal).
 - A Xenon proportional counter is operated at 2570 V.
 - The pulse height selector is operated in the differential mode with a base line 0.25 V and a window of 2.00 V.
 - The amplifier gain is set at 4x.
 - The instrument is run using a vacuum atmosphere.
 - The samples are rotated during analyses.

The EMC Metals Corp. samples were all prepared at the ALS Chemex sample preparation facility in Winnemucca, Nevada. The sample preparation routine involved drying, crushing to 90% passing a -2 mm screen and pulverizing a 1 kg split until 85% is -75 μm diameter. Independent consultant, William Gilmore (2008) of Discovery Consultants designed these procedures specifically for the Springer Tungsten samples. There are slight modifications of the ALS Chemex standard procedures.

The sample pulps prepared in Winnemucca, Nevada were shipped to the ALS Chemex Lab in North Vancouver, B.C. Canada for analysis. The samples were analyzed for WO_3 using a pressed pellet wavelength dispersive XRF technique. This method is very similar to that used by GE and UII during the earlier sampling programs.

11.2 ISO 9000 Certification

Most of the analytical work by previous workers GE and UII, was done by the XRF technique in the respective company-owned laboratories. The assays of EMC Metals were sent to ALS Chemex for XRF determined tungsten analyses. ALS Chemex, at its North American laboratories, holds ISO 9002:1994 and ISO 9001:2000 certifications.

The certification process for analytical labs was not common practice in the 1970's, and would not have been a consideration for the company-owned labs of GE and UII.

11.3 Quality Controls and Quality Assurance

GE and UII conducted exhaustive QA/QC on the diamond drill and channel samples. They recognized very early in their exploration program that the nature of the tungsten mineralization made absolute assay reproduction very difficult and adopted a standard policy of duplicate check assays at three laboratories. The QA/QC program is summarized by Parks (1978) as follows:

“The initial task in the sampling program was to set up standard sampling and preparation techniques to assure consistent results. Tungsten ore standards were carefully prepared and sent out in a round-robin to several well-known analytical labs to determine standard grades to be used in x-ray fluorescence analysis. A sample preparation facility was designed and built to accommodate several practical size reduction steps recommended for ores with high “nugget effects”. Both GE (Cleveland) and UII (Sunnyvale) analytical labs were used to insure consistent results.”

The drillhole database contains 731 samples. Of these, 424 samples were analyzed by both GE and UII. The RMGC lab was used as the private, referee check for both GE and UII. There are 88 samples analyzed by both GE and RMGC and 56 samples analyzed by both UII and RMGC. The results of the duplicate check analyses are presented in Figure 11-1 to Figure 11-3. The results show that there was no systematic bias at any of the laboratories and that the analytical results were reproducible within typical standard for the style of mineralization.

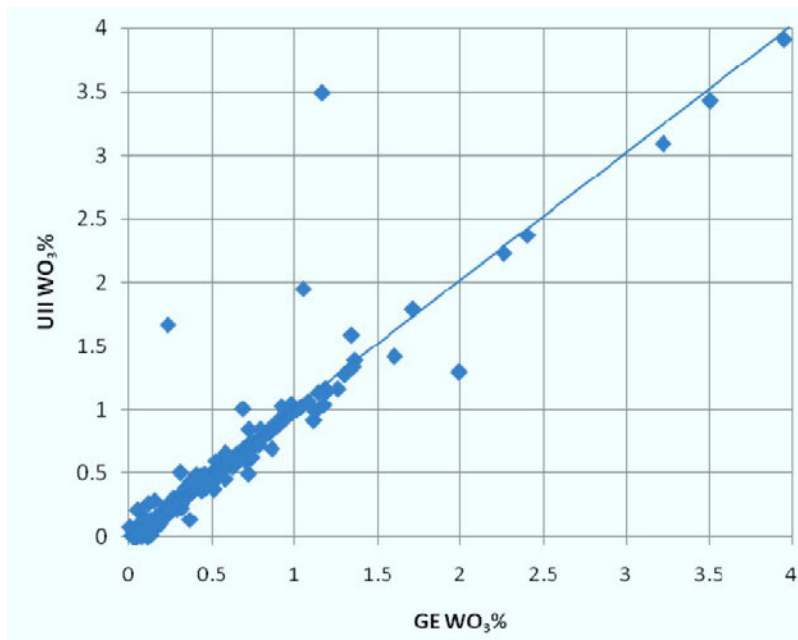


Figure 11-1: Duplicate Check Assays UII versus GE (after SRK, 2009)

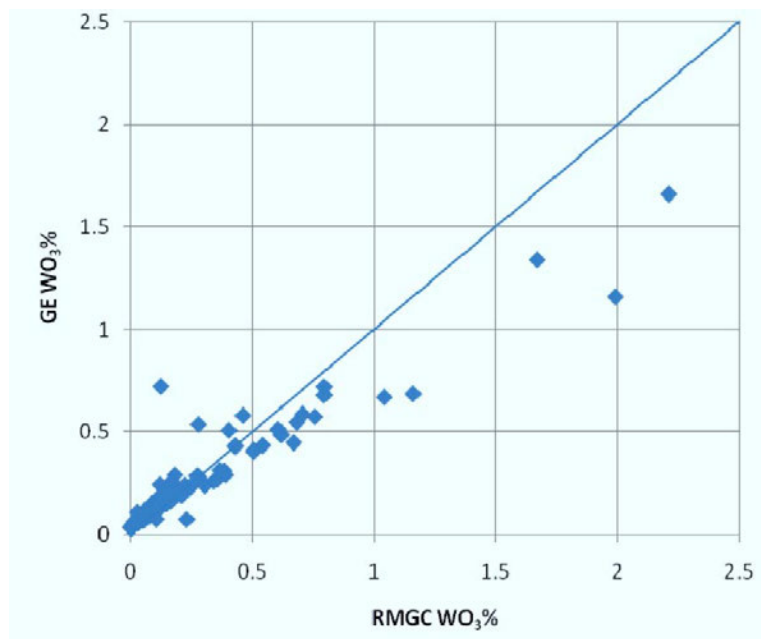


Figure 11-2: Duplicate Check Assays GE versus RMGC (after SRK, 2009)

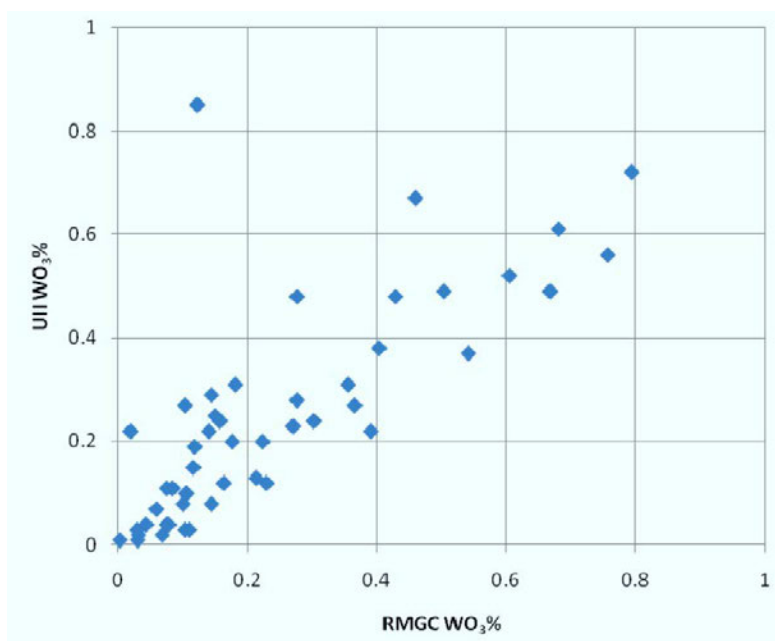


Figure 11-3: Duplicate Check Assays UII versus RMGC (after SRK, 2009)

EMC Metals Corp. conducted an industry standard QA/QC program throughout its sampling and analysis program. The program included a blank sample, a standard reference sample and a field duplicate inserted every 20th sample. The results of the standard reference material analyses are presented in Figure 11-4. These show that ALS Chemex consistently reported elemental tungsten above the expected value. On average, the ALS Chemex values are 7.4% higher than the expected value. Since the EMC Metals analyses support only a very small portion of the current resource estimate described in Section 15, this deviation is not considered material.

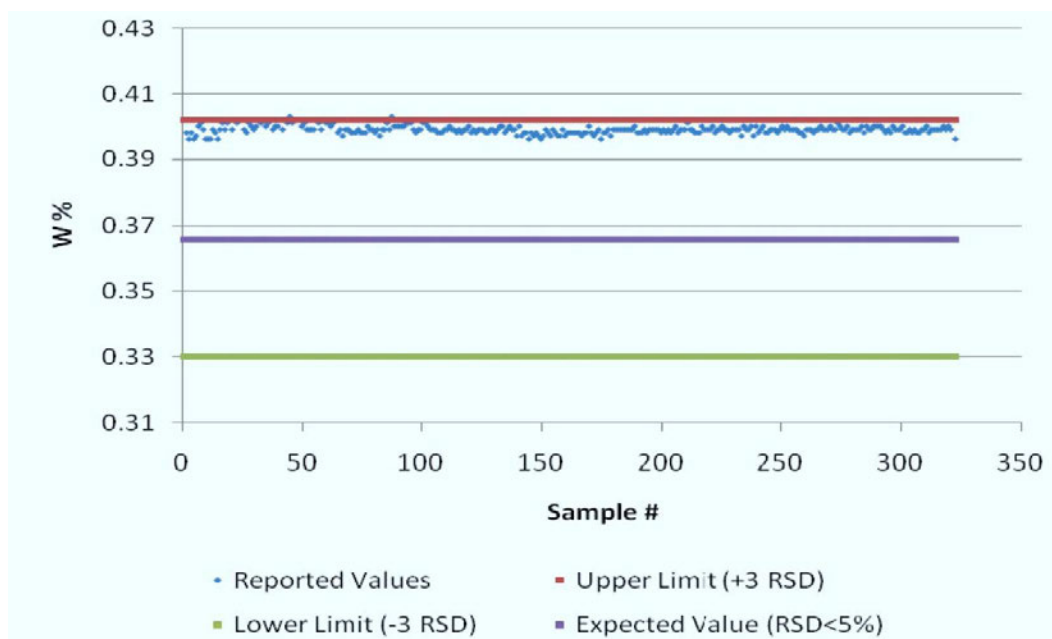


Figure 11-4: EMC Metals Standard Reference Material (after SRK, 2009)

11.4 Interpretation

SRK is of the opinion that the analytical work performed by GE, UII, RMGC and ALS Chemex Labs on Springer Facility tungsten mineralization was good, and suitable for use in resource estimation. The colorimetric method, as well as XRF, were methodologies commonly used for tungsten analysis in that era. Tungsten determinations today typically utilize XRF spectroscopy or Neutron Activation Analysis (NAA) methodologies for determination of tungsten values. There are no references in any of the documents supplied to SRK pertaining to security procedures in effect during the GE and UII sampling programs. During the late 1970's it was not a standard component of project reporting to document these routines of project operation. Industry and corporate standards have always been to prohibit any outsiders to handle or inspect fresh drill core or channel samples at any stage of exploration operations. The drill core was typically picked up at the drill site by the geologist or designated assistant, or delivered by the driller at the end of shift. At the core logging facility, only the geologist and assistants are permitted to handle and prepare the core. Commercial carriers in bulk form of boxes, larger sacks, pallets, or buckets usually handle transportation of the split bagged core and channel samples to a laboratory facility. SRK assumes that the drill core and channel samples for the 1974 to 1978 program were handled in the customary industry manner by drill contractors, geologists, and transportation carriers, and was not compromised by outsiders.

The drilling samples collected by EMC Metals Corp. were maintained in a secured manner until they were transported to the ALS Chemex sample preparation facility in Winnemucca, Nevada. GE and UII conducted routine QA/QC analysis during their sampling programs. This QA/QC included duplicate assay checks at three different laboratories. The results of this work showed that there was no systematic bias from any of the labs. EMC Metals Corp. has conducted a modern QA/QC analysis on their drilling at the Springer Facility. This consisted of insertion of blanks, standards, and field duplicates, and submitting all these to an accredited laboratory. The laboratory employed industry standard sample preparation and the techniques of analyses were appropriate for the level of tungsten mineralization. The results of the QA/QC study verified that no systematic assay bias was present in the vast majority of the samples supporting the resource estimate in Section 15 of this report.

12.0 DATA VERIFICATION

All of the data verification work was completed before and reported in the SRK (2009) Technical Report. AGL has relied on this information, presented in its entirety below for the purposes of this updated technical report.

The database prepared by EMC Metals and verified by SRK relies on the industry professionalism of information supplied by GE, UII, RMGC, EMC Metals and ALS Canada. No discrepancies were noted to source data indicating that EMC Metals has obviously taken significant internal QA/QC while compiling it.

SRK noted that they assembled the data with utmost regards to accurate transfer and data entry, but they did not take responsibility for the quality of the source data.

AGL has conducted limited auditing of the original data but generally accepts SRK's verification and subsequent comments.

The mineralization and data of the Springer Facility has been verified in two ways. The Simpson and Sandberg 2008 Report describes verification of the mineralization by re-sampling of core drilled by GE and UII. The data verification conducted by SRK focused entirely on the electronic database used to support the resource estimate in Section 15 of this report below.

12.1 Quality Control Measures and Procedures

Simpson and Sandberg (2008) collected 84 samples comprised of 1/4-core spits off the remaining 1/2-core of intervals previously sampled by GE and UII. The samples were analyzed by ALS Chemex and the results were plotted on an x-y scatter plot against the original assay results. The plot showed *"a moderate positive correlation, with considerable scatter"*. The scatter was attributed to the fact that the 1/4-core re-samples represented a smaller volume of material than the original 1/2-core samples. It was also reported that *"Overall, the historic assays averaged 17% lower than the ALS results"*.

SRK's data verification focused on comparing the electronic database's drill collar locations, orientations and assay results to the original source data. The electronic database was compiled by EMC Metals as follows. The original drill logs and a listing of collar coordinates were used to compile the X, Y and Z locations of the drill collars. These were all entered in local GE, mine grid coordinates. A licensed surveyor from Aero-Graphics provided a translation solution to convert the mine grid to State Plane Nevada West, NAD83 Conus Cors96 coordinates. The mine grid coordinates and translation solution were then input to the Blue Marble™, geo-calculator software and the State Plane Nevada coordinates were generated. The drillhole orientations were input from individual drill logs and the down hole survey readings. The assay database was compiled from each individual drill log file. The assays were input directly from the hand recorded sample log sheets generated by GE and UII. About 50% of the drill collar

locations in local grid were verified to the scanned copies of the original drill logs or collar coordinates lists. The same amount of down hole surveys in the electronic database were also verified to the scanned copies of the drill logs. No errors were found in either data set. SRK was able to locate original signed assay certificates from RMGC and assay lab reports from GE and UII for approximately 86% of the core drilling and channel sampling results. These were spot checked against the electronic drillhole database and no errors were found.

The electronic database of the 2007 and 2008 drilling completed by EMC Metals was also verified to the original source data on a limited basis. Because all of the drill collar locations were read directly from a GPS unit into electronic data files, the database is considered as the source data. The drillhole orientations were also read directly from electronic down hole survey files or from the proposed/actual orientations of the drillhole. The assay database was also generated directly by electronic data file. SRK did spot check the electronic assay database to .pdf copies of the signed assay certificates and no discrepancies were found.

12.2 Limitations

The database prepared by EMC Metals and verified by SRK relies on the industry professionalism of information supplied by GE, UII, RMGC, EMC Metals and ALS Canada. No discrepancies were noted to source data indicating that EMC Metals has obviously taken significant internal QA/QC while compiling it.

SRK has assembled the data with utmost regards to accurate transfer and data entry, but does not take responsibility for the quality of the source data.

13.0 MINERAL PROCESSING AND METALLURGICAL TESTING

13.1 Historic Processing Methods

Several gravity separation mill facilities were established on the Springer property and employed by the prior miners in the area, as early as 1918, and extending through 1958. All of these early mills preceded modern milling methods employed today, and the remnants of these historic wooden structures were destroyed in a significant brush fire in 2007, which did no damage to the modern mill constructed from 1979-1981, and remains on site today.

The on-site tungsten processing facility commissioned by GE and UII in 1981 was considered state-of-the-art at the time, particularly for final production of ammonium paratungstate $[(\text{NH}_4)_{10}(\text{H}_2\text{W}_{12}\text{O}_{42}) \cdot 4\text{H}_2\text{O}]$, known as APT. The existing Springer mill process (the ‘GE’ process) was capable of making two distinct tungsten products:

- Synthetic scheelite (CaWO_4) concentrate, suitable as feedstock for a tungsten carbide (WC) product, and
- APT, suitable as feedstock for manufacture of tungsten wire filament, used specifically in lighting applications and in numerous other tungsten applications.

The synthetic scheelite process employs a continuous digester, which is an autoclave system employing high temperature/high pressure in an alkali environment, to dissolve a low grade (5-10%) tungsten concentrate feed provided from a standard three stage flotation circuit. The dissolved silica and molybdenum are then preferentially precipitated out of the resultant solution, which can be finished and packaged to a marketable 75% WO_3 concentrate grade, or better. This process typically generates good recoveries and a high grade tungsten concentrate, at the expense of both added capital and operating costs, when compared to simpler gravity and flotation-only processes.

The APT process is a solvent extraction process (“SX”) which generally starts with a relatively clean and relatively high grade (+50%) WO_3 concentrate as feedstock, to make a virtually pure tungsten product, in a powder form. APT process technology is a conventional, chemical refining step, considerably different from standard milling and flotation technology. It adds significant cost to the final product, and generates a higher value end product which is typically one step closer to many end user tungsten applications.

A traditional scheelite tungsten mill contains neither of these two systems. Historic processing technology for scheelite tungsten typically employed a grinding circuit, followed by a low cost gravity concentration step that generates a high grade concentrate but typically achieves low recoveries (<60%) from the feed. The tungsten-laden tails from this process are then re-processed using flotation systems, with varying success as to both concentrate grades and recovery, depending on the specific characteristics of the material.

A traditional wolframite ($(\text{Fe},\text{Mn})\text{WO}_4$) tungsten mill is similar, with higher recoveries from the gravity step, producing a wolframite concentrate that is, because of its iron and manganese content, somewhat less valued by customers in end use markets, particularly for refining to APT.

13.2 Original Mill Process Plans

From late 2006 through 2008, EMC (and its predecessor company, Golden Predator Mines-GPM) worked to restart the Springer mine and mill, utilising all of the existing equipment and upgrade steps in place. Work was done to replace seals and pumps, update filters throughout the mill, and over \$2 million was spent on automation controls to improve process quality. In the grinding circuit, these controls will allow for more careful control of sizing of material, recognizing the ease with which friable scheelite ores can readily be over-ground and affect downstream recovery results. In the flotation circuit, reagent consumption and air flow parameters were considered and optimized, with the intent of improving both concentrate grades and recoveries.

Improvement capital was spent on both the continuous digester circuit and the APT plant. The continuous digester was converted from a rotating unit to a stationary unit with internal mixing impellers. Numerous control upgrades were carried through both the digester circuit and the APT circuit, although certain missing elements in the SX step within the APT plant were not replaced, having been removed by GE prior to EMC ownership. The APT circuit reagent tank farm was reconditioned, and the location where the tanks were to be re-installed has been readied for a full concrete spill pad containment and berm system, consistent with current permitting regulations. It was estimated that approximately \$1 million in additional work was required to make the APT plant operational, and approximately \$2-3 million in additional work was required to ready the digester circuits and the remainder of the mill rehabilitation.

13.3 Testing and Analytical Procedures-Original GE Mill Process

Work done to optimize the traditional processing flowsheet was initiated in 2007 at Montana Technical University's Centre for Advanced Mineral and Metallurgical Processing ('Montana Tech' or 'CAMP') and completed in March of 2008. CAMP received Springer tungsten ore samples along with 8 chemical flocculants to determine which reagent and pH would produce the best flotation recoveries for scheelite minerals. The following is a summary of the work performed.

- Samples were supplied to CAMP having been initially processed through a jaw crusher followed by roll crushing. The samples were then blended in order to obtain a representative sample. Next, the sample was pulverized using a disc until a P_{80} of 200 mesh was achieved.
- The sized crushed ore was then directly introduced to scheelite flotation, where a 1 kilogram charge was placed into the flotation cell along with 1.5 liters of tap water obtaining a pulp density of about 40% solids. The sample was mixed in the

flotation cell for 10 minutes. Next, 0.2 grams per ton xanthate was added and the pH of the system was adjusted to between 5 and 6. The mixture was allowed to condition for 5 minutes followed by 6 minutes of flotation for pyrite removal and concentration.

- For rougher flotation, 1 of 8 received collectors, at 0.3 grams per ton, was used along with pH adjustment of 7.5, 8.5, 9.5, or 10.5. A conditioning time of 5 minutes followed by a flotation time of 6 minutes was used to produce a scheelite rougher concentrate. The targeted pH was maintained with lime or sulfuric acid as needed.
- For cleaner flotation, additional collector was added at a dosage of 0.2 grams per ton and needed pH adjustment was used along with a 3 minute conditioning time followed by 6 minutes of flotation time. After flotation, the tailings were pressure filtered. Lastly, all the samples were placed into an oven at 100°C for removal of residual water prior to weighing to complete mass balances.
- For analyses of concentrate samples, x-ray fluorescence (XRF) was used to determine tungsten assays. For pyrite and tails analysis, Inductively Coupled Plasma (ICP) Spectrometry techniques were used. After analysis, results were placed into spreadsheets to determine percent recoveries.

The results of this test work done were nearly identical to the test work records available from Springer's historic files, done by GE in 1978 & 1979. The results in both cases confirmed that only a low grade concentrate could be generated using the existing grind and flotation circuits, necessitating further processing to meet minimum market product specifications.

The conclusion drawn from the first stage of the CAMP work was that the existing continuous digester (autoclave) circuit in place at Springer was required to make a marketable concentrate product. No improved flotation techniques were discovered to avoid the cost and complexity of the digester circuit.

Additional testing followed at CAMP, followed by testing by EMC, to further evaluate alternate separation processes augmented by gravity pre-concentration systems.

13.4 Revised Mill Process Concepts

The EMC restart of Springer was halted in late 2008, a direct result of declining tungsten pricing and a collapse of the financial markets required to provide additional capital investment to the restart. With the halt in restart, the EMC metallurgy team at Springer began to revisit work done by CAMP earlier in the year, specifically flotation work that experimented with suppressing calcites. In early 2009, the metallurgy team began new work on a revised mill flowsheet that was capable of making a scheelite concentrate of 65% grade or better, with 80% recoveries or better, and do so without reliance on the continuous digester and a synthetic scheelite process.

Despite continued low prices for tungsten (APT), market demand for scheelite concentrates was encouraging enough that the APT circuit was no longer seen as a requirement for making a readily saleable 'finished' product. The digester system and APT plant represented complexity and manpower/cost elements in the flowsheet that would be helpful to sideline in any new system---although the APT plant could be commissioned at some future time if economically desirable.

13.5 Testing and Analytical Procedures-Revised Mill Process

The key characteristic in the Springer ore that created grade problems in flotation is the calcite content. Calcites float with scheelites, making the final float con a lower grade than desirable for customers. CAMP work suggested that a combination of gravity separation techniques could effectively select out calcites and other deleterious elements from the scheelite feed, allowing for a more concentrated and selective flotation feed to be delivered and ultimately generate a higher grade float concentrate.

The EMC team conducted both internal and external independent testwork on various gravity separation and centrifugal systems to determine their effectiveness at separating calcites (s.g. @ 2.7) and silicates (s.g.@ 2.6) from scheelite mineral (s.g.@ 6.1). While several gravity-based systems were evaluated, a system from Downer EDI Mining-Mineral Technologies (Downer), of Carrara, Queensland, Australia was pre-selected for specific additional testwork and trials. The Downer unit, a Kelsey Centrifugal Jig (KCJ) showed excellent results with Springer resource material, indicating overall scheelite recoveries exceeding 90% on de-slimes feed material. Testing was based on a bulk sample of 250 kg of Springer laboratory-crushed resource taken from on-site ROM stockpiles.

EMC intends to keep confidential the specific testwork, optimum sizing fraction results, and recommendations for associated mill equipment which were completed by Downer for EMC in late 2009. However, the general conclusions of the Downer testwork were as follows:

- Based upon the samples tested, a standard KCJ unit should be expected to reject better than 80% of the overall gangue materials and achieve significantly better than 80% total scheelite recoveries for Springer scheelite resources,
- The KCJ unit can be expected to operate at a higher efficiency, and generate improved overall scheelite recoveries, if supplied with a de-slimes material feed,
- The use of Derrick screens rather than traditional cyclone units to classify resource material will likely do a superior job of controlling and optimizing the grinding/re-grinding circuits and achieving maximum recovery of scheelite product for four reasons:
 - Better size control will reduce the re-circulating load on the grind circuit, thereby reducing overall milling costs,

- Better size accuracy will generate an optimized size fraction in the process stream for the centrifugal jig, thereby optimizing the effectiveness of jig throughput, recoveries and grade,
- More precise sizing will carry over into optimizing flotation recoveries as well, and
- Minimized over-grinding of friable scheelite particles will reduce fines and/or slimes generation, keeping fine WO_3 losses to a minimum.

It is important to note the Downer testwork was performed with pre-ground material, done with laboratory gear that had a propensity to over-grind, thereby generating a greater slimes fraction in the 250 kg test sample, and consequently greater losses of scheelite material that ended up in that slimes component. The test results therefore may be conservative as to recovery calculations when compared to what is likely possible in a well controlled mill using Derrick screens. The over-grinding would, as noted above, also reduce recoveries in both the jig and flotation testwork which followed with this material.

The results of the KCJ testwork, on de-slimes material, were as follows:

- 90% WO_3 recovery to concentrate
- <5% concentrate mass yield
- >95% rejection to tailings of other elements including SiO_2 , Al_2O_3 , CaO , MnO , and MgO
- Only 500 ppm WO_3 reported to the tailings

The Springer metallurgical team also did additional testwork on recovery of scheelite from slimes, the ultra fine fraction removed prior to processing in the centrifugal jig systems. Work was done with Met-Solve Laboratories of Burnaby, Canada in 2009, and those results suggested that multiple stage gravity separation with appropriately sized equipment could liberate an additional 32% of scheelite materials.

Met-Solve Laboratories, Vancouver CA also did testwork on screen sizing and effectiveness of classification of Springer resource material at various mesh sizes and particle size distributions.

Final test work was undertaken in late 2009, and focused on producing a high grade flotation concentrate using a combination of gravity and flotation. The ultimate goal of these tests was to produce a concentrate with grade of 65% or better while achieving overall recoveries (on de-slimes ore) greater than 85%.

The Downer EDI gravity testwork generated the source of the feed material which was subsequently tested in the Springer lab facility for amenability to flotation. Details of flotation reagents applied in the testwork were as follows:

- Initial sulfide suppression - NaHS at a high pH.
- Secondary element and gangue suppression - Na_2CO_3 and sodium silicate.
- pH adjustment - NaOH.
- Final scheelite float/collector - GP 07 and frother.

The internal results of this work were that flotation recoveries on the scheelite were excellent, in excess of 95%. Effective removal of deleterious constituents that interfered with flotation response dramatically improved both the scheelite recoveries and also concurrently the grade of scheelite concentrate produced, meeting the target recovery/grade results.

13.6 Overall Mill Recovery Estimate

Based on this testwork on Springer resource material, the overall mill recovery estimate for scheelite is 79% in the first year and 82% thereafter. This estimate is based on recognized fines (slimes) generation, as-tested partial recovery of tungsten from slimes, KCJ gravity concentration results and final flotation work, as reported.

The critical factor, as indicated, is fines generation from friable scheelite resource material due to over-grinding in mill circuits. Fines generation is expected to be between 5% and 10%. Centrifugal jig recoveries (KCJ) are estimated at 91%, and flotation recoveries are estimated at 96%. If centrifugal unit is applied to recover scheelite from the slimes tails, the recovery is estimated at 35-50%. Table 13-1 below illustrates the various overall recoveries, based on the fines generation and subsequent fines recovery circuit, if that secondary circuit is applied.

Figure 13-1, Figure 13-2 and Figure 13-3 show the revised processing circuit devised for the Springer Project.

Table 13-1: Overall Mill Recoveries Summary

Total Mill Recoveries			
Based on Fines (slimes) Generation and Fines Recovery			
Slimes	Scheelite Recovery from Slimes		
Generation	0%	35%	50%
5%	83.0%	84.7%	85.5%
7.50%	80.8%	82.6%	83.7%
10%	78.6%	82.1%	83.0%
PEA assumes 6% slimes generation, 0% slimes recovery, 82% overall recovery, beginning in year two (year one recovery @ 79%)			

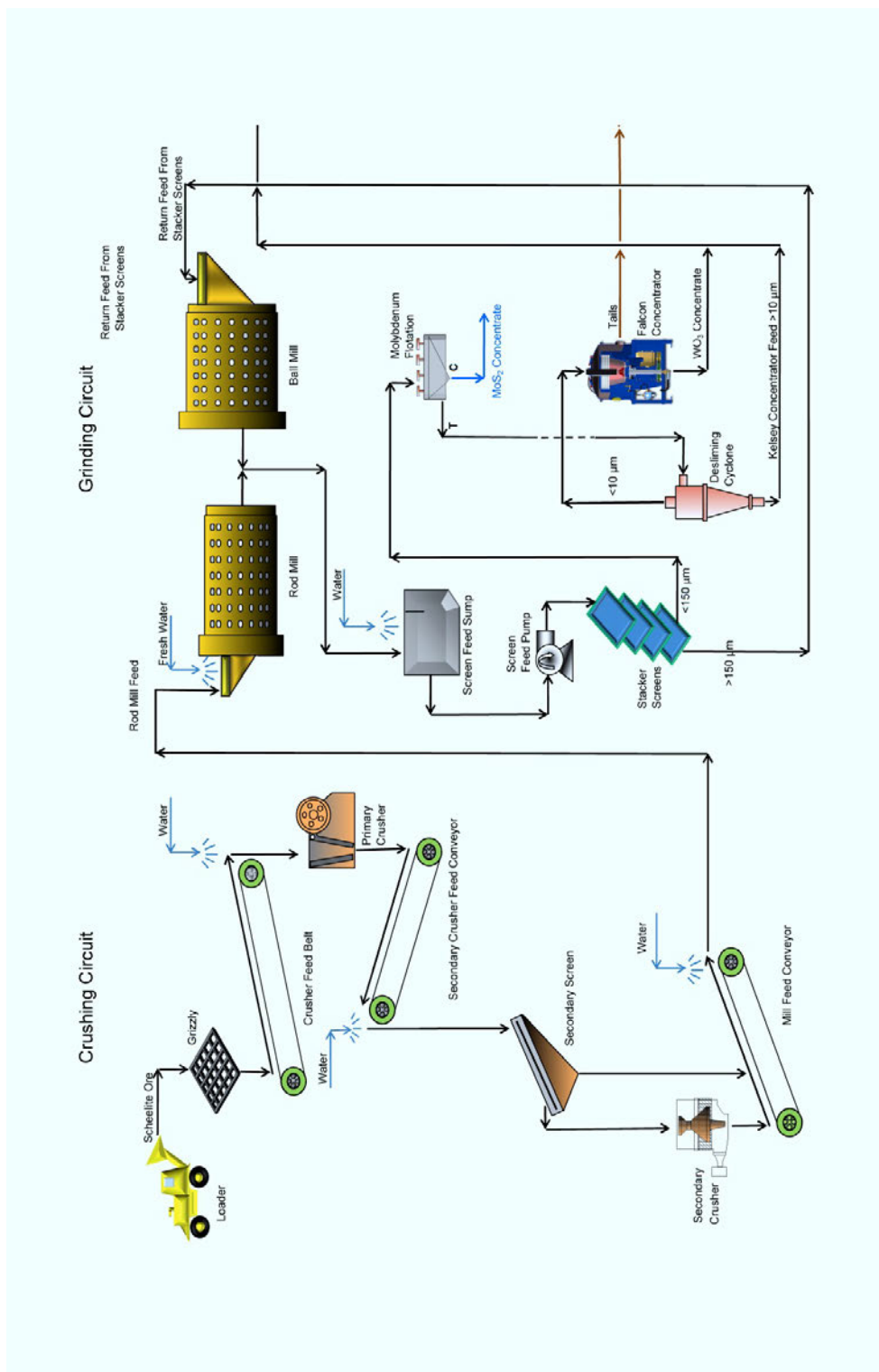


Figure 13-1: Crushing and Grinding Circuits

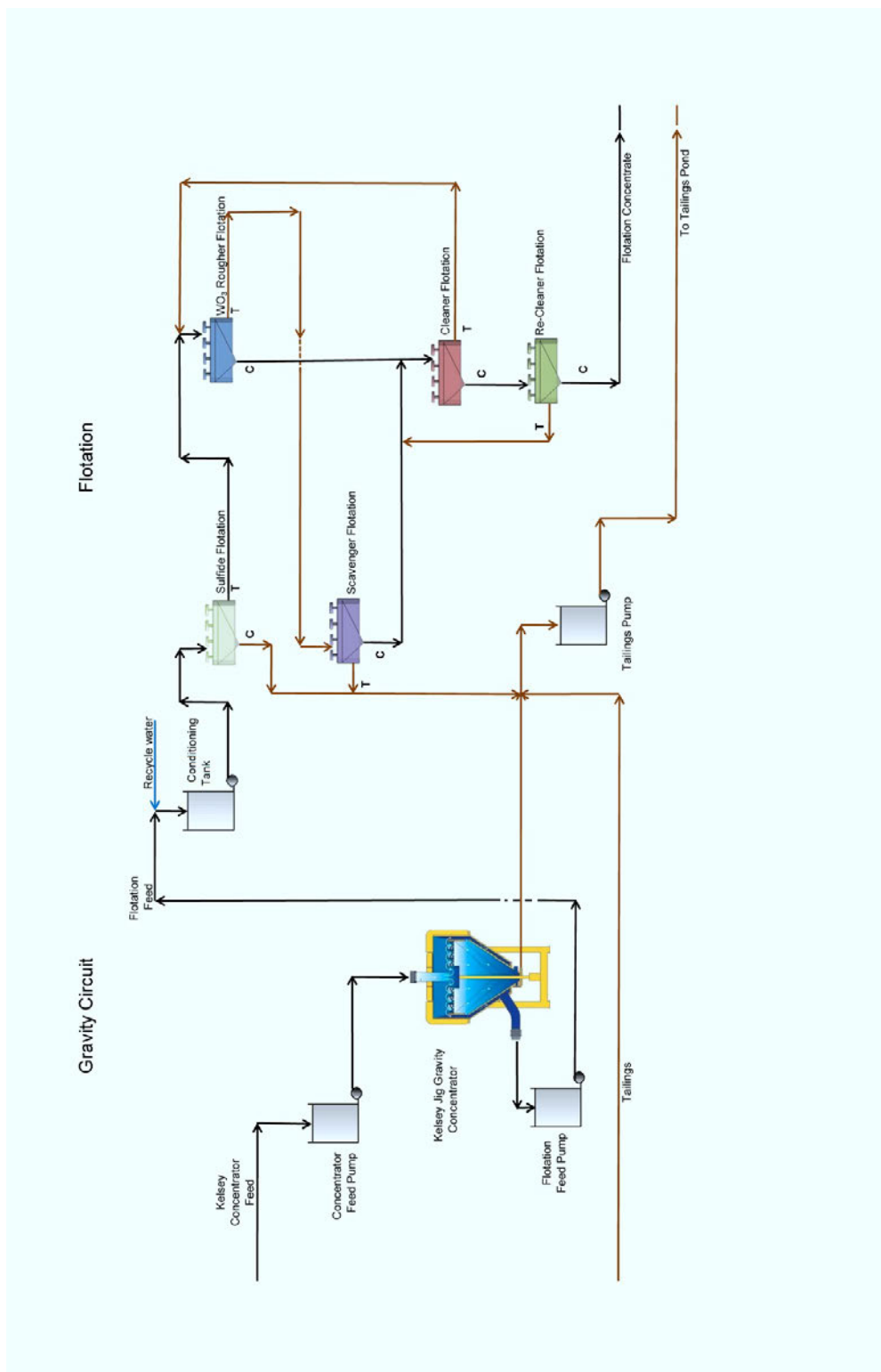


Figure 13-2: Gravity and Flotation Circuits

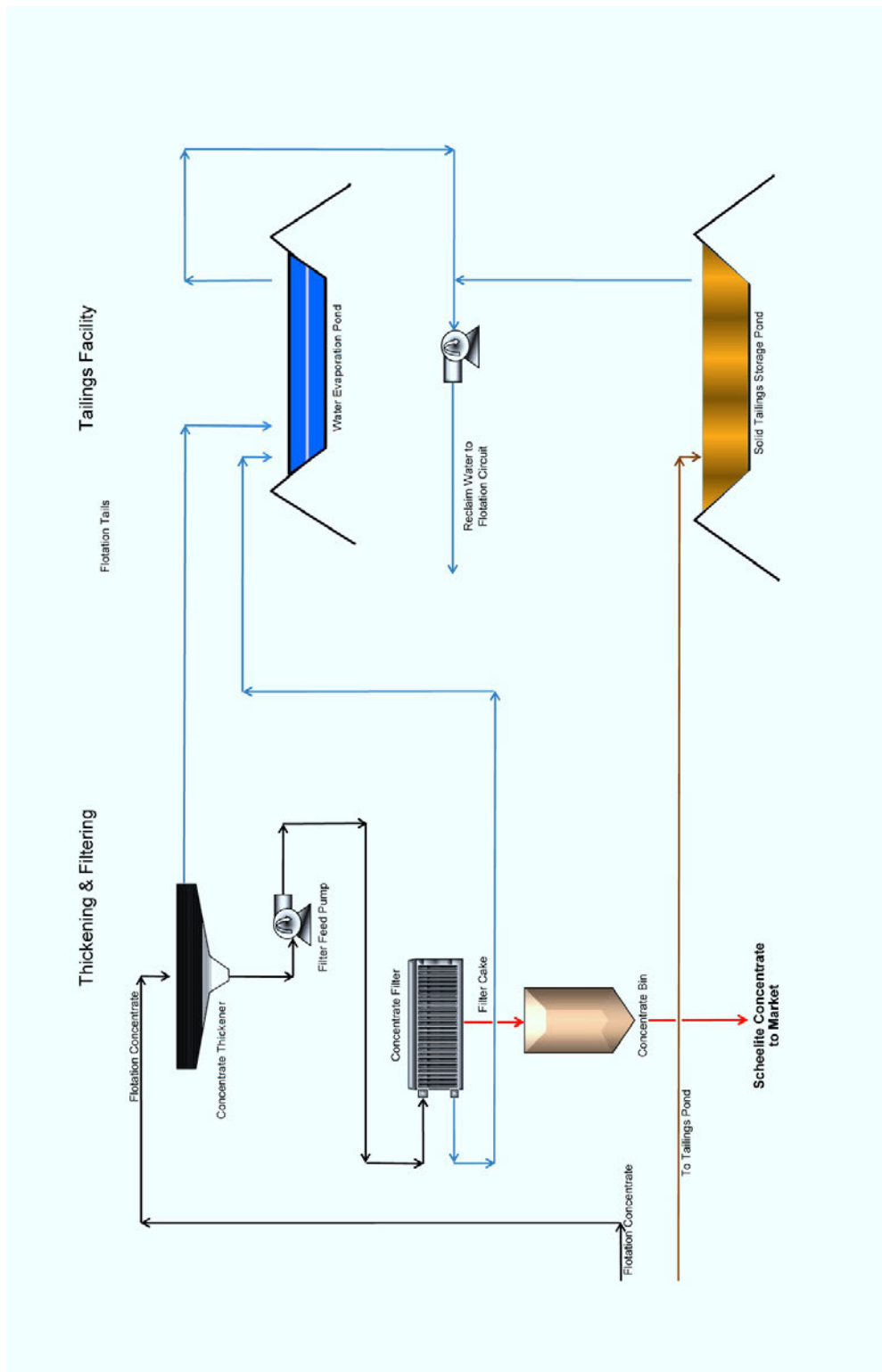


Figure 13-3: Thickening and Tailings Circuits

14.0 MINERAL RESOURCE ESTIMATES

AGL has audited the Sutton I and Sutton II resource estimates prepared by SRK and detailed in their 2009 Technical Report on Resources (*op. cit.*). AGL considers that the SRK estimate has been reported in accordance with the National Instrument 43-101 Standards for Disclosure for Mineral Projects and prepared according to the Canadian Institute of Mining, Metallurgy and Petroleum “Best Practices and Reporting Guidelines”.

The Sutton I and Sutton II resource estimates as prepared by SRK are summarised in Table 14-1 below.

Table 14-1: Sutton I & II Mineral Resource Statement of Resources

Sutton I & II Mineral Resource Statement of Resources					
Resource Category	Cut-Off Grade	Resource	Grade	Contained Tungsten Units	
	WO ₃	Tons	WO ₃	STU's	MTU's
Indicated	0.20%	355,000	0.537%	190,635	172,990
Inferred	0.20%	1,616,000	0.459%	741,744	673,089
Note: a short ton unit (STU) = 20 lbs. WO ₃ ; a metric ton unit (MTU) = 22.04 lbs. WO ₃					

In addition to the Sutton resources, AGL has prepared a resource estimate on Springer project areas west of the Springer Stock, as presented in Table 14-2 below:

Table 14-2: Springer West Mineral Resource Statement

Springer West Mineral Resource Statement of Resources					
Resource Category	Cut-Off Grade	Resource	Grade	Contained Tungsten Units	
	WO ₃	Tons	WO ₃	STU's	MTU's
Inferred	0.20%	318,600	0.663%	211,232	191,680
Note: a short ton unit (STU) = 20 lbs. WO ₃ ; a metric ton unit (MTU) = 22.04 lbs. WO ₃					

14.1 Drill Hole Database

AGL compiled the drill hole database based on the previous iteration prepared by EMC and SRK and supported according to recent and historical documents. The current Microsoft Access® database consists of collar, lithology, structure, and survey tables.

Drill hole collar and channel sample locations are listed as State Plane Nevada West, NAD83 Conus Cors96 coordinates (some of the drill holes were converted from known mine grids). Collar table includes 1045 entries of which 684 represent channel samples and 361 represent drill holes. Drill holes were conducted through various campaigns (see exploration history), include both diamond drill core and RC as well as both surface and underground drilling. Survey table includes orientations with down hole deviation surveys.

Assay results from GE and UII drilling included assays from three different laboratories. The assay table includes 5835 records with WO_3 analyses of which the bulk (5151 samples) are drill hole results and the remainder are channel sample results. Samples with no recovery, or sample intervals missing from the database, were not utilized for compositing so as not to affect the results of resource estimation.

The database quality is considered to be better for Sutton areas than the West area based on relative confidence in the data (older drilling occurs in the West with less confidence in the drill hole surveying) with the exception of the West 'George' area where drilling has occurred in recent years.

Overall the entire database is considered to be suitable for resource estimation when considering the extensive mine history across the project and the existence of known workings to support historic drill hole locations.

14.2 Geological Model

14.2.1 Sutton

Geological modeling for the Sutton areas was conducted by SRK and audited by AGL;

The SRK Sutton model wireframes, comprising the mineralized tungsten skarn, were evaluated through cross sections and level plans by AGL and are deemed to be good representations of the drill hole mineralization. Details pertaining to the SRK Sutton geological model are presented in their entirety below, as outlined in the SRK (2009) Technical Report.

The resource estimation is based on a generalized geologic model consisting of just one mineralized rock type, namely the tungsten skarn, also referred to historically as tactite, which occurs in four distinct beds. These have a sheet like geometry, which ranges from 1.0 to 10.0 ft. thick with an approximate average of about 3.0 ft. They have been drill testing along strike for 5,600 ft and down dip for 1,500 ft. The mineralized beds at Sutton I strike along azimuth 30° and dip 80° west, the beds at Sutton II strike at azimuth 5° and dip 70° west. The three dimensional geometry of the mineralized beds is based entirely on WO_3 analysis results. For the resource estimation, the mineralized beds were constructed based on a minimum WO_3 threshold of 0.15%. The polygonal outlines based on channel sample data were first digitized on all level plans. Where the underground channel sampling terminated into un-sampled workings, the

polygons were projected along strike for the distance of the average sample spacing. In the upper levels of the mine areas, these polygon outlines were linked directly between levels to define the geometry of the mineralized beds. In the lower parts of the mine, where only diamond drill information was available, the bottom level (4100) outlines were projected down to each drill intercept, the width of mineralization was modified at the drill intercept and the polygon was then projected to the next intercept etc. This method was used to emulate the geometry of the bed in the drift, where the most information was available. Where only diamond drilling was available, the polygons were extended along strike and dip a maximum of 100 ft. beyond the drillhole intercepts.

Detailed geologic drift maps were geo-registered into the model and compared to the channel sampling. In general, the skarn alteration shown on the geologic mapping is much more extensive both in width and along strike than that reflected by the channel sampling. It is reported that on the upper levels of the historic workings, the channel samples were collected only to confirm historic muck samples not to necessarily map the grade of the mineralization. For this reason, the skarn outlines from the geologic plans could not be used to define the mineralized beds because they could not be justified by the sampling. The wire frame solids of the mineralized beds boundary formed a geologic constraint to limit the assignment of grade regardless of the search distance. The wireframe solid shapes were used to code each bed into the block model. Only the blocks whose centroids were located within the vein wireframes were estimated.

Six levels of mine development were input to the model and triangulated into three-dimensional solids. The x-y locations of these were digitized by EMC Metals and converted to Nevada State Plan coordinates using translation solution input to Blue Marble geo-calculator. SRK imported the 2-D plans into the model and then adjusted their elevations based on x-y-z survey coordinates taken by NM and UII. The drift elevation coordinates were assigned as an average level for each of the workings. The long section stope plans from the Park (1984) reserves report were geo-registered and draped onto the 3-D mineralized bed solids so that all areas of historical mining could be removed from the model. The same was done for the underground drifts. All blocks whose centroids were located within the underground development or stopes were assigned a zero specific gravity.

14.2.2 West Springer

Similar to SRK's Sutton model, AGL prepared a generalized geologic model consisting of just one mineralized rock type, namely the tungsten skarn, for the West area using Gemcom Surpac™ modeling software;

The West skarns have a sheet like geometry, ranging from one to ten feet thick with an average of about three feet. They have been drill tested along strike for 5,600 ft and down dip for 1,500 ft.

The mineralized beds on the West area occur as four discrete clusters which strike at 030° azimuth and dip between 70° (in the north) and 85° (in the south). The most continuous mineralized cluster occurs along 2,600 ft of strike length, and while mineralization appears continuous down-dip in the West area, increased faulting appears to affect continuity on the mineralization along strike;

Mineralized wireframes were constructed using a minimum WO_3 threshold of 0.1% as a guideline (reduced from the previous SRK mineralized outline of 0.15% WO_3 at Sutton due to the improved economics of tungsten). Historical level plans were brought into modeling software as geo-referenced images and used as guidelines to supplement the drill hole assay data while building mineralized wireframes. In general, the skarn alteration shown on the geologic level plans is much more extensive both in width and along strike than that reflected by the existing drilling;

The wire frame solids of the mineralized beds boundary formed a geologic constraint to limit the assignment of grade regardless of the search distance. The wireframe solid shapes were used to code each bed into the block model such that only the blocks whose centroids were located within the vein wireframes were estimated.

As witnessed during the site investigation, abundant small-scale mining has occurred throughout the property at surface level which was not accounted for during the West area geological modeling- these area are deemed to have relatively little impact on the overall West area resource as the majority of resources are at depth;

14.3 Compositing

Similar to the SRK Sutton model, the AGL West model utilized a composited dataset for resource estimation. The diamond core drilling, RC drilling and channel samples were all composited into straight intervals equal to the original sample length of two feet. Cumulative probability plots were used to assess capping levels resulting in a 4% WO_3 cap (samples above 4% were recoded as 4% for compositing purposes);

14.4 Specific Gravity

A specific gravity of 0.0933 t/ft³ was utilized for the resource modeling based on the UII testing. This specific gravity was also used for the Sutton model.

UII conducted a detailed specific gravity analysis of the mineralized material at Springer in 1977. They collected 100 samples from the mineralized Sutton beds from the underground workings. The samples were weighed in air and again in water; specific gravity was determined by the resulting ratio. The results of the study showed an average specific gravity of 3.02 g/cm³

with a standard deviation of 0.211 g/cm^3 . The metric specific gravity was converted to imperial units of 0.0933 t/ft^3 .

14.5 Variogram Analysis

Both Sutton and West models were estimated using an inverse distance squared estimation technique rather than Ordinary Kriging. SRK (2009) contains a detailed discussion on variogram analysis and validation, which remains relevant and is presented in its entirety below;

Variogram construction was attempted using the WO_3 sample data. No valid variograms could be obtained. Experimental variograms oriented down the drifts where abundant sample data was available turned out to be pure nugget effect. This indicates no correlation between samples even at minimum sample spacing and highlights the extremely variable nature of the mineralization. For this reason, the deposit was estimated using an inverse distance squared estimation technique rather than Ordinary Kriging. Variograms are commonly difficult to construct in tungsten deposits. The lack of reasonable variography is more likely a function of grade variance rather than a reflection of the continuity of mineralization. Cross-sections and bench plans clearly indicate that mineralization is continuous between drillholes, along drifts and down-dip, however the grade is highly variable.

14.6 Block Model

The block model was constructed within the State Plane Nevada grid coordinate limits and other parameters listed in Table 14-3.

Table 14-3: Block Model Parameters

Block Model Parameters			
Parameter	Axis		
	Y	X	Z
Minimum Coordinates	15317420.33	2744433.528	4659.766
Maximum Coordinates	15323580.33	2746353.528	5459.766
User Block Size	80	80	80
Minimum Block Size	2.5	2.5	2.5
Rotation	20	0	0

The wireframe solids of the mineralized beds were used to sub-cell the block model as were topography and any available mine workings. Once the block model was constructed, blocks situated above topography were assigned a zero density.

14.7 Grade Estimation

14.7.1 Sutton

A detailed description of the grade estimation methods for Sutton I and II is presented in the SRK (2009) Report, and as they remain relevant, also in their entirety below:

Statistical analysis showed that the average grades within the Sutton I, East and West beds were nearly identical whereas at Sutton II, the Hanging Wall bed is higher grade than the Main Bed. For these reasons, geologic hard boundaries were used at Sutton II to confine the grade estimation to within each bed using only the composites from the same bed. At Sutton I the model was allowed to choose the closest composite from either bed to assign grade in the block model. These confining boundaries were also used to define the limits of the grade extrapolation.

The grade estimate was completed using the inverse distance squared weighting algorithm, conducted in two passes. The first required a minimum of 3 and maximum of 12 samples which were less than 50ft from the block centroids. The second pass only considered un-estimated blocks and required a minimum of 1 and maximum of 12 composites which were less than 350 ft. away from the block centroids. During the estimation, the composites were length weighted to accommodate for sample length. No octant-search restriction was applied and no limit of the number of samples from a single drillhole was used. The results showed that during the first pass estimation, an average of eight composites were used within an average distance of 64ft to estimate the blocks. During the second pass estimation, an average of eleven composites were used within an average distance of 175ft to estimate the blocks. A distance restriction was applied during the second pass estimation whereby any assay greater than 1% WO₃ at Sutton I was restricted to less than 105 ft. of extrapolation and at Sutton II restricted to 200 ft. of extrapolation. A long section of the interpolated block model grades from each bed is shown in Figures 14-1 through 14-4.

14.7.2 West Springer

The grade estimate was completed using the inverse distance squared weighting algorithm, conducted in one pass requiring a minimum of 1 and maximum of 12 composites which were less than 350 ft. away from the block centroids.

West Springer grade estimates and the block model are shown in Figure and Figure .

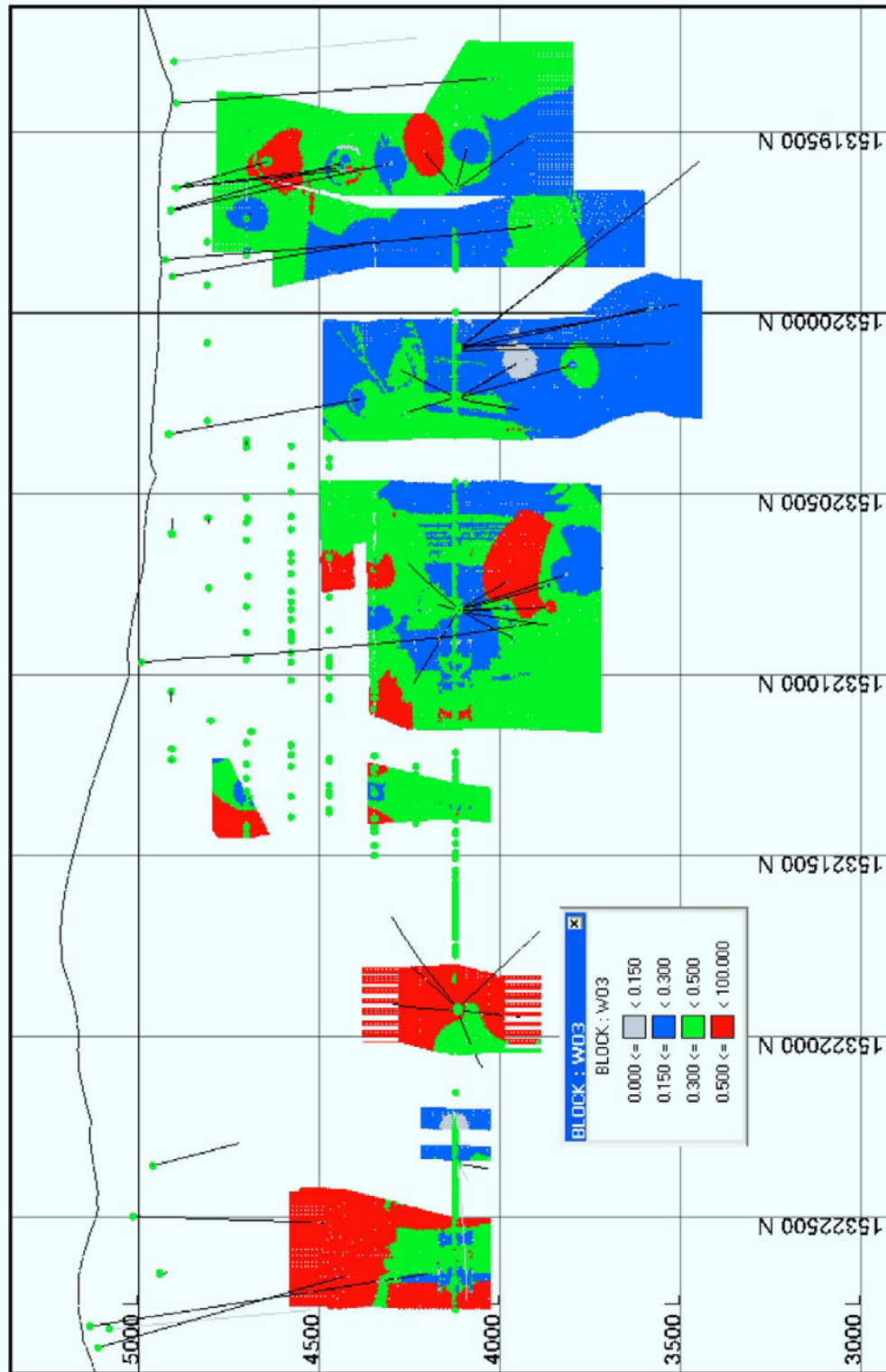
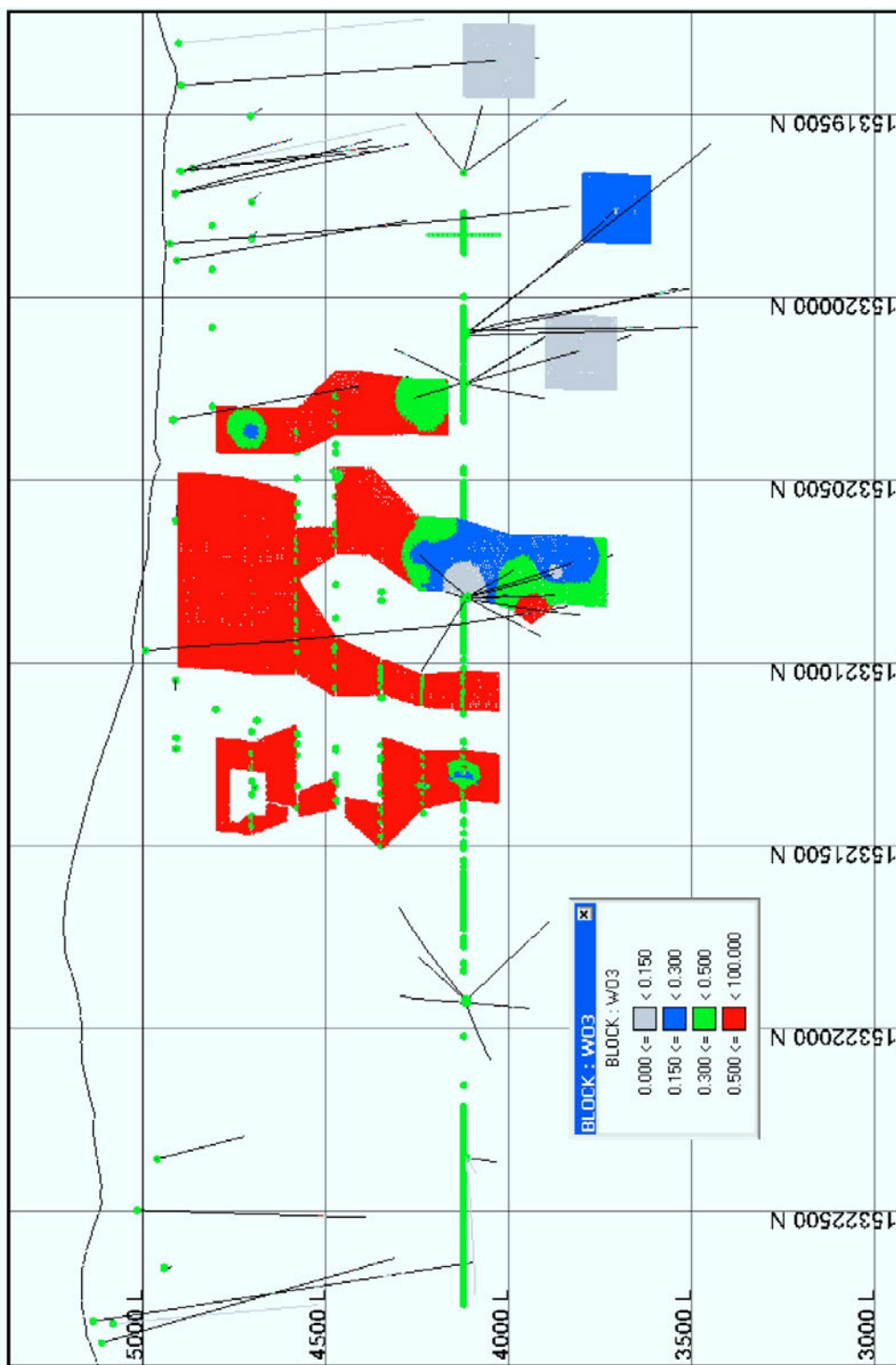


Figure 14-1: Sutton II Main Bed Estimated WO₃ Block Grades Viewing East (after SRK, 2009)

Figure 14-2: Sutton II Hanging Wall Bed Estimated WO₃ Block Grades Viewing East (after SRK, 2009)

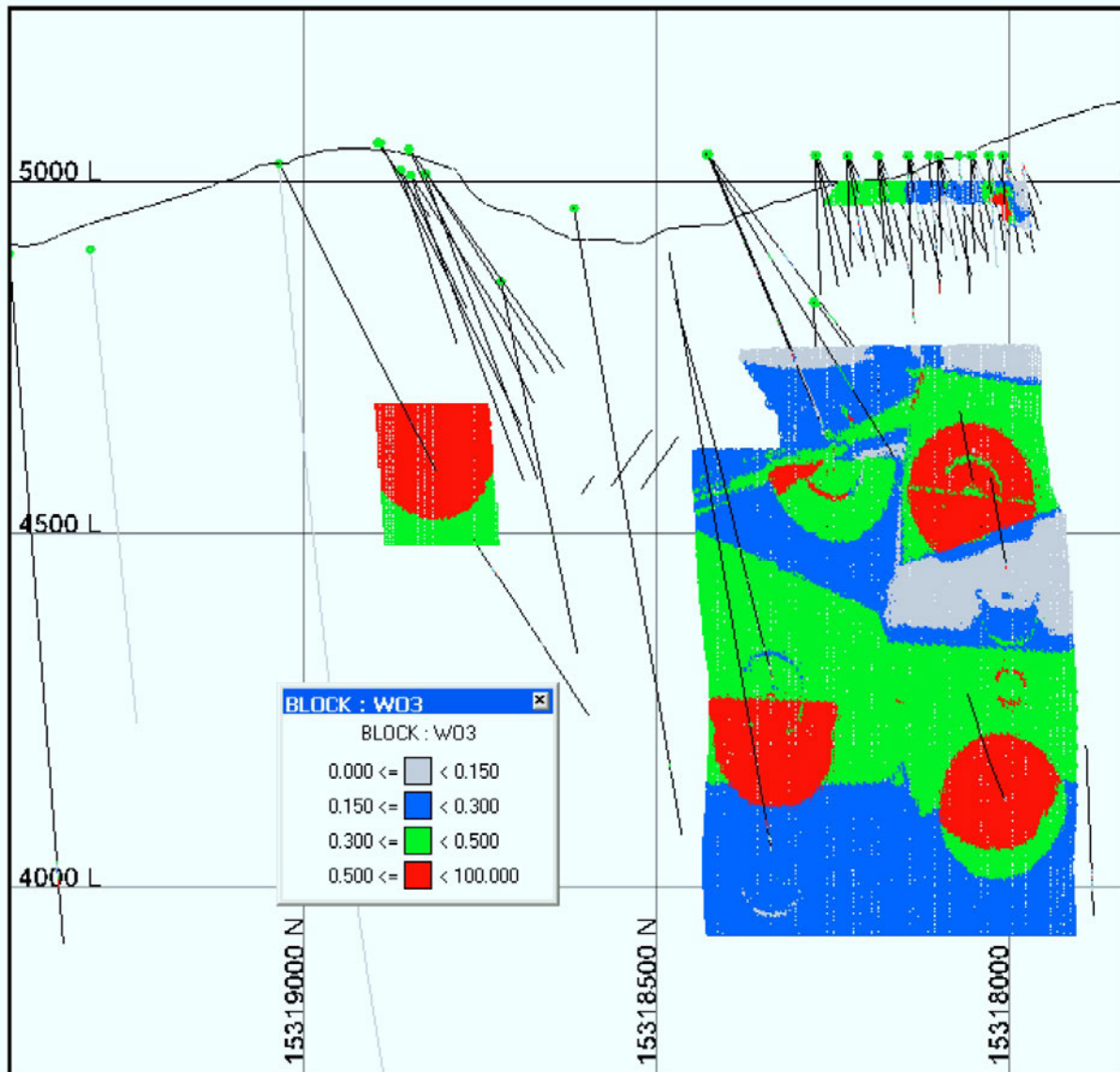


**Figure 14-3: Sutton I West Bed Estimated WO_3 Block Grades Viewing East
(after SRK, 2009)**

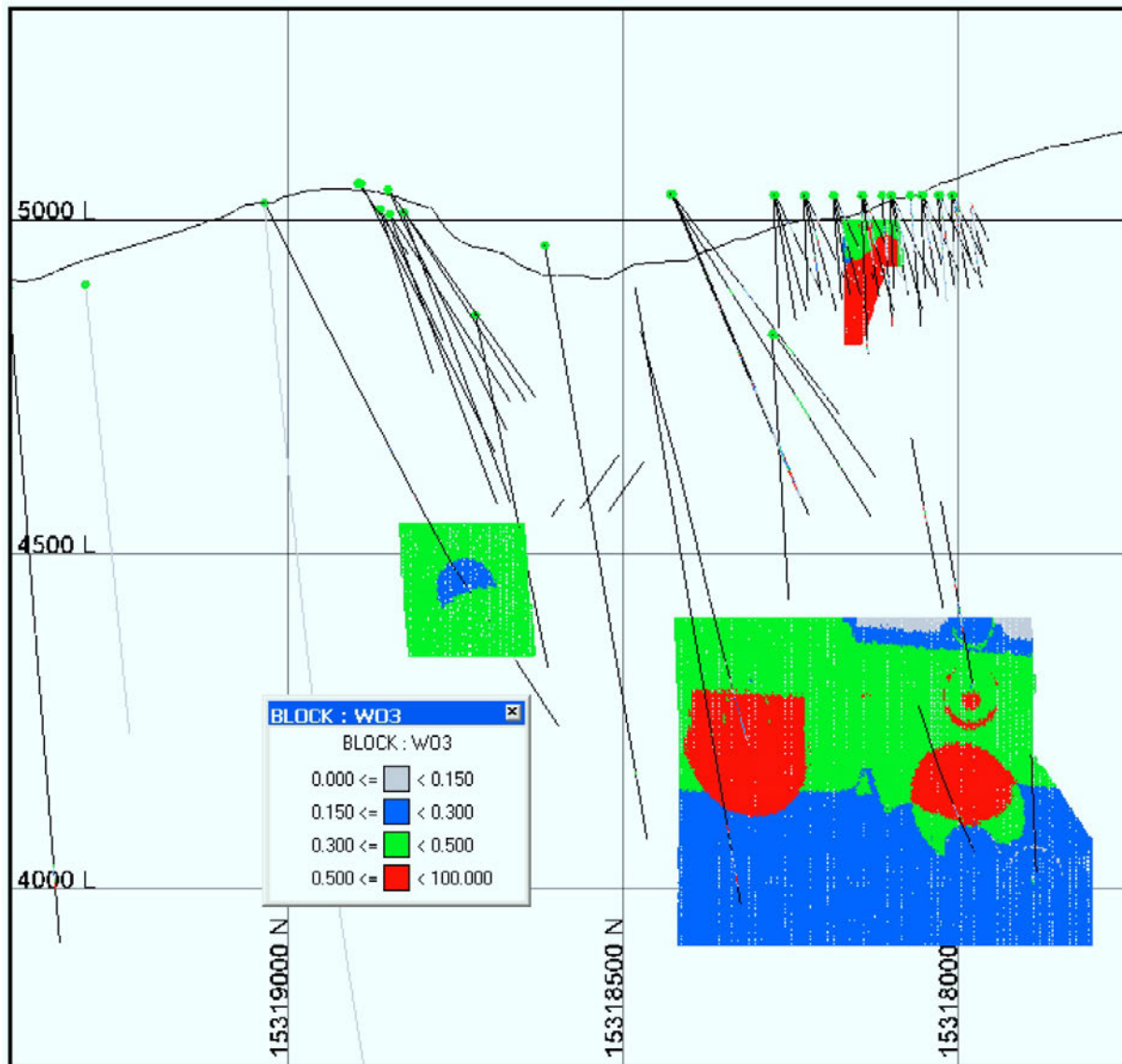
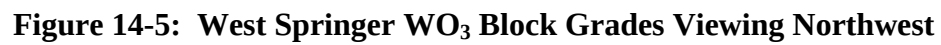


**Figure 14-4: Sutton I East Bed Estimated WO_3 Block Grades Viewing East
(after SRK, 2009)**



14.8 Model Validation

14.8.1 Sutton

A detailed description of the model validation methods for Sutton I and II is presented in the SRK (2009) Report, and as they remain relevant, also in their entirety below:

Three techniques were used to evaluate the validity of the block model. First, the interpolated block grades were visually checked on sections for comparison to the composite assay grades. Second, statistical comparisons were made between the interpolated block grades and composite data within each bed. These results are presented in Table 14-4 and show block grades slightly less than composite grades as desired. Third, swath plots were generated to compare model blocks and composite grades at regular section spacing through the deposit. The results are presented in Figure 14-7, Figure 14-8 and Figure 14-9. These show an acceptable amount of grade smoothing with the majority of the block grades very close to the composite grades.

Table 14-4: Model Validation Statistical Results (after SRK, 2009)

Bed	Data Group	Mean	Maximum	# Samples
All Beds Sutton I & II	Composites WO ₃ %	0.44	4.0	836
	Block Model WO ₃ %	0.40	3.9	533,371
Sutton II Main Bed	Composites WO ₃ %	0.36	4.0	472
	Block Model WO ₃ %	0.30	3.9	268,667
Sutton II HW Bed	Composites WO ₃ %	1.07	4.0	99
	Block Model WO ₃ %	0.77	3.6	88,847
Sutton I East & West Beds	Composites WO ₃ %	0.35	4.0	265
	Block Model WO ₃ %	0.36	2.9	175,857

14.8.2 West Springer

Various techniques were used to evaluate the validity of the block model. Firstly, the interpolated block grades were visually checked on sections for comparison to the drill hole database. The interpolated block grades were also visually checked on sections for comparison to the composite assay grades.

Further statistical comparisons were made between the interpolated block grades and composite data within each bed.

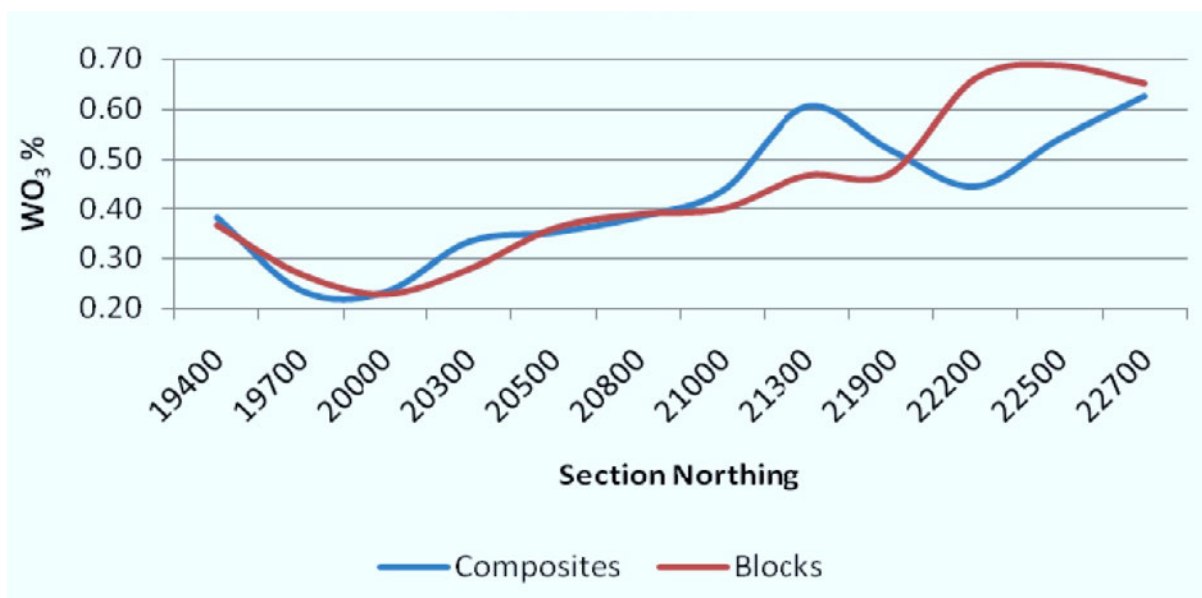


Figure 14-7: Sutton II Main Bed Swath Plot (after SRK, 2009)

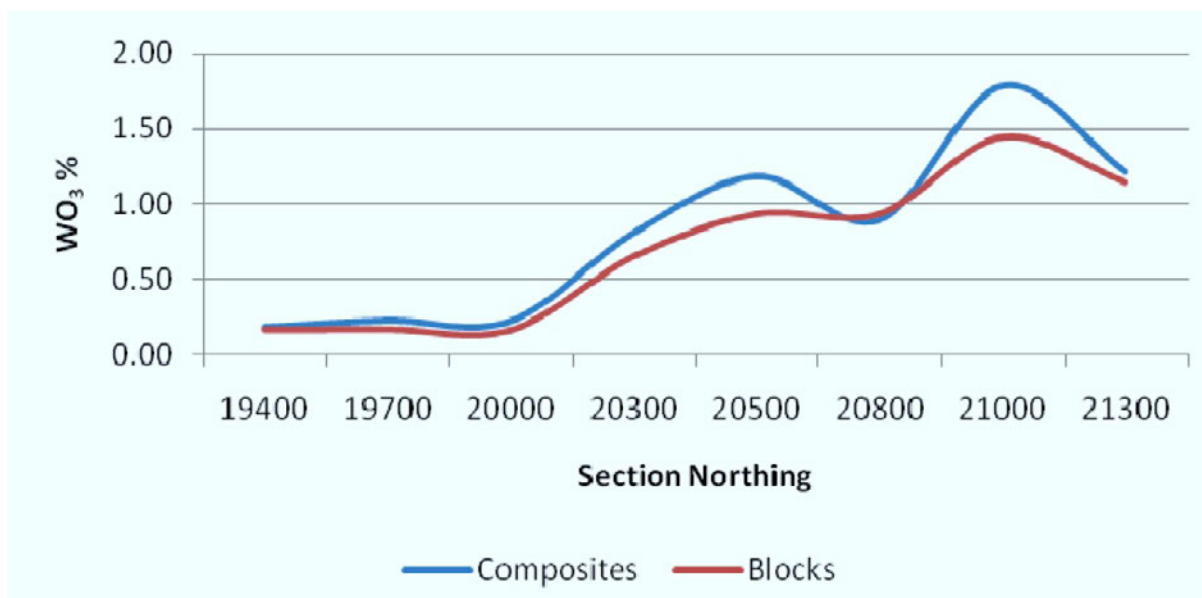


Figure 14-8: Sutton II Hanging Wall Bed Swath Plot (after SRK, 2009)

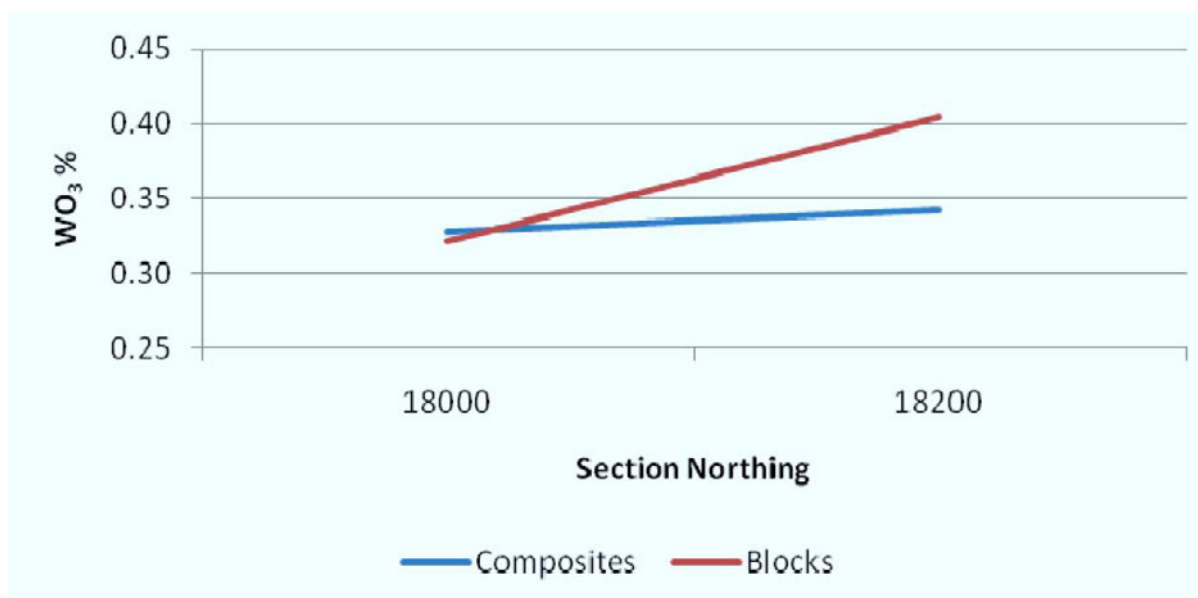


Figure 14-9: Sutton I Swath Plot (after SRK, 2009)

14.9 Mineral Resource Classification

14.9.1 Sutton

The Mineral Resources at Sutton I and Sutton II are classified by SRK under the categories of Indicated and Inferred Mineral Resources.

AGL has audited the Sutton Mineral Resources and deems the classification to have been performed according to CIM guidelines and the Mineral Resources to be at an acceptable confidence level for Indicated and Inferred resources.

The Mineral Resources are classified under the categories of Indicated and Inferred Mineral Resources according to CIM guidelines. Classification of the resources reflects the relative confidence of the grade estimates. This classification is based on several factors including; sample spacing relative to geological and geo-statistical observations regarding the continuity of mineralization, data verification to original sources, specific gravity determinations, accuracy of drill collar locations, accuracy of topographic surface, quality of the assay data and many other factors, which influence the confidence of the mineral estimation. No single factor controls the resource classification rather each factor influences the result. Generally, most of the factors influencing the resource classification in the Springer Project are positive. The resources have been classified as Indicated and Inferred based primarily on sample spacing as indicated by drilling and sample density. For the resource classification, solid shapes were constructed around the parts of the beds where most drillholes are

spaced approximately 100 ft apart and where abundant channel samples were taken. All blocks located within these areas were classified as Indicated resource. All blocks located outside of these areas, about the periphery of the drilling were classified as Inferred resource.

14.9.2 West Springer

The Mineral Resources at West Springer are classified by AGL under the category of Inferred Mineral Resources according to CIM guidelines. Classification of the resources reflects the relative confidence of the grade estimate.

Classification is based on several factors including; sample spacing relative to geological and geo-statistical observations regarding the continuity of mineralization, data verification to original sources, specific gravity determinations, accuracy of drill collar locations, accuracy of topographic surface, quality of the assay data, existence of localized small-scale workings not reflected in the estimation, and many other factors which influence the confidence of the mineral estimation. No single factor controls the resource classification, rather each factor influences the result.

The resources have been classified as Inferred based primarily on sample spacing as indicated by drilling and sample density.

14.10 Mineral Resource Statement

The Mineral Resource statement of the Springer Project - Sutton I, Sutton II, and West Springer area is presented in

Table 14-5: Springer Project Mineral Resource Statement

Springer Mine- Mineral Resource Statement of Resources					
Resource Category	Cut-Off Grade	Resource	Grade	Contained Tungsten Units	
	WO ₃	Tons	WO ₃	STU's	MTU's
Indicated Total (Sutton only)	0.20%	355,000	0.537%	190,635	172,990
Inferred (by location)					
Sutton Resource	0.20%	1,616,000	0.459%	741,744	673,089
George Resource	0.20%	143,950	0.423%	60,863	55,230
O'Byrne Resource	0.20%	173,670	0.862%	149,719	135,861
Inferred Total	0.20%	1,933,620	0.493%	952,326	864,180
Note: a short ton unit (STU) = 20 lbs. WO ₃ ; a metric ton unit (MTU) = 22.04 lbs. WO ₃					

The Mineral Resource statement has been presented at a 0.20 WO₃% cutoff grade was chosen for resource reporting based on an approximate mining cost of \$40/ton, processing cost of \$13.50/ton, administration cost of \$7/ton, mill recovery of 82% and a WO₃ price of \$11.50/lb

The original SRK Mineral Resource statement for Sutton I and II was presented at a 0.3 WO₃% cutoff grade with results at a 0.20 WO₃% cutoff grade reported as a sensitivity.

AGL has audited the Sutton Mineral Resources and reissued the Mineral Resource statement based on current economics.

The results reported in this mineral resource statement have been rounded to reflect the approximation of grade and quantity, which can be achieved at this level of resource estimation.

14.11 Mineral Resource Grade-Tonnage

The grade tonnage distributions of the Indicated and Inferred Mineral Resources are presented in Tables 14-6, 14-7, 14-8 and 14-9.

Table 14-6: Sutton Mine Indicated Resource, Cut-off Sensitivity

Sutton Indicated Mineral Resource Cut-Off Grade Sensitivity				
Variation in WO ₃	Resource	Grade	Contained Tungsten Units	
Cut-Off Grade	Tons	WO ₃	STU's	MTU's
0.15%	371,000	0.522%	193,662	175,737
0.20%	355,000	0.537%	190,635	172,990
0.25%	325,000	0.566%	183,950	166,924
0.30%	274,000	0.619%	169,606	153,907
0.35%	197,000	0.735%	144,795	131,393
0.40%	133,000	0.911%	121,163	109,948
Note: a short ton unit (STU) = 20 lbs. WO ₃ ; a metric ton unit (MTU) = 22.04 lbs. WO ₃				

Table 14-7: Sutton Mine Inferred Resource, Cut-off Sensitivity

Sutton Inferred Mineral Resource Cut-Off Grade Sensitivity				
Variation in WO ₃	Resource	Grade	Contained Tungsten Units	
Cut-Off Grade	Tons	WO ₃	STU's	MTU's
0.15%	1,816,000	0.423%	768,168	697,067
0.20%	1,616,000	0.459%	741,744	673,089
0.25%	1,283,000	0.521%	668,443	606,573
0.30%	1,097,000	0.562%	616,514	559,450
0.35%	913,000	0.609%	556,017	504,553
0.40%	760,000	0.657%	499,320	453,103
Note: a short ton unit (STU) = 20 lbs. WO ₃ ; a metric ton unit (MTU) = 22.04 lbs. WO ₃				

Table 14-8: Western Resources (O'Byrne) Inferred Resource, Cut-off Sensitivity

O'Byrne Inferred Mineral Resource Cut-Off Grade Sensitivity				
Variation in WO ₃	Resource	Grade	Contained Tungsten Units	
Cut-Off Grade	Tons	WO ₃	STU's	MTU's
0.15%	179,548	0.840%	150,754	136,800
0.20%	173,670	0.862%	149,719	135,861
0.25%	172,128	0.868%	149,377	135,551
0.30%	167,653	0.884%	148,224	134,505
0.35%	161,852	0.905%	146,462	132,906
0.40%	161,694	0.905%	146,400	132,849
Note: a short ton unit (STU) = 20 lbs. WO ₃ ; a metric ton unit (MTU) = 22.04 lbs. WO ₃				

Table 14-9: Western Resources (George) Inferred Resource, Cut-off Sensitivity

George Inferred Mineral Resource Cut-Off Grade Sensitivity				
Variation in WO ₃	Resource	Grade	Contained Tungsten Units	
Cut-Off Grade	Tons	WO ₃	STU's	MTU's
0.15%	187,168	0.363%	68,010	61,715
0.20%	143,951	0.423%	60,863	55,230
0.25%	114,297	0.476%	54,349	49,319
0.30%	91,300	0.527%	48,154	43,697
0.35%	89,284	0.533%	47,549	43,148
0.40%	73,255	0.569%	41,706	37,846
Note: a short ton unit (STU) = 20 lbs. WO ₃ ; a metric ton unit (MTU) = 22.04 lbs. WO ₃				

15.0 MINERAL RESERVE ESTIMATES

No mineral reserves have been estimated or reported for the Springer Mine

16.0 MINING METHODS

16.1 Ore Production

The Springer scheelite beds vary in width, from a few feet up to 20 feet or more, and dip from 60 degrees to near vertical. The beds are located adjacent to intrusive stocks and can be traced up to several thousand feet along strike. They are locally cut by crosscutting faults with minor displacements.

Shrinkage stoping was the sole mining method employed by the Nevada Massachusetts Company throughout the district. Rail haulage levels were typically mined at 100 to 120 ft. vertical intervals. If the stope was not bounded by offsetting structures, hanging wall exposures of over 200 ft. longitudinally and 100 to 120 ft. vertically were successfully mined.

End slicing is the modern day equivalent to shrinkage stoping and is proposed as the mining method to be employed at Springer. The geotechnical conditions and conducive to shrinkage stoping are also conducive to end slicing. Incorporating cemented sand fill into the method allows recovery of 100% of the resource when the value of the necessary support pillars exceeds the cost of sand fill. A typical stoping arrangement is shown in Figure 16-1.

End slicing is similar to longhole stoping with one exception. An end slicing stope mines the full width of the mineralized zone where as in longhole stoping, the mineralized zone is much wider than one stope and several stopes are required to extract the full width of the mineralization

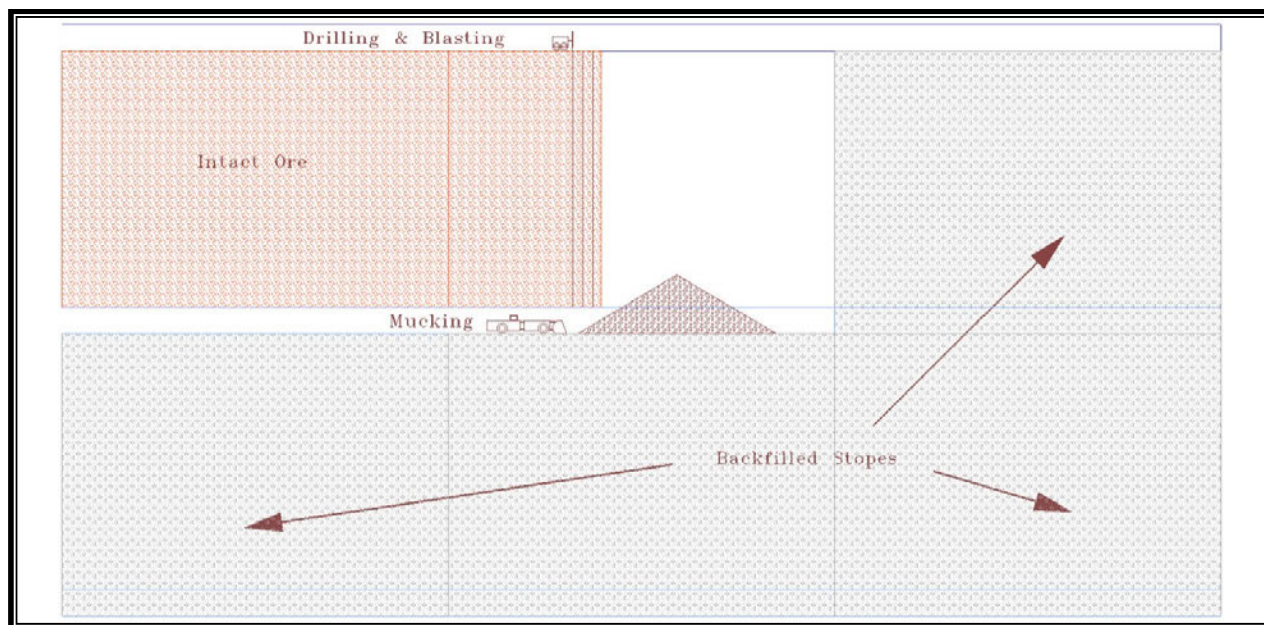


Figure 16-1: Long Section View of End Slicing Stopping Arrangement

Level spacing for end slicing will be the same as that for shrinkage stoping, or approximately 110 ft. vertically. Stope lengths will be limited to 150 ft. prior to backfilling but there may be opportunity to extend these lengths further, after evaluation of the local jointing and hanging wall conditions exposed in each stope.

16.2 Backfill

Backfill will be manufactured by mixing the mill tailings greater than 0.007 inch diameter (80 mesh) with cement and then pumped underground to the stope being filled. Since mining below backfill is not required, the fill strength necessary is only that to support the height of fill exposure. This corresponds to an unconfined compressive strength (UCS) for the backfill of between 150 and 200 psi (pounds per square inch). When mining is only planned above, and not adjacent to, a stope, it may be filled with un-cemented sand fill.

16.3 Stope Development

Stope development drifting dimensions will be nominally 10 ft. x 10 ft., which is large enough to accommodate the proposed 3½ cubic yard LHDs and 15 ton trucks. The existing rail haulage drifts in the Sutton Mine will be cleaned out and enlarged to accommodate the trackless mining equipment where these drifts are required to access new stopes. Rehabilitation of old workings will not be required in the O'Byrne Mine.

All of the stope development drifting will be supported with split set rock bolts and wire mesh and miners will not be exposed to unsupported ground. The required rock bolt length is a function of drift width. Typical values for bolt length range from 1/4 to 1/3 of the drift width. At Springer the minimum rock bolt length is 5 feet.

Spacing of rock bolts depends on pull out resistance developed between the rock and the bolt and on the ability of the wire mesh to support any loose rock that may accumulate on it. Typical values for rock bolt spacing range from 3 ft. in severe loading conditions up to the rock bolt length. Five feet is the planned rock bolt spacing at Springer.

16.4 Stope Sequencing

Stope mining will commence at the lowest elevation in the stoping block and progress upwards. Thus the top or drilling level will become the mucking level for the subsequent stopes. Stope mining on a level will commence at the farthest point from the shaft or level access point and retreat in the direction of the shaft or level access point. In the Sutton mine where there are two parallel beds the footwall bed will be mined prior to mining the hanging wall bed.

This sequencing arrangement has two principle advantages. The first is to limit the buildup of mining induced rock stress by minimizing the need to mine secondary stopes or pillars. The second advantage is to reduce the amount of waste development required since reestablishing access to the beds will not be required as is normally the case when secondary stopes are mined.

The disadvantage of this arrangement is to limit the selectivity and flexibility of stope mining. The stopes must be mined in the direction of retreat without exception.

16.5 Capital Development

The Sutton 3 existing shaft stations are located at the 375, 625 and 875 levels. The skip load out is located below the last station at the 1125 level and is connected to each shaft station by twin muck passes.

To gain access to the intervening levels it will be necessary to drive inter-level development ramps from the levels serviced by the Sutton 3 shaft. The existing (green) and planned (orange) capital and stope development drifting is shown in Figure 16-2.



Figure 16-2: Long Section of the Sutton Mine Looking S 76 E

The new mining methods and modern rubber-tired diesel powered mining equipment, shared between various production levels, necessitates a modern, interconnected design, which is now the intended design. Internal ramps will be necessary to connect the levels accessed by the Sutton #3 shaft to the intervening levels and to extend the mine 2 levels down dip from the existing 1125 level. Additional ramps will be required to access the resource defined down dip from the Sutton #1. Internal raises will provide ventilation and secondary egress from all the planned development.

In addition to the existing shaft and hoist system at Sutton, a new portal is planned for access directly into the 125 and 250 levels constructed southeast of the mill. Access ramps will connect the portal to both levels.

The O'Byrne mine will be accessed by two portals, located east of the mineralized bed, and interconnecting ramps. Internal ventilation and escape raises will connect all of the ramps and both portals. Portal locations are shown in Figure 16-3 and a long section of the planned mining is shown in Figure 16-4.

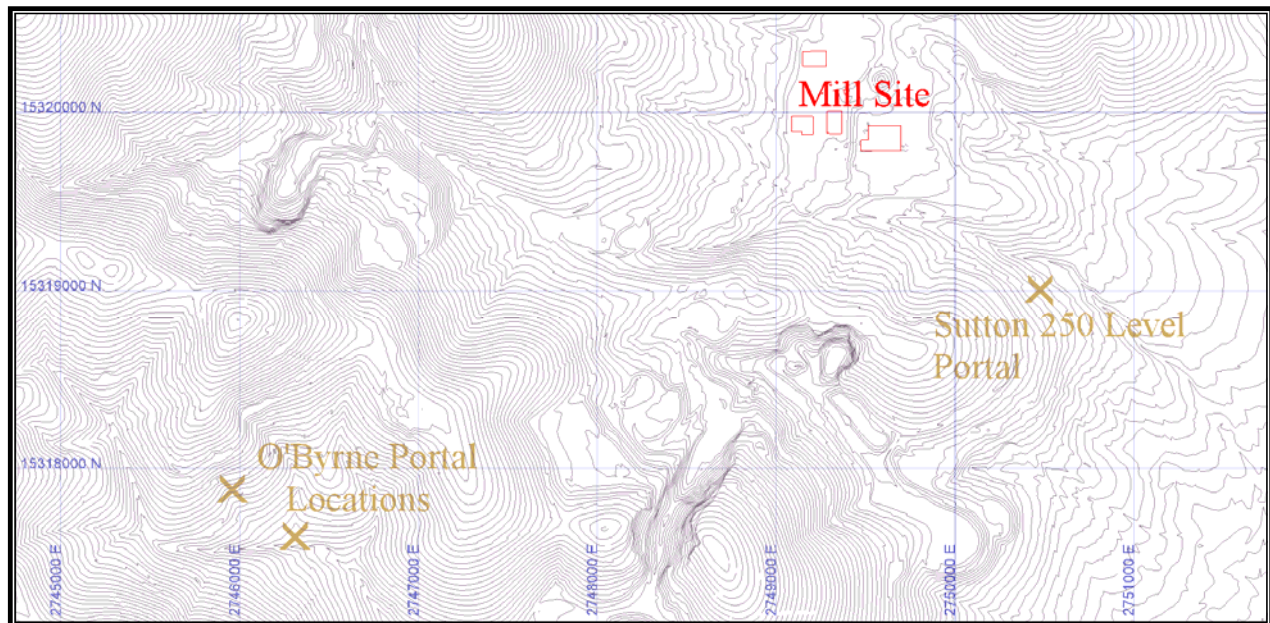


Figure 16-3: Sutton and O'Byrne Portal Locations

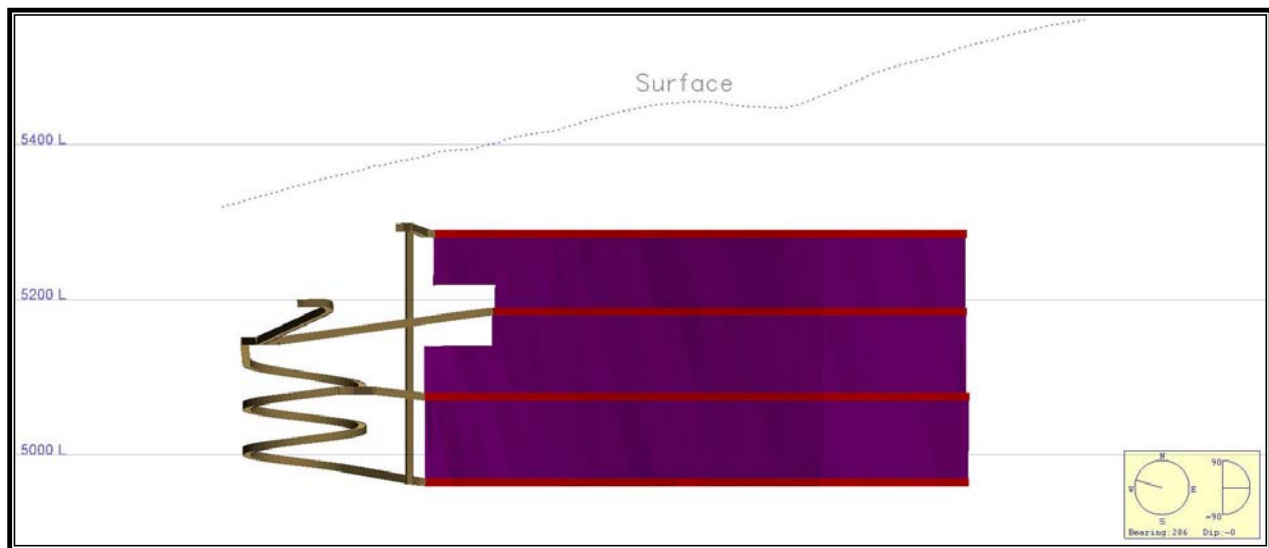


Figure 16-4: Long Section of the O'Byrne Mine

The Capital development drifting will also be a standard 10 ft. by 10 ft. to accommodate the rubber tired haulage fleet. The gradient of the ramps will range between +15% and -15% as required. As with the stope development drifting, all capital development drifts will be

supported with split set rock bolts and wire mesh. Resin rebar, cable bolts and/or shotcrete can also be used to supplement the primary ground support where needed.

Table 16-1 lists the drifting and raising requirements by year for each mine.

Table 16-1: U/G Mine Capital Development Plan

Underground Mine Capital Development Plan	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5
<u>Sutton Mine</u>						
Drifting (feet)	3,321	4,024	4,024	4,024	742	513
Raising (feet)	208	861	317			
<u>O'Byrne Mine</u>						
Drifting (feet)	2,505					
Raising (feet)	320					
<u>Total</u>						
Drifting (feet)	5,826	4,024	4,024	4,024	742	513
Raising (feet)	528	861	317	0	0	0

16.6 Mine design and Production Plan

The Sutton and O'Byrne resource block models were imported into Vulcan Mine design software. Stope design polygons were created on 25 ft. centers and extending between levels throughout the un-mined regions of the deposits. The polygons were constructed to be either the larger of (1) the mineralized bed width plus 1 ft., or (2) a 5 ft. minimum mining width, thus incorporating dilution factors into the designs. After completion of the polygons three dimensional solids were produced from each pair of polygons. The tons and grade of each solid was calculated from the block model and any solid with an average grade below the 0.2% cutoff grade was excluded from the mine plan.

Figure 16-5 and Figure 16-6 are long sections through the Sutton 2 Mine looking S 76 E. The mined out zones are illustrated by the hatched areas and the planned stopes exceeding 0.2% WO₃ are shown in magenta. All of the planned stopes are either below or along strike from the historic workings.



Figure 16-5: North Sutton Footwall Bed

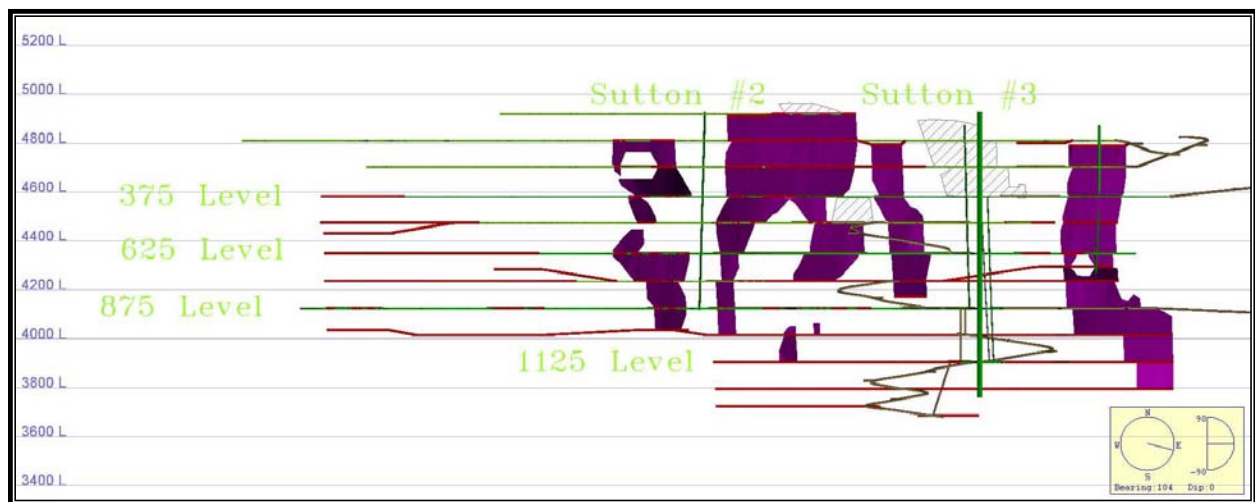


Figure 16-6: North Sutton Hanging Wall Bed

Once the stope designs were completed, stope development drifting, capital drifts and raises were designed. These designs were then used to produce the production schedules shown in Table 16-2 and Table 16-3 below.

Table 16-2: Measured and Indicated Resource Mining Schedule

Measured and Indicated Resource Mining Schedule	Year 0	Year 1	Year 3	Year 3	Year 4	Year 5	Total
<u>Sutton Mine</u>							
Mined Resource (tons x 000)		52	71	153	74	17	366.4
Tungsten Grade (%)		0.30%	0.31%	0.36%	0.62%	0.80%	0.42%
Tungsten Produced (STU)		15	22	55	46	14	152.1

Table 16-3: Inferred Resource Mining Schedule

Inferred Resource Mining Schedule	Year 0	Year 1	Year 3	Year 3	Year 4	Year 5	Total
<u>Sutton Mine</u>							
Mined Resource (tons x 000)	3.5	245.7	313.7	284.9	365.1	334.6	1,547.5
Tungsten Grade (%)	0.25%	0.29%	0.46%	0.41%	0.38%	0.42%	0.40%
Tungsten Produced (STU)	0.9	72.4	145.0	118.1	137.0	139.8	613.2
<u>O'Byrne Mine</u>							
Mined Resource (tons x 000)	10.4	94.8	54.1				159.3
Tungsten Grade (%)	0.58%	0.78%	0.75%				0.76%
Tungsten Produced (STU)	6.1	74.2	40.4				120.7
<u>Total</u>							
Mined Resource (tons x 000)	14.0	340.5	367.8	284.9	365.1	334.6	1,706.9
Tungsten Grade (%)	0.50%	0.43%	0.50%	0.41%	0.38%	0.42%	0.43%
Tungsten Produced (STU)	7.0	146.6	185.5	118.1	137.0	139.8	734.0

16.7 Infrastructure

16.7.1 Hoist and Shaft

The Sutton #3 hoist and shaft was constructed in the early 1980's by General Electric Corporation. The shaft is serviced by a double drum production hoist driven by twin 325 hp AC motors. The production hoist is connected to two 9 ton capacity bottom dump skips.

The service hoist is a balanced single drum hoist driven by a 1500 hp DC motor. DC power is supplied by a motor generator set consisting of a 1250 hp AC motor driving and a 1250 kw DC generator. The hoists were inspected (Tiley, 2008) during the summer of 2008 and their recommendations for refurbishing the hoists and controls have been included in the capital cost estimates.

All of the conveyances were carefully removed from the shaft when it was decommissioned and are securely stored on site. Shaft rehabilitation will consist of re-blocking the steel sets, replacing the guides, repairing the compressed air, water supply and water discharge lines. Finally the feeder power cable will be replaced and communications lines installed.

16.7.2 Dewatering

The Sutton Mine is currently flooded to approximately 500 ft. below the #3 shaft collar. Dewatering will be accomplished by staging the mine water between pump stations located on each level. The total flooded volume of the mine is estimated to be 40 to 50 million gallons and the historical water inflow rates averaged approximately 100 to 150 gallons per minute (gpm). It is estimated that mine dewatering will take 2 to 3 months to complete at sustained pumping rates of 500 gpm. The water pumped from the mine will be stored in the tailings dam and will be evaporated or reclaimed as needed for process water makeup.

16.7.3 Backfill Plant

GE constructed a sand fill system along with the process plant and other facilities in 1981. The plant consist of a large concrete lined holding basin, associated tanks, pumps and piping necessary to mix cement with the tailings and deliver it to the stopes being filled. Sand fill, either cemented or un-cemented, will be pumped from the plant through a cased borehole to the mine level and then through piping to the top of the stope being filled.

17.0 RECOVERY METHODS

17.1 History

Refer to a section on prior milling activities at Springer in Chapter 13. Mineral Processing.

17.2 Revised Springer Mill Process-Overview

EMC will employ a revised milling process to directly produce a 65% WO₃ scheelite concentrate, which will not rely on the existing digester circuit, nor will it employ the APT plant facility on site. The new process will utilize the existing grinding circuits, consisting of a rod mill and a ball mill, along with Derrick screens to accurately size material for optimum scheelite liberation from gangue material. The sized material will be processed through a flotation circuit to first remove molybdenum disulfide (MoS₂), and then delivered to a centrifugal jig to separate gangue minerals and deleterious elements from the feed using specific gravity differences. The pre-concentrated tungsten feed will next move to a three-stage flotation unit operation, using existing flotation cells in place in the existing mill. A scheelite concentrate product will then be recovered, filtered, dried and bagged for sale to customers.

The digester circuits on site today are anticipated to never be reactivated, as the upgrade systems based on the centrifugal jig process represent a better, cheaper alternative. The jig is best located inside the existing mill building, where it can be protected from freezing conditions and desert elements.

The APT plant also resides inside the existing mill building, and the intent is to preserve this product capability in the event Springer ever decides to produce APT at some future time. The APT plant is incomplete, as certain minor SX circuit systems components were removed by GE in the years prior to EMC ownership. The associated reagent tank farm storage units have been reconditioned to current environmental standards and remain on site, with a concrete catchment and berms plus tank re-installation required. Capital cost to re-activate the APT plant, sized to process Springer's entire concentrate product, is estimated at approximately \$1 million, however this cost is not included in the restart capital figures, or the restart plan. Springer's permitting and utility services remain in place, and have been preserved to allow a rapid APT circuit restart, should that be desirable.

17.3 Overview of Unit Operations

Based on the revised EMC flowsheet, the major process steps for scheelite concentrate production are as follows:

- Mill feed preparation
- Resource grinding circuit (rod & ball mills)
- Molybdenum flotation circuit

- Gravity separation circuit (Kelsey Jig, KCJ)
- Residual sulfide flotation circuit
- Scheelite flotation circuits
- Product finish and packaging

Major unit operations are illustrated on the following flowsheet, Figure 17-1.

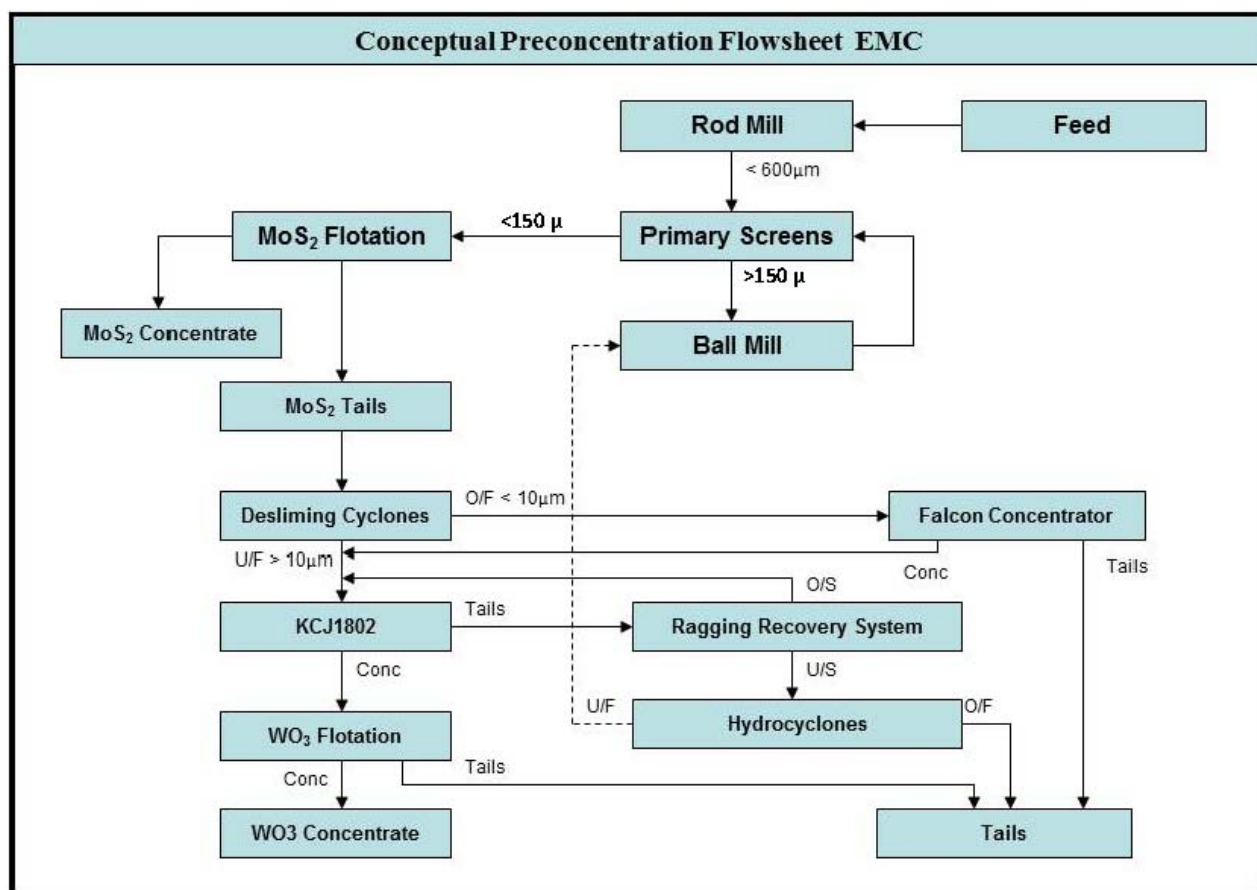


Figure 17-1: Conceptual Preconcentration Flowsheet EMC

17.3.1 Mill Feed Preparation

Resource material is lifted (via production hoist) into two 400 ton surface material bins (currently one resource, one waste) or delivered (from adits) to a secondary crusher tower and platforms. ROM material is initially crushed through a 100 hp Tel-smith gyratory crusher (set at 4 inches) rated at 200 tph, followed by a secondary 250 hp Tel-smith cone crusher (set at 5/8 inches) rated at 180 tph. Material is then moved by a series of crushed material conveyors,

further screened and sized to specification, and dropped onto a material stockpile with a capacity of approximately 50,000 tons. A remote-operated hydraulic rock breaker unit is also installed adjacent to a sizing grizzly to receive and properly reduce over-size resource material from adits, via separate conveyor, to the cone crusher, where it joins the material flow with underground material.

The pre-crushed and sized resource material is pulled from the stockpile by five underground draw points, consolidated onto an underground mill feed conveyor by five reclaim feeders, run over a belt scale and delivered to the mill building.

All belt conveyors are covered, wiring is enclosed in conduit, and grease/lubrication points retrofitted.

17.3.2 Resource Grinding Circuits

Resource material enters an elevated platform and is delivered to a hopper-fed 450 hp Dominion rod mill (9 ft. by 12 ft.). The rod mill grinds to specification, and will deliver material to a Derrick screen sizer unit selected to pull out target sized material and pass that on to moly flotation. Oversize material is then returned to a hopper-fed 750 hp Dominion ball mill (11.5 ft. by 10 ft.) where it is re-ground to specification, screened and joins the feed flow at the moly float circuit.

The milling circuit is rated for 1,000 tpd, and with current horsepower ratings would not be able to meet the current 1,200 tpd throughput intended for the mill. New, higher horsepower motor drives (750 hp/rod mill & 800 hp/ball mill) have previously been purchased, are located on-site, and will be installed to meet production targets.

17.3.3 Molybdenum Flotation Circuit

Molybdenum is historically present in the Springer resource, was removed by GE when they then operated the mill facility in 1982, and is considered a deleterious element in a tungsten concentrate, subject to a quality penalty unless removed. A conventional flotation system will be employed using single stage flotation cells to separate molybdenite (molybdenum disulfide or MoS_2) from the mineral feed prior to delivery to a gravity separation circuit. The existing MoS_2 separation equipment may be partially re-applied to this process, but this step is expected to be an addition to the existing sulfide removal systems in place.

As no molybdenum resource has been established in this updated resource estimate, no economic recovery of moly products (MoS_2) has been assumed in this PEA.

17.3.4 Gravity Separation Circuit

Springer intends to add a centrifugal gravity separation system into the existing process flowsheet to separate and reject gangue materials from the mineral stream prior to flotation.

A 50 tph modular Kelsey Jig unit (Model J1 800) is the largest presently available, and is appropriately sized for mill throughput. The Kelsey Jig is delivered as an integrated, near-fully assembled unit (five shipping containers) for erection on site—in this case inside the existing Springer mill.

Prior to the gravity circuit process, feed material will initially be introduced into a slimes classifier, such as a cyclone unit, to remove <10 µm material from the feed. This slimes separation step is an integral element of the Kelsey Jig system. The de-slimes feed will then be pumped to the high speed rotating centrifugal drum where it will separate approximately 80% of feed material to tails and reduce overall flotation feed tonnages to less than 20% of initial grind volumes (depending on slimes generation).

Slimes will be directed from the hydrocyclone tailings stream to a Falcon concentrator system, where part of the higher specific gravity scheelite can be selectively separated, while rejecting the lower density gangue material to the final tailings stream.

Slimes scheelite recovery is relatively poor (35-50%). Depending on the effectiveness of screening, full mill stream automation, and the in-line sampling system updates which have been installed, slimes generation has the potential to be substantially minimized. This will improve overall recoveries and is the operational objective. Success from slimes reduction through proper grind control may actually further reduce the economics of scheelite recovery from a smaller slimes volume. The PEA assumes no slimes recovery in year one of the economic analysis, and the Falcon system is shown in the flowsheet as a possible addition, only if justified in later years based on experience minimizing slimes generation.

17.3.5 Flotation

As in the previous Springer mill process flowsheet, a sulfide removal flotation circuit is also included. Sulfide minerals, such as pyrite, marcasite, and chalcopyrite will report to the gravity jig concentrate alongside scheelite, so their removal prior to scheelite flotation is warranted. The upgraded mineral stream from the Kelsey Jig moves first to the sulfide removal flotation step, and then on to a standard scheelite flotation circuit. Scheelite flotation is anticipated to be a conventional four stage process involving rougher, scavenger, cleaner, and re-cleaner steps, designed to float scheelite and reject any residual sulfides. The existing flotation cells in the mill today represent substantial excess capacity for this planned circuit, and it is anticipated a portion of the current 1,000 tpd throughput on this circuit will be applied to moly and sulfide flotation.

17.3.6 Product Finish

Scheelite concentrate (~65% WO₃) moves from flotation to a series of leaf filters and material drying units to generate a substantially dry concentrate for shipping. Concentrate product will be bagged, weighed, and stored on pallets in a finished product area of the existing mill for shipment to customers, by truck or sea/rail container, as required.

17.3.7 Laboratory Facilities

The Springer mill includes a fully equipped laboratory and sample preparation facility, to enable continuous sampling of resource feeds, and finished product specifications. Laboratory facilities include an X-Ray Fluorescence unit (XRF) and an Inductively-Coupled Plasma Mass Spectrometry unit (ICP-MS) to fully sample and document product quality on-site and provide customer quality assurance.

17.3.8 Mill Electrical Consumption

Power consumption for the mill is estimated based on current Nevada Energy rates and based on the connected load levels for the main components within the mill, as shown in Table 17-1.

Table 17-1: Mill Electrical Consumption Detail

Mill Facility Electrical Consumption				
Mill Circuit	Connected Load (HP)	Annual Consumption (kwh)	Cost/Ton	Cost/Year
Crusher/Belts	500	523,000	\$0.11	\$46,000
Mill Pumps	560	2,270,000	\$0.47	\$199,000
Mill MCC	765	3,090,000	\$0.64	\$272,300
Rod Mill	450	2,600,000	\$0.54	\$228,800
Ball Mill	750	4,330,000	\$0.90	\$381,400
Totals		12,813,000	\$2.66	\$1,127,500
Nevada Energy connected rate - \$0.11/kwh				

17.3.9 Mill & Mine Water Consumption

The mine and mill facility have current ownership rights to the necessary water to operate, from the State of Nevada. The mine is expected to make as much water as is required for any process needs underground and around the surface facilities for dust control and road maintenance. The mill water consumption, based on the PEA operational rate of 1,200 tpd, is estimated to be approximately 300 gpm or 484 acre feet/year. The Springer facility has approximately 2.2 times that required amount of water assigned from the State, enough to support expansions of the mill (to 1,500 tpd) and a restart of the APT plant, if either of these two possibilities are pursued.

Adjacent to the mine, Springer Mining Company (SMC) owns a 2,600 acre ranch known as the Cosgrave Ranch, straddling Interstate Highway 80. The ranch has approximately 650 acres under cultivation (3 pivots) and typically produces four alfalfa cuttings per year. A farmer is under contract to use the ranch and the agricultural water allotment, demonstrating beneficial use, and thereby protecting the water right asset. The ranch was originally acquired by SMC to increase the available water for possible mine expansions and related mill operations at Springer, and currently holds 1,515 acre feet/year of agricultural use water rights. In 2010, 395 acre feet of

water rights were transferred from the ranch to SMC, and it is believed that additional portions of this water resource could be re-designated for mine use if ever required. Detail on mine/mill water consumption and the available water resource is shown in Table 17-2 below.

Table 17-2: Springer Water Consumption and Resources

Mine & Mill Water Consumption and Facility Water Rights Totals	Acre Feet/ Year	Gallons/ Minute
<u>Mill Demand</u>		
Springer Mill (1,200tpd) (PEA)	484	300
Springer Mill (1,500tpd)	616	382
APT Plant	130	81
Mine Demand (PEA)	194	120
PEA Total Water Demand/Year	678	420
<u>Property Water Rights</u>		
Springer Mine (industrial)	1,082	671
Cosgrave Ranch (agricultural)	1,515	939
Mine Water	242	150
Total Available	2,839	1,760

18.0 PROJECT INFRASTRUCTURE

18.1 Access Road and Transportation

The Springer Mine property is serviced by Interstate Highway 80, and is located approximately 130 miles east of Reno, Nevada and approximately 30 miles west of Winnemucca, Nevada. The property is accessed off the Interstate by State Road 400, a paved/gravel two lane 8 mile road used by mine traffic and local ranchers. The Southern Pacific railway parallels Interstate Highway 80 and a track cut-out and short siding is located at Cosgrave, approximately 18 miles from the mine site.

18.2 Electric Power and Natural Gas Supply

Nevada Power supplies a 69 kV, 3 phase, 60 Hz power source to the Springer Mine facility. Springer maintains the electrical infrastructure from the metering station to the mine, and water well pumps on adjacent property. This infrastructure includes over fifty poles and three main transformers. A significant range fire burned on the property in 2007, destroying most of the utility-owned electrical delivery poles, which have all been replaced. Natural gas is provided to the mine facility by Southwest Gas. Natural gas was significant when GE operated the digestion and APT processes in the mill, but will be much less so with the current operating plan for scheelite concentrate production. The gas service will find use in the facility, and is in place should future plans call for its application.

All of the electrical transformers on site have been refurbished to current standards, and none on the property contain PCB's.

18.3 Water Supply

Water for the Springer mill and surface facilities is supplied by two wells in the valley, both capable of pumping in excess of 1,000 gpm. The water is delivered across a BLM right of way through an existing water pipeline. Well water was stored in a 550,000 gallon storage tank on a hill above the mill facility. The mine and mill facility is designed to consume 400 gpm on average, assuming a 1,200 tpd processing rate, and depending on cleanup work being performed in and around the mill and property. Mill tailings will be piped in slurry to a tailings pond facility, where a significant portion of the contained process water will be reclaimed as make-up water for re-use in the mill. Net water requirement for the mill, supplied from wells, is estimated at 200 gpm.

Water quality from existing wells is not to drinking water standard. Potable water requirements on site, specifically for mine shower facilities, will require a clean water standard that will need to be met by reverse osmosis water purification systems, which is onsite and will be installed in year zero.

Sub-surface water quality on the property is monitored by 11 groundwater monitoring water wells, sampled and serviced as required to maintain reporting standards. Extensive baseline

water quality data is available for comparison, beginning with acquisition of the property from GE in 2006.

18.4 Shipping Facilities

A 60 foot truck scale is located at the mine gate, to establish delivery weights on material arriving on site. The nearest major port facility is located in Stockton, California, on the Sacramento river, approximately 320 miles from the mine, accessible by either rail or truck transport.

18.5 Buildings and Ancillary Facilities

The existing infrastructure at the Springer Mine consists of a 1,360 ft (440 m) vertical shaft and underground workings (currently flooded), a resource stockpile, a 950 tpd mill with tungsten, molybdenum, and sulphide flotation circuits, an (unlined) tailings pond and numerous outbuildings. The Springer mill is currently configured to produce either ammonium paratungstate (APT) or calcium tungstate (synthetic scheelite), although changes are underway to produce a standard scheelite concentrate, at an up-rated 1,200 tpd mill throughput.

The current mine and mill facilities were constructed between 1978 and 1981, commissioned and operated in 1982. Initial construction cost was approximately \$70 million, managed through a joint venture between GE and Utah International Inc.

Specific infrastructure and facilities are as follows:

- Shaft is a 5 compartment unit, with head frame, two 9 ton production skips and one 20 ton service cage, and two 400 ton material bins (one for resource, one for waste),
- Hoist house, pre-engineered steel, 10,560 sf, includes a Nordberg 350 hp (AC) 7 ft. double drum production hoist (130 tph), and a Nordberg 1,500 hp (DC) 7 ft. single drum service hoist (10 ton), with separate control stations, plus stationary air compressors,
- Administration building, pre-engineered steel, HVAC, plumbing, 10,800 sf, with approximately 15 offices, miners dry, map and engineering rooms, storage facilities, and meeting rooms.
- Warehouse building, pre-engineered steel, HVAC, plumbing, 10,000 sf, with approximately 10 offices, part mezzanine, plus machine shop, electrical shop and weld shop facilities.
- Mill building, pre-engineered steel, HVAC, plumbing, part mezzanine, 30,000 sf, includes rod mill, ball mill, flotation cells, regrind mill, digester circuit and full

APT circuit, plus fully-equipped laboratory (ICP and XRF) and two sample preparation areas.

- Various storage sheds, core sheds, and equipment shelters.

EMC Metals spent two years (2006-2008) rehabilitating and expanding the mill facility. Work is nearly complete to make the primary milling and flotation circuits operational. Work remaining to make the tungsten processing facility operational includes the addition of a gravity circuit, sizing screens, moly flotation circuits, and completion of the installation of new automatic controls throughout the mill.

A stockpile of resource material extracted from the mine by Utah International Inc. in 1982 is present on site. The stockpile contains an estimated 25,000 t of crushed mill feed material and an additional 15,000 t of run of mine material. Sampling by EMC Metals along the surface of both stockpiles has shown the material to have an average grade of 0.5 WO₃%.

18.6 Tailings Storage Area

A tailings impoundment was constructed by General Electric Corp. during the development of the mine site in the 1980s. The original design was for a total volume capacity of 85 Mft³ capable of accommodating 192,000 t of tails per year for a 13-year mine life. The actual as built capacity is reported to be the same as its design, or approximately 2.5 Mt.

18.7 Waste Disposal Area

There are numerous historical waste dumps located on site. The majority of these waste piles are small spoil piles located at the adits of historical workings. There are adequate locations available on private land to accommodate the anticipated mine waste production. The site is permitted for solid waste landfill disposal, and for a large capacity septic system.

Hazardous waste is handled, stored and disposed of in accordance with applicable regulations.

18.8 Manpower Availability

Winnemucca is the closest population center to the mine site, approximately 30 miles east. It is a community of 18,000 in the town and surrounding area, which includes schools and two hospital facilities. Winnemucca is a regional mining center, with 1,150 hotel rooms, considerable mining support services and mining businesses. Mining staff and an experienced mining workforce are attracted to the area and availability of trained staff is considered good.

19.0 MARKET STUDIES AND CONTRACTS

19.1 Market Size

World annual demand for tungsten is estimated at about 85,000 tonnes today, essentially unchanged from 2008 figures (source: USGS), and equating to roughly \$3.5 billion in traded value as APT. Some relevant statistics:

- 2011 global tungsten production is estimated at 72,000 tpa (source: USGS),
- The remainder is addressed by recycling of tungsten scrap material, averaging about 30% of consumption, and considerably exceeding this level in certain countries.
- World tungsten consumption in 1970 was about 28,000 tpa, so roughly one third of consumption levels today, representing about a 3% compound annual growth rate (CAGR) over the last 40 years,
- Very little new tungsten supply has been brought online since 2008 (6,000 t, USGS), and
- While tungsten consumption has remained relatively flat since 2008 due to limited world GDP growth, analysts had in fact predicted a strong demand push to 109,000 tpa by 2012, based on tungsten's uses and applications - a forecast likely to be revisited in any stronger economic recovery.

China is by far the dominant player in global tungsten markets. China holds an estimated 61% (USGS) of known global tungsten resources, the largest of any nation, and also holds some of the largest deposits. China produces an estimated 60,000 tonnes of tungsten annually (USGS, 2011 estimate), representing over 83% of world production. China is estimated to consume just under 50% of its internal tungsten production, which makes it a heavy exporter of tungsten-content manufactured goods and machinery.

Once a concentrate exporter, China now is a net concentrate importer and has significant internal restrictions on export of non-processed tungsten feed stocks. China has been managing its tungsten exports for ten years now, first employing export quotas in 2002. Export tariffs on tungsten content products followed in 2004. Chinese export quotas for the current year have again been lowered (2%), and the predictions are for growing restrictions in the future on both primary and intermediate tungsten exports. In early 2012, the USA, EU, and Japan filed a challenge with the World Trade Organization (WTO) regarding China's tungsten export restrictions. The EU now classifies tungsten as a "critical raw material" and the British Geological Society put it on their list of 'supply risk minerals'.

19.2 Tungsten Demand Outlook

Tungsten consumption has been traditionally closely tied to economic activity and growth rates, in fact matching or slightly exceeding those growth rates. In the 1980's, analysts predicted 4% long term annual growth rates for tungsten, but the actual growth rates have been about 3%. More recently, tungsten applications in high tech and specific high growth industrial sectors have played a role in consumption that have allowed tungsten demand to show strength in lower overall growth environments, offset partially by higher recycling. The rapid and continuing industrialization of both China and India will generate increased tungsten demand as well.

19.3 Tungsten Applications

Tungsten is one of the heaviest metals, at 19.25 g/cm³ (approximately the weight of gold), and has the highest melting point of all metals at 3,422°C, a temperature at which iron, aluminum, copper and titanium have already exceeded their boiling points (vaporized). This makes tungsten alloyed steels the strongest high temperature man-made metallic materials. Tungsten monocarbides (WC) are extremely hard, with a hardness index of 300-600 HV₃₀, very close to diamond.

Approximately 60% of all tungsten is converted to tungsten cemented carbides, which are used as high wear surfaces or cutting surfaces on high speed tools used to form, shape and cut other metals, glass, ceramics, wood, and composites. Tungsten carbide 'hard-facings' remain the (essential) material of choice for drill bits in oil and mineral exploration, production mining equipment, and the construction industry. Tungsten carbides are manufactured by cementing tungsten monocarbide grains in a binder matrix of cobalt or nickel alloy using liquid phase sintering. These manufactured materials exhibit superior hardness, strength, toughness and compressive strength. The basic sintering process for manufacturing hardmetals has been practiced since the 1920's, although the science and the engineered materials have progressed substantially since the initial techniques were applied.

Mill products represent the next segment of tungsten application by tonnage, at about 20%. Because of tungsten's very high melting point, tungsten shapes are typically not melted & cast, but fabricated from powders which are pressed, sintered and worked or formed into the desired shape. Lighting filaments, electrodes, wire and electronic contacts are formed in this fashion, as are certain tungsten alloys, such as tungsten-carbide silver, or sintered tungsten copper. Lighting applications make up approximately 4% of tungsten usage. New lighting technologies (CFL, fluorescent, HP mercury-vapor, metal halide, etc.) have not diminished this application for tungsten, as most also have tungsten content in critical parts, some with more tungsten than was present in traditional mono-filament bulbs.

The steel alloy segment represents the remaining 20% of tungsten consumption globally. Steels and metals can be alloyed with tungsten by introducing tungsten or ferro-tungsten into the melt or through secondary electro-slag re-melting. Tungsten can also be introduced in this application as scrap. High speed hardened steels typically contain a minimum of 7% tungsten, molybdenum,

and vanadium, plus 0.6% carbon. At 10% alloy content, the hardness and toughness of steel is maximized. Tungsten is also commonly alloyed with steels used in high heat applications, such as engine valves and steam, gas, and jet engine turbine blades. Tungsten is added to stainless steels to improve corrosion resistance.

19.4 Tungsten Customer Contracts & Sales Terms

The majority of tungsten is mined and processed into APT, tungsten carbide, or end use products in China. China had followed a path of value added processing for its internally mined/sourced tungsten, choosing to export finished goods with tungsten content rather than exporting concentrates, as was done in the 1970-1990 timeframe. China is a net importer of tungsten concentrates today.

While there has always been a market for tungsten concentrates, that market has not been particularly transparent and remains characterized by private contracts between miners and tungsten upgraders, typically ammonium paratungstate (APT) refiners. APT is publically quoted, with daily prices reported by Metal Bulletin (Euro quote), Bloomberg (USA quote), Chinese trading houses (FOB China, not duty-paid)), and others. As a result, APT is universally considered as the benchmark pricing form for tungsten. This is also appropriate as APT represents tungsten in the form most often used by fabricators and others for manufacturing downstream and end use tungsten products.

APT is priced in metric ton units (“MTU’s”), which are equal to 22.04 pounds, or 10 kg. Thus, 100 MTU’s equals one tonne. Tungsten is also typically quoted in US dollars. Concentrate is also priced in MTU’s, but as a concentrate is usually only 65% tungsten trioxide by weight, the concentrate pay-weight is actually calculated on a tungsten-equivalent basis. Concentrates are almost always low moisture, less than 5%, essentially dry powder. Occasionally tungsten outputs or measures are quoted in short ton units (“STU’s”) , which is one hundredth of an imperial ton (2,000 pounds) and therefore only 20 pounds or approximately 10% less than an MTU.

Tungsten concentrates are in short supply today. Scheelite concentrates, (Springer’s intended product) are typically demanded by APT customers to be pure and free of a number of other metals and contaminants, particularly uranium, but also molybdenum in any significant concentrations, grading 62.5% to 65% tungsten trioxide (WO₃). Concentrates are typically sold in 1-2 tonne reinforced fabric bags on pallets. Concentrate prices typically reference a specific independent quote for APT, discounting to APT on various bases, depending on the individual customer-supplier negotiation. Pricing formats can include, for example, one or more of the following:

- Fixed discount percent to APT price, current month or multi-month trailing quote,
- Variable discount percent to APT price, based on APT price thresholds, with either higher or lower discounts as APT pricing rises,

- Fixed dollar discounts to APT,
- Combinations of all of the above pricing mechanisms, and
- Single year or multi-year contract terms.

The very low APT pricing environment of the late 1970-90's encouraged structures based on fixed pricing discounts, while the more volatile pricing environment since the 2000 timeframe has had both suppliers and customers favoring percentage of APT- based pricing formulas.

A typical baseline pricing formula, as used in this PEA, is a compliant quality-agreed 65% concentrate price of 80% of the previous month APT price quote, FOB mine gate.

19.5 Historic APT Pricing

Pricing on APT has been volatile in the decade beginning with the year 2000 (Figure 19-1). Chinese influence on APT markets kept prices under \$100/MTU in the first five years of the decade, only breaking through \$100/MTU and into the +\$200/MTU range in 2005. Monthly pricing flirted with \$300/MTU levels but never achieved that mark in 2005 and 2006, settling into a \$250/MTU price range that stayed relatively stable as the chart below shows through 2007-2008. Pricing retreated in 2009, reflecting the then-current financial crisis, combined with very poor world industrial growth rates and tungsten de-stockpiling, back to the \$200/MTU range. By 2010, APT prices were again rising, and finally convincingly broke the \$300/MTU price point in Q4. Pricing in 2011 continued the trend of 2010, with APT pricing quickly exceeding \$400/MTU and pushing to just under \$500/MTU before falling back into the \$450/MTU range, where prices stayed through Q1 2012. The recent six months has seen prices settle over \$400/MTU, falling through that level just at the writing of this report to \$360/MTU in the beginning of September 2012.

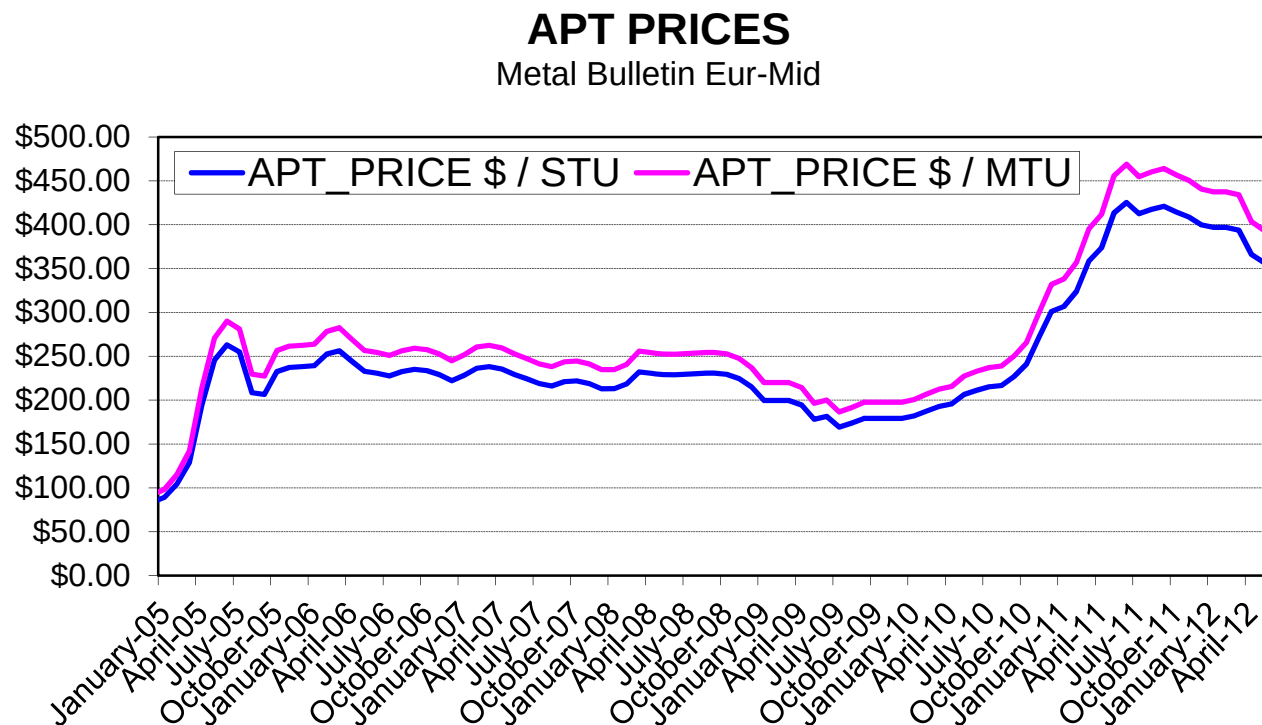


Figure 19-1: Historic Tungsten Prices

This PEA uses a long term (5 year) price average for APT of \$400/MTU, adopting the trailing 24 month pricing average, and assumes production of a 65% scheelite concentrate will be sold for an average of 80% of the prevailing APT price over the period (Table 19-1).

Table 19-1: Derivation of Tungsten Price for the PEA

Historic APT Price Quotations (US\$/MTU) (Bid-Offer Average)	Bloomberg (USA)	Metal Bulletin (Europe)
Spot Price - September 3, 2012	\$360.00	\$360.00
12 Month Trailing Average Price (Sept-Aug)	\$429.00	\$426.00
18 Month Trailing Average Price (Mar-Aug)	\$427.00	\$431.00
24 Month Trailing Average Price (Sept-Aug)	\$399.00	\$400.00
36 Month Trailing Average Price (Sept-Aug)	\$338.00	\$338.00
NOTE: PEA Assumption is US\$400/MTU		

20.0 ENVIRONMENTAL STUDIES, PERMITTING AND SOCIAL IMPACT

20.1 Mining and Operating Permits

The Springer mine was in active restart relatively recently, in the 2007-2008 timeframe, and the team in place at that time included full time environmental staff that identified and either initiated or obtained all key operating permits from the various State of Nevada and federal agencies. Permits included water and air pollution control permits, tailings/water dam and pond permits, and industrial water rights permits (Table 20-1: Springer Mining Company Major PermitsTable 20-1 and Table 20-2. Agency monitoring requirements and fee payments have been maintained and are current.

Table 20-1: Springer Mining Company Major Permits

Springer Mining Company - Major Permits			
Permit Name	Number	Agency	Issue Date
Water Pollution Control Permit	NEV2007108	NDEP-BMRR	12/3/2008
Air Quality Operating Permit, Class II	AP1061-2442	NDEP-BAPC	10/10/2008
Dam Permit - IWT	J-610	NDWR	7/11/2008
Dam Permit - WT	J-622	NDWR	9/19/2008
Reclamation Permit & Bond	#0282	NDEP-BMRR	
BLM Right-of-Way	Nev-014482	BLM	11/16/1956
BLM Right-of-Way		applied	BLM
Industrial Artificial Pond Permit - Mill/Tailings	S30626	NDOW	5/1/2008
Water Rights	80174	NDWR	2/25/2011
Water Rights	77521	NDWR	9/9/2009
Water Rights, Sutton 3	77738	NDWR	9/9/2009
Water Rights, Sutton 3	77739	NDWR	9/9/2009
Water Rights, Cosgrave	77979	NDWR	9/9/2009
Water Rights, Cosgrave	77980	NDWR	9/9/2009
Water Rights, Cosgrave	77981	NDWR	9/9/2009

Table 20-2: Springer Mining Company - Minor Permits

Springer Mining Company - Minor Permits			
Permit Name	Number	Agency	Issue Date
Solid Waste Class III Landfill Permit Waiver	F449	NDEP-BWM	5/7/2007
Stormwater General Permit NVR300000	MSW-385	NDEP-BWPC	7/18/2008
Large Capacity Septic System	File 40200	NDEP-BWPC	7/23/2007
Radiological Health Section, Registration	14-06-3431-01	NV-HHS-HD-RHS	6/1/2009
Potable Water		NDEP-BSDW	
Section 404 Clean Water Act	awaiting final rules	US-ACOE	
EPA ID Number	need final chem. List	US-EPA/NDEP-BWM	
State Hazardous Material Storage Permit	need final chem. List	SFM-LEPC	
Hazardous Materials Registration Statement	need final chem. list & loc	US-DOT	

20.2 Right-of-Way-Tailings Pipeline

GE established a right-of-way (ROW) over BLM owned property in the 1970s, over which it pumped fresh well water to the mine/mill from groundwater wells in the valley. That ROW remains in place and will be used for the same purpose by Springer in operations.

GE also traversed US Bureau of Land Management (BLM) property with a tailings pipe, in a direct route to the existing tailings dam facility in the valley, located on private land owned by Springer mine. The ROW associated with this BLM property was not fully perfected at the time GE used it. Nonetheless, the pipe and route would have been available to Springer today, on a grandfathered basis, except for the fact that a substantial range fire that ran through this area in 2007 destroyed the GE tailings pipe in place at the time. In order to re-establish the pipe on this property, the ROW needs to be formally re-established with the BLM. The property section in question happens also to be the site of historic tungsten mine tailings deposition, so the ground is disturbed and has legacy environmental impacts.

Springer has formally applied to the BLM for a reinstatement of this ROW to allow a new tailings pipeline to traverse the approximate 1.1 mile length (one section, slight diagonal) of this disturbed area. This plan represents the most efficient solution for Springer—one that has better life of mine economics than the currently permitted solution.

The currently permitted solution, based on earlier planning work, called for the construction of a small, intermediate tailings pond on privately owned property directly adjacent to the mill.

This ROW is expected to be granted and approved not later than June 2013, and will not delay facility restart.

20.3 Mine Closure Considerations and Requirements

Nevada State mining regulations require site reclamation bonding to be established, prior to the start of operations. Reclamation cost estimates are made based on predetermined cost factors established by state regulators. Springer Mining Company has prepared and filed the required reclamation cost estimates in accordance with Nevada regulations. The current reclamation cost estimate is \$3.9 million and the associated bonding requirement is included in the capital cost estimate to restart mine operations.

21.0 CAPITAL AND OPERATING COSTS

As the mine was a fully operational facility in the past, the capital requirements are now associated with restart of the existing facilities, including rehabilitation of certain areas, additions of new or different equipment in the mill and mine, and modernization and conversion of the underground operations to more efficient mining methods. The existing buildings and infrastructure is all in place and in excellent condition.

Total restart capital is estimated at \$30 million, including environmental bonding, working capital and contingencies, with most expenditure required in the year prior to production. Certain expenditures can be delayed until the mine is in commissioning and early production.

Table 21-1 is a summary of total restart capital.

21.1.1 General

This capital estimate has been determined on the basis of estimates provided directly by third party contractors, discussions with contractors and service providers familiar with the facility, and internal estimates (Table 21-2). Because there is no 'greenfields' construction required, the typically factored costs are not a part of this estimate. However, as the mine is not able to be inspected due to flooding, rehabilitation costs are estimates only, based on as-found condition.

21.1.2 Production Mining Equipment

Mobile equipment requirements were estimated in the same manner as labor requirements and are listed in Table 21-3. New mining equipment generally has a life expectancy of approximately 7 years at average utilization rates. Since this typical equipment life exceeds the currently planned mine life of 4.75 years, and equipment sizes specified are available in the used market today, the capital cost of the mining equipment has been estimated at 60 – 80% of new equipment.

Table 21-1: Total Capital Cost Summary

Capital Spending Summary (2 years)	Capitalized Restart Cost (US\$M)
<u>Mill Refurbish Capital</u>	
Gravity Circuits	\$3.00
Molybdenum Flotation Circuits	\$1.15
Rehab Mill & Complete Automation Project	\$2.00
Product Finish & Packaging	\$0.75
Sub-total Mill Capital	\$6.90
<u>Surface Facilities Refurbish Capital</u>	
Tailings Pond Lining & Piping	\$3.00
Nevada State Environmental Bond*	\$2.00
Shaft/Hoist/Cement B-Fill Rehab	\$3.20
Shaft De-water Cost	\$0.50
Sub-total Surface Facilities Capital	\$8.70
<u>Underground Mine Capital</u>	
Underground Mine Equipment (used gear)	\$3.80
Sutton Adit Development	\$1.00
O'Byrne Adit Development	\$1.50
Sutton Drift & Raise Development	\$1.97
O'Byrne Drift & Raise Development	\$1.00
Sob-Total U/G Mine Capital	\$9.27
Contingency (10% of Equipment Capital)	\$2.00
Working Capital	\$3.00
Total Restart Capital (2 years)	\$29.87
Sustaining Capital (5 years)	\$13.80

Table 21-2: Pricing Development by Discipline

Discipline/Item	Quantity Development/Pricing
New Mill Equipment	Vendor Quote
Mine Equipment	Catalog Pricing & Used Price Listings
Shaft Refurbishment	Vendor/Inspector Estimate
Hoist House Automation	Vendor/Inspector Estimate
Sand Fill Plant Rehab	Vendor Quote
Tailings Pond Reline	Vendor Quote
Mill Rehab - General	Internal Estimates
Adit Development	Factored Cost/Foot Engineering Estimates
Drift & Raise Development	Factored Cost/Foot Engineering Estimates
Contingency	10% on Equipment Estimates

Table 21-3: Mining Equipment Detail

Production Mining Equipment	Quantity	Cost New (\$000's)	Cost Used (\$000's)
LHD 3 -1/2 yd³	3	\$1,860	\$ 1,116
Mine Truck 15 ton	6	1,680	1,008
Single Boom Drift Jumbo	3	1,638	982
Compressor Rotary Screw 900 CFM	2	104	83
Longhole Drill	2	736	441
Mine Fans	10	229	183
Total		\$ 6,247	\$ 3,815

21.1.3 Freight Costs

Freight costs on the equipment not already on site are assumed to be included in total equipment cost estimates.

21.1.4 Spare Parts/First Fills

The on-site warehouse at Springer is well stocked with fittings, hoses, and hardware as it was when the mine was last operated. Welders, tools, tool chests, a complete machine shop and electrical shop, and spare parts are evident throughout the warehouse and other facilities, along with an electronic inventory system. Any additional spares required would be a fraction of what could be otherwise expected in a new project.

21.1.5 Contingency

Hard equipment purchases total approximately \$20 M, and a 10% contingency has been applied to these estimates, leaving a remaining \$3 M in rehabilitation costs without contingency.

21.1.6 Escalation/Inflation Assumptions

This PEA is done on a constant dollar basis, that is, no escalation of capital was estimated to adjust for rising costs of procurement over the next 12 months into 2013.

21.1.7 Exclusions from Capital Estimates

- Escalation,
- Currency Fluctuations,
- Sunk Costs,
- Costs associated with any environmental studies or permits, and
- Geological studies, resource development, exploration costs.

21.2 Operating Costs Summary

This section summarizes the operating costs for the underground mining operations at both Sutton and O'Byrne mines, and the scheelite resource beneficiation at the Springer mill.

21.2.1 Overall Costs of Operation

Overall production costs, including annual mine development expense, milling costs and G&A expenses are shown in Table 21-4.

Table 21-4: Operating Cost Summary

Operating Cost Summary (5 Year Average)			
Cost Area	Ave. Annual Spend	Cost/Ton	Cost/MTU
Production Mining	\$13,117,124	\$31.66	\$97.19
U/G Development (expense)	\$3,413,498	\$8.23	\$25.29
Milling Expense	\$5,705,100	\$13.50	\$42.27
General & Administrative	\$2,777,820	\$6.70	\$20.58
Total Operating Cost	\$25,013,541	\$60.09	\$185.34

21.2.2 Underground Mining Costs

Annual mining production requirements can be met by operating the two mine locations on 2 ten hour shifts per day. The mine work force will total 53 hourly operations and maintenance personnel and will be divided into three crews on a rotating shift schedule. Hourly labor productivity is estimated at 3.6 tons of ore and waste per hour worked.

Mine development and operating costs were estimated using local labor rates and typical production bonus programs, 35% burden levels, and current Nevada consumables prices. These values were combined with the annual production plan and experience based estimates for productivity and consumables consumption. Labour cost details are shown in Table 21-5. Activity-based unit costs are summarized in Table 21-6 and the composition of the total cost is shown in Table 21-7.

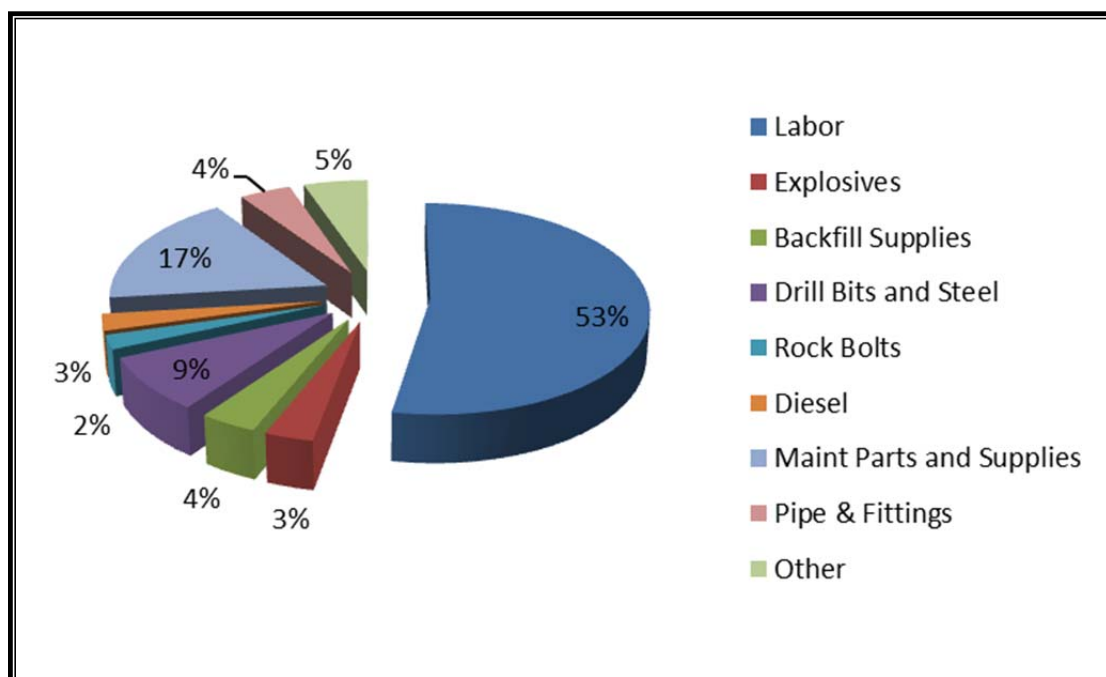
Table 21-5: Labor Costs, Underground Mining

Mine Labor Cost Detail			
Operator Type	Operators/Day (2 x 10 hr shift)	Annual Cost (inc. burden)	Cost/Ton
Drilling	4.7	\$1,222,254	\$2.95
Blasting	1.5	\$375,759	\$0.91
Mucking and Hauling	8.6	\$1,866,567	\$4.50
Bolting	2.0	\$533,772	\$1.29
Backfill	3.3	\$769,817	\$1.86
Underground Utilities /Services	0.9	\$239,834	\$0.58
Shaft	6.1	\$1,409,621	\$3.40
Maintenace	6.3	\$1,710,129	\$4.12
Salary	3.5	\$633,852	\$1.53
Mine Labor Totals	37	\$8,761,605	\$21.13
Percent of Total Mining Cost			53%

Table 21-6: Mining Unit Costs and per Ton Costs

Mining - Unit Cost Detail			
	Costing Unit	Cost/Unit	Cost/Ton
<u>Annual Expensed Costs</u>			
Stope Production	\$/stope ton	\$28.74	\$28.74
Stope Development Drifting*	\$/drift ton	\$48.15	\$4.87
Cemented Sand Fill	\$/bcf	\$11.50	\$4.40
Un-cemented Sand Fill	\$/bcf	\$6.50	\$1.88
Total Mining Cost/Ton			\$39.89
<u>Capitalized Costs</u>			
Development Drifts	\$/foot	\$800	
*Note: cost/ton reflects credits for drifting on resource			

Table 21-7: Mining Costs by Category



21.2.3 Tungsten Milling Cost Summary

The Springer tungsten mill annual average cost/ton is estimated at \$13.50/ton. The mill will not be operated as it was by GE in 1982, so the historic cost experience is not a useful indicator of cost from a flowsheet standpoint, in addition to being 39 year old figures.

The mill has been extensively automated, and can be run today with approximately one third of the staff that was used at the time the digester and APT plant were also in service. Labor cost estimates for mill operation are shown in Table 21-8.

Mill costs have been estimated based on cost factors as understood for similar facilities. The most significant cost items are grinding media, electricity, mill maintenance, reagents and labor.

- Grinding media costs are factored based on pounds/ton throughput consumption,
- Electricity at 12M kwh at \$0.11/kwh, plus other factors, or \$2.58/ton milled,
- Maintenance Cost of 5% of estimated capital value per year,
- Reagents - specific items, volumes and costs calculated, and
- Labor – as described in Table 21-8.

Table 21-8: Mill Labor Costs

Mill Labor Cost Detail			
Operator Type	Operators/Day (2 x 12 hr shift)	Annual Cost (inc. burden)	Cost/Ton
Control Room Operator	2.0	\$295,600	\$0.70
Remote Crusher Operator	2.0	\$260,200	\$0.62
Mill Operator	2.0	\$260,150	\$0.62
JCJ Operator	2.0	\$260,150	\$0.62
Flotation Operator	2.0	\$260,150	\$0.62
Assayer	0.5	\$59,200	\$0.14
Sample Prep Tech	0.5	\$53,000	\$0.13
Mechanics	2.0	\$307,500	\$0.73
Electricians	1.0	\$165,600	\$0.39
Mill Laborers	2.0	\$201,000	\$0.48
Mill Labor Totals	16	\$2,122,550	\$5.02
Percent of Total Milling Cost			37.20%

Average calculated cost elements detail is shown in Table 21-9, below.

Table 21-9: Mill Cost Summary

Milling Cost Summary			
Cost Item	Annual Spend	Cost/Ton	Cost/MTU
Wear Steel/Grind Media	\$629,400	\$1.49	\$4.66
Natural Gas	\$47,800	\$0.11	\$0.35
Electricity	\$1,128,000	\$2.67	\$8.36
Transport Fuels	\$43,000	\$0.10	\$0.32
Mill Lubricants	\$82,300	\$0.19	\$0.61
Mtnce/Repair Expense (5%)	\$489,300	\$1.16	\$3.63
Product Packaging	\$20,000	\$0.05	\$0.15
Laboratory Costs	\$43,200	\$0.10	\$0.32
Reagents	\$1,099,550	\$2.60	\$8.15
Mill Labor Cost	\$2,122,550	\$5.02	\$15.73
Total Milling Cost	\$5,705,100	\$13.50	\$42.27

21.3 General and Administrative Costs Summary

The mine is planned to operate with 19 total staff, including all supervision for the mine and the mill, plus geologists, engineers and support staff to the mine manager.

The existing office facility will accommodate more staff than is planned for the operation, and additional heated/AC space is available in the warehouse facility adjacent to the main administration building.

Detail on staffing levels, costs and office expenses is detailed in Table 21-10. Considerable additional expense for medical benefits costs and other employee costs has been included in the 35% burden rate directly applied to all salaries and wages.

Table 21-10: General and Administrative Cost Summary

General and Administrative Cost Summary			
Operator Type	Annual Cost (inc. burden)	Cost/Ton	Cost/MTU
Labor Cost Detail			
Mine General Manager	\$270,000	\$0.65	\$2.00
Mill Operations Manager	\$202,500	\$0.49	\$1.50
Mine Operations Manager	\$202,500	\$0.49	\$1.50
HR Manager	\$94,500	\$0.23	\$0.70
Safety Manager	\$94,500	\$0.23	\$0.70
Accounting Officer	\$81,000	\$0.20	\$0.60
Purchasing Manager	\$81,000	\$0.20	\$0.60
Geologists (2)	\$216,000	\$0.52	\$1.60
Mine Engineers (3)	\$324,000	\$0.78	\$2.40
Surveyor	\$67,500	\$0.16	\$0.50
Office Assistants (3)	\$141,820	\$0.34	\$1.05
Warehousemen (2)	\$135,000	\$0.33	\$1.00
Machinist	\$94,500	\$0.23	\$0.70
Total G&A Labor	\$2,004,820	\$4.84	\$14.86
Insurance	\$450,000	\$1.09	\$3.33
Utilities	\$120,000	\$0.29	\$0.89
Communications Costs	\$80,000	\$0.19	\$0.59
Supplies	\$63,000	\$0.15	\$0.47
Legal Costs	\$60,000	\$0.14	\$0.44
Total Other Costs	\$773,000	\$1.86	\$5.73
Total G&A Costs	\$2,777,820	\$6.70	\$20.58

22.0 PRELIMINARY ECONOMIC ANALYSIS

The preliminary economic analysis is preliminary in nature and includes inferred mineral resources that are considered to be too speculative, geologically, to have the economic considerations applied to them that would enable them to be categorized as a mineral reserve and there is no certainty that the preliminary economic analysis will be realized.

The Project has been valued using a constant dollar, discounted cash flow analysis to generate Net Present Values (“NPV”) for a 5 year project plan of operation, plus one year prior to production to de-water the Sutton mine, rehabilitate various surface and underground facilities, and complete a re-commissioning of the mill facility. Both pre-tax and after-tax NPV results are presented, at various discount rates. Discounted cash flow-internal rate of return (“DCF-IRR” or “IRR”) results are also presented, and calculated on restart capital only—no sunk costs are included. The effects of changes in key inputs has also been assessed and presented in a sensitivities review.

22.1 Summary

As previously discussed in Chapter 21 (*Capital and Operating Costs*), the economic evaluation on the Project considered all capital and development costs to re-establish Springer Tungsten Mine as a modern longhole mine. This includes capital and capitalized development costs to establish ramp connected levels, and adit access. The mine plan calls for two separate mining operations: the existing GE mine in Sutton on the eastern side of the property, and a new smaller high grade mine at O’Byrne on the western side of the property. The mine life presented in all economics is defined by the updated NI 43-101 resource estimate, and limited to 5 years of production. Project performance is summarised in Table 22-1.

Table 22-1: Project Performance Summary

Key Performance Measures Summary	Financial Result (US\$)
Capital Cost (millions)*	\$29.8
Average Annual Revenue (millions)	\$43.2
Average Annual Operating Cost (millions)	\$25.0
Average Operating Cost (\$/MTU)	\$186
Average Annual EBITDA (millions)	\$17.8
Constant Dollar NPV (8%)	\$22.8
Constant Dollar NPV (10%)	\$20.1
internal Rate of Return (IRR)	47%
Price Assumption - APT Equivalent/MTU (Euro Quote)	\$400
*NOTE: Includes working capital and contingency	

22.2 Cash Flow Model – Financial Summary

The financial returns, as defined by the cash flow model for a 5 year production plan are summarized in Table 22-2.

The cash flow model uses a conventional discount method, and is constructed with annual revenue and cost inputs, annual capital cost inputs, and assumes no contractor participation or leased equipment, and no leverage (debt). The economics are presented on a 100% equity basis. The annual cash flows are discounted back to ‘time zero’, specifically January 1, 2013. Revenue and production begins in 2014.

Table 22-2: Financial Returns Summary (Pre-tax & After-tax)

Financial Returns Summary Constant Dollar Net Present Value (NPV) (millions)	Pre-Tax Return (US\$M)	After-Tax Return (US\$M)
6% Discount	\$28.6	\$25.8
8% Discount	\$25.3	\$22.8
10% Discount	\$22.4	\$20.1
12% Discount	\$19.7	\$17.6
Internal Rate of Return (IRR) (%)	49%	47%
Payback (years)	2.0	2.0
Price Assumption - APT Equivalent/MTU	\$400	\$400

22.3 Capital Cost Summary

The capital cost estimate to restart the Springer mine is US\$29.9 million, over a two year restart plan. This estimate includes all costs to rehabilitate the existing tungsten mill and surface facilities, add circuits required in the mill to produce and package a tungsten concentrate (65% WO₃), purchase used underground mining equipment (60% of new catalog prices) and meet all environmental standards with respect to tailings pond performance, for the full 5 year term of the PEA. In addition, the capital cost estimate includes a 10% contingency on equipment cost estimates (\$2.0 M), and a working capital estimate of \$3.0 M (45 days operating expenses). The financial model cash flow also includes \$3.0 M in pre-production expenses to income plus US\$13.5 M million in sustaining capital over the total 5 year PEA term, mostly underground mine development work.

Details of the elements of restart capital are presented in Table 22-3 below.

Table 22-3: Project Restart Capital Cost Estimate (plus sustaining capital)

Capital Spending Summary (2 years)	Capitalized Restart Cost (US\$M)
<u>Mill Refurbish Capital</u>	
Gravity Circuits	\$3.00
Molybdenum Flotation Circuits	\$1.15
Rehab Mill & Complete Automation Project	\$2.00
Product Finish & Packaging	\$0.75
Sub-total Mill Capital	\$6.90
<u>Surface Facilities Refurbish Capital</u>	
Tailings Pond Lining & Piping	\$3.00
Nevada State Environmental Bond*	\$2.00
Shaft/Hoist/Cement B-Fill Rehab	\$3.20
Shaft De-water Cost	\$0.50
Sub-total Surface Facilities Capital	\$8.70
<u>Underground Mine Capital</u>	
Underground Mine Equipment (used gear)	\$3.80
Sutton Adit Development	\$1.00
O'Byrne Adit Development	\$1.50
Sutton Drift & Raise Development	\$1.97
O'Byrne Drift & Raise Development	\$1.00
Sob-Total U/G Mine Capital	\$9.27
Contingency (10% of Equipment Capital)	\$2.00
Working Capital	\$3.00
Total Restart Capital (2 years)	\$29.87
Sustaining Capital (5 years)	\$13.50
*NOTE: Reclamation bond is \$3.9M, 50% insurance guarantee assumption	

22.4 Key Operating Parameters

The cash flow inputs reflect the key operating assumptions described in Table 22-4.

Table 22-4: Key Operating Parameters

Key Operating Parameters and Assumptions	PEA Assumption/Result
General	
Life of Mine (limited by NI 43-101 Resource)	5 years
Tungsten Grade (5 year average)	
Sutton Mine	0.40%
O'Byrne Mine	0.76%
Combined Mine Average	0.43%
PEA APT Price Assumption (US\$/MTU)	\$400
PEA WO ₃ Concentrate Price Assumption (US\$/MTU)	\$320
Tax Rate-Nevada Resource Tax	5%
Tax Rate-Federal Income Tax	34%
Production Assumptions	
Throughput -Springer Mill (tpa)	422,600
Throughput -Springer Mill (tpd)	1,200
WO ₃ Average Annual Production (contained WO ₃ tons)	1,488
WO ₃ Average Annual Production (MTU)	134,960
Mining Cost/ton (US\$)	\$39.87
Total Cost/ton (US\$)	\$59.19
Mill Recovery Assumption (year 2 onwards)	82%
Mill Availability Assumption (year 2 onwards)	89%
Cash Modeling Assumptions	
CapEx in discount year #	1 and 2
Production in discount year #	2
Working Capital/Sustaining Capital	yes
Contingency	10%
Escalation of Costs or Prices	none
First Discount Year	2013

22.5 Project Scope

The cash model is based on a 5 year mine plan to produce tungsten concentrates as 65% WO₃. The mine restart plan calls for a 12 month concurrent permitting, ROW, and construction program in 2013, with de-water beginning in month 6, and full production commencing in January 2014. The PEA has production scheduled for a total of 4.8 years, and cash flows modeled for 6 years including the initial start-up year.

22.6 100% Basis Presentation

The Project is presented on a 100% basis, as EMC holds 100% ownership rights to the Springer assets and mineral rights, subject to royalties on certain minor mineral parcels which are not material to the project economics.

22.7 Basis of Revenue Estimates

Sales revenues are based on 24 month trailing average European delivery Metal Bulletin quoted Ammonium Paratungstate (APT) prices, which is the form in which tungsten is typically sold to manufacturing customers or tungsten carbide converters. Springer will sell a 65% WO₃ concentrate, which is assumed to sell for 80% of its contained tungsten in concentrate. APT prices are typically quoted in metric ton units (MTUs) and US dollars, either FOB Europe or FOB China. An MTU is equal to 22.04 lb of contained tungsten, or 1/100th of a metric ton. An allowance for freight costs has been taken in the cash flow estimates.

22.8 Cost and Production Price Escalation

The cash flow model is a constant dollar model, and no inflation is assumed in costs, revenues, or margins. NPV discount rates should be viewed as constant dollar rates as well.

22.9 Currency and Exchange Rate Assumptions

The cash flow model is expressed in United States dollars (US\$), as to costs and revenues. The project does not expect to incur expenses or receive revenues in any other currency than US\$.

22.10 Mine Closure and Salvage Costs

No costs have been included at the end of the 5 year cash flow model for mine closure or salvage. The Nevada State environmental bond of \$3.9 M represents a worst-case shut-down cost for the facility, and the cash flow model assumes that the cash collateralized \$2 M portion of this estimate would likely reclaim most of the property, particularly if salvage costs on the mill and mining equipment were applied to any unfunded reclamation and dismantling costs.

22.11 Taxes and Royalties

The property is burdened by two royalty-holders who have over-riding Net Smelter Returns (“NSR”) of 5% of revenues, net of any freight on CIF sales. This NSR is included in the cash flows and economics.

These NSR’s are payable on small mineral license parcels inside the general mineral license area owned or controlled by Springer Mining Company. The tonnage of tungsten resource and grade on these properties is unknown, and certain advance royalties have been paid since 2008. The PEA assumes that 10,000 tons of ore per year is mined from these properties collectively, and that average ROM grades generate a \$50,000 annual royalty payable. Prior advance royalty payments serve as credits against future recoveries from these claims, and the PEA further assumes that royalties will only be payable on years 4 and 5 in the cash flow analysis.

The State of Nevada has a net proceeds tax payable on all mining business, which is technically considered a property tax. The net proceeds tax rate is 5% of earnings before interest and federal tax (“EBIT”), and while depreciation deductions are allowed, depreciation schedules are restricted to a 20 year straight line convention.

A US corporate income tax applies to Springer taxable income (“EBT”) which is currently 34% on pre-tax income under \$10 M. This tax rate assumption was used in the cash flow analysis for the PEA. The Nevada State tax is deductible for federal tax calculation purposes.

Springer Mining Company has considerable net operating loss carry-forwards (“NOLs”) as a result of previous restart spending in the 2006-2011 period that were taken as income statement losses. These prior period losses can be used to offset taxable income in a return to profitability and have been assumed usable for that purpose in the PEA cash flow model. Further to costs written off to income, there also remains a significant prior investment in capitalized development work and assets from the 2006-2008 period that have been assumed can be written off over the 5 year PEA life in the cash model. As a result of utilizing these prior period investments as depreciable assets, the cash model shows US corporate tax payable beginning in the second half of year 3 of the total 5 year mine life cash model. Nevada resource taxes are paid in every operating year in the model and prior period NOLs cannot be utilized in that taxable income calculation.

Payroll taxes and other employee taxes and burdens are assumed as a part of operating costs in each year. Mineral royalties are payable to the State of Nevada annually; they total approximately \$50,000 on the un-patented mining claims held by Springer Mining Company.

22.12 Select Annual Output Levels and Financial Results

Mining operations are scheduled to begin at both the Sutton and O’Byrne mine locations, although O’Byrne is severely limited as to mineable tonnage, based on the NI 43-101 resource available. As a result, while Sutton operates for approximately 4.8 years, O’Byrne operates for only 1.6 years. Stockpile draw downs of 40,000 tons extend product output levels slightly, and

are shown in the table below as Sutton production in the tungsten (MTU) category, as they were produced there historically, thus carry similar grade.

Table 22-5: Annual Project Production Levels, EBITDA and Cash Flow

Annual Project Production Levels, EBITDA, and Cash Flow							
	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Annual Average
Annual Mine Production (tons)*							
Sutton I & II Mines		300,652	384,169	437,751	439,165	352,033	382,754
O'Byrne Mine		105,259	54,125				79,692
Total		405,911	438,294	437,751	439,165	352,033	414,631
Annual Tungsten Production (MTU)							
Sutton I & II Mines		78,394	124,281	128,954	135,252	124,645	118,305
O'Byrne Mine		53,196	30,070				41,633
Total		131,590	154,350	128,954	135,252	124,645	134,958
Annual Project EBITDA*	\$ (3,000,000)	\$ 18,579,980	\$ 21,002,357	\$ 13,808,992	\$ 16,046,249	\$ 19,600,184	\$ 17,807,552
Annual Project Cash Flow*	\$ (21,900,000)	\$ 7,075,821	\$ 15,844,399	\$ 9,528,153	\$ 11,545,106	\$ 15,135,620	\$ 11,825,820
*Notes--milled tons slightly higher than mined tons due to stockpile drawdowns during period							
Average annual EBITDA and Cash Flow are shown as 5 year averages beginning in production year 1, excluding investment year zero.							

22.13 Sensitivities to Key Variables

Project economic risks were assessed and can be seen below. The risks were segregated into three categories, as follows:

- Sensitivity to fluctuations in tungsten prices (Table 22-6), defined as APT pricing, Euro quote in metric ton units (MTU's),
- Sensitivity to key financial assumptions, specifically total production cost (mining/milling/G&A), and restart capital cost estimates, as shown in Table 22-7, below, and
- Sensitivity to production and operating parameters, such as mill tungsten recoveries, and resource head grade assumptions, as shown in Table 22-8, below.

Table 22-6: Tungsten Price Sensitivities

Sensitivity to Tungsten APT Price Changes		Constant Dollar NPV (8%i) (US\$M)	Constant Dollar IRR (%)
APT Price (US\$/MTU)	Product Price (US\$/MTU)		
\$300	\$240	NEG	N/A
\$350	\$280	\$6.1	14%
\$400	\$320	\$22.8	47%
\$450	\$360	\$35.6	68%
\$500	\$400	\$48.3	86%
\$550	\$440	\$60.9	104%
NOTE: Assumes CIF WO3 concentrate price is 80% of Euro APT price per MTU			

Table 22-7: Financial Parameter Sensitivities

Sensitivity To Select Financial Parameters	Constant \$ NPV (8%) (US\$M)	Constant \$ IRR (%)
Base Case Result	\$22.8	47%
<u>Production Cost Sensitivity (US\$ 59.19/ton)</u>		
Operating Cost Increase (10%)	\$16.4	36%
Operating Cost Decrease (10%)	\$28.8	57%
<u>Restart Capital Cost Sensitivity (US\$29.9M)</u>		
Higher Startup Capital Cost (10%)	\$20.1	41%
Lower Startup Capital Cost (10%)	\$25.5	54%

Table 22-8: Operating Parameter Sensitivities

Sensitivity To Select Operating Parameters	Constant \$ NPV (8%) (US\$M)	Constant \$ IRR (%)
Base Case Result	\$22.8	47%
<u>Mill Recoveries (82%)</u>		
Mill Recovery Decrease (5% to 78%)	\$18.6	41%
Mill Recovery Increase (by 5% to 86%)	\$26.8	53%
<u>Tungsten Ore Grade (0.43%)</u>		
Lower Tungsten Ore Grade (by 5% to 0.41%)	\$17.4	37%
Higher Tungsten Ore Grade (by 5% to 0.45%)	\$28.0	56%

23.0 ADJACENT PROPERTIES

There are no materially significant adjacent properties

24.0 OTHER RELEVANT DATA AND INFORMATION

All relevant data and information is disclosed in this report.

25.0 INTERPRETATION AND CONCLUSIONS

The project is hampered by a small, NI 43-101 compliant resource and thus a short mine life, but does make an economic return on restart capital at current tungsten prices. Underground production and operations will present opportunities to conduct exploration for additional resources that may extend mine life. Mining will also present opportunities to efficiently attempt to validate existing historical data that has otherwise not been useable in the current NI 43-101 resource estimate.

Molybdenum has historically been removed from the scheelite concentrate as a deleterious element. It has not been considered as a co-product that contributes to project revenue in this PEA (per the CSA Staff Notice dated August 16th 2012) because a NI 43-101 molybdenum resource has not been established on the property. Mining operations underground are likely to create an opportunity to do exploration and assay work on molybdenum that could create a moly resource in the future. If saleable quantities and grades of MoS₂ are captured in the mill, it is likely that these co-products will have marketable value. The flowsheet and capital spend estimates do indicate that SMC intends to attempt to capture this opportunity.

26.0 RECOMMENDATIONS

Consideration should be given to developing a NI 43-101 mineral resource estimate for molybdenum, corresponding to tungsten resources:

- Existing molybdenum assay values have been entered into the Springer Microsoft Access® database. This effort should be continued and managed to achieve a moly resource if possible.
- Since molybdenum must be removed from the scheelite concentrates, where it is considered a “deleterious” element, consideration should be given as to whether there is any economic value to capturing a separate molybdenum (MoS₂) concentrate product.

Investigate whether early testing applications of the Kelsey Jig can be applied to tungsten resources to make a saleable concentrate to provide immediate cash flow during the second half of the start-up year zero:

- An existing 40,000 ton surface resource stockpile from Sutton may be a candidate for concentration and flotation testing in the mill to produce saleable product quickly.
- Historic tailings are in the vicinity of the mill, reportedly grading 0.2% scheelite, and may be recoverable into product, depending on size fractions and concentration techniques applied.

Other Recommendations for optimization that should be undertaken in the start-up year zero:

- Perform test work on tailings samples to determine the optimum size fraction and cement content required for backfill.
- Convert all historical mine maps into the current state plane grid.

We believe that these tasks can be accomplished by the existing or appointed engineering staff within the operational budget established earlier in this report.

In addition to the above, the company should evaluate, at some later date, the potential economic benefits of conducting the underground sampling and underground and surface drilling required to re-establish the historic resource in Sutton I, II & II to an NI 43-101 standard to capture value in future economic studies and shareholder value.

- This evaluation can only be conducted after the existing underground facilities are dewatered and accessible.

- The cost/benefit analysis should consider the possibility that the work would add resources and increase confidence in current resources to the extent that the resource base approaches the historic resource base in the Sutton Mine.

27.0 REFERENCES

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28.0 EFFECTIVE DATE AND CERTIFICATES

The effective date of publication of this technical report is August 20, 2012.

“ORIGINAL SIGNED AND SEALED BY AUTHOR”

Keith McCandlish, P.Geol
Managing Director, Associated Geosciences Ltd., Calgary, Alberta, Canada

“ORIGINAL SIGNED AND SEALED BY AUTHOR”

Mark Odell, P.E.
Practical Mining LLC, Elko, NV, USA.

Following are signed and dated Certificates of Qualifications of the persons responsible for the report.

28.1 Keith M^cCandlish

- (a) I, Keith M^cCandlish, P.Geol., P.Geo., am the Managing Director of Associated Geosciences Ltd. of Suite #415, 708-11th Avenue S.W., Calgary, Alberta, CANADA, T2R 0E4.
- (b) I am the Project Technical Director and a co-author of the technical report entitled:

*Preliminary Economic Assessment of the Springer Tungsten Mine,
Pershing County, Nevada, USA.*

with an effective date of August 20th, 2012 and an issue date of September 14th, 2012, prepared for:

EMC Metals Corp.
1430 Greg Street, Suite 501
Sparks, Nevada, USA 89431

- (c) I am a registered Professional Geologist (P.Geol.) with the Association of Professional Engineers and Geoscientists of Alberta (APEGA-Member Number 45717) and am Licensed as a Professional Geoscientist (P.Geo.) by the Association of Professional Engineers and Geoscientists of British Columbia (APEGBC-Licensee Number 31222) and the Northwest Territories Association of Professional Engineers and Geoscientists (NAPEG-Registration Number L2528).

I have thirty years of geological and engineering experience in minerals, oil sands/heavy oil, precious stones, coal and industrial minerals. I have worked on the exploration, development and assessment of metasomatic tungsten and magnetite skarns associated with copper projects across the world with relevant experience in Canada, Chile, Mexico, Philippines, Portugal, Peru, Spain, and the United States. Typical projects include the following:

- Due diligence evaluation and owner's technical representative at the Panasqueira Mine near Covilhã, Castelo Branco, Portugal.
- Tyler Resources Inc. Bahuerachi copper porphyry (and associated magnetite skarns) project in Chihuahua State, Mexico,
- Navan Resources Chelopech copper-gold and Almagrera copper-zinc underground mines in Bulgaria and Spain, respectively,
- Copper Fox Metals Inc. Schaft Creek copper porphyry project in northwestern British Columbia,

- Carmen Copper Corporation copper porphyry project on Cebu Island in the Philippines,
 - Copper bearing hydrothermal breccias of the Cabeza de Vaca Deposit, Copiapo, Chile,
 - Marcobre iron-oxide copper gold (IOCG) deposit in San Juan de Marcona, Peru,
- (d) I have read the definition of “Qualified Person” set out in National Instrument 43-101 and certify that by reason of my education, affiliation with a Professional Association(s) and past relevant work experience, I fulfill the requirements to be a “Qualified Person” for the purposes of NI 43-101.
- (e) My most recent personal inspection of the property which is the subject of this report occurred from April 11th, 2012 to April 13th, 2012.
- (f) I am responsible for all aspects of the technical report.
- (g) I am independent of the Company as described in Section 1.5 of National Instrument 43-101.
- (h) I have read the Canadian Securities Administrator’s National Instrument 43-101 (including the most recent CSA Staff Notice dated August 16th, 2012) and the technical report has been prepared in compliance with this instrument.
- (i) At the effective date of the report, August 20th, 2012, to the best of my knowledge, information and belief, the technical report contains all scientific and technical information that is required to be disclosed to make the technical report not misleading.

Dated this 14th day of September, 2012 at Calgary Alberta, Canada.

“ORIGINAL SIGNED AND SEALED BY AUTHOR”

Keith M^cCandlish, P.Geol., P.Geo.

28.2 Mark A. Odell

- (a) I, Mark A. Odell, P.E. am a consulting mining engineer at Practical Mining LLC, 495, Idaho Street, Suite 205, Elko, NV 89801.
- (b) I am a co-author of the technical report entitled:

*Preliminary Economic Assessment of the Springer Tungsten Mine,
Pershing County, Nevada, USA.*

with an effective date of August 20th, 2012 and an issue date of September 14th, 2012, prepared for:

EMC Metals Corp.
1430 Greg Street, Suite 501
Sparks, Nevada, USA 89431

I am a Registered Professional Mining Engineer in the State of Nevada (#13708), and a Registered Member (#2402150) of the Society for Mining, Metallurgy and Exploration (SME).

- (c) I am a graduate of The Colorado School of Mines, Golden, Colorado with a Bachelor of Science Degree in Mining Engineering in 1985. I have practiced my profession continuously since 1985.
- (d) Since 1985, I have been engaged in engineering and operational capacities for base metal, precious metal and coal mines in both surface and underground environments in North America, Africa and Asia.
- (e) I have read the definition of “Qualified Person” set out in National Instrument 43-101 and certify that by reason of my education, affiliation with a Professional Association(s) and past relevant work experience, I fulfill the requirements to be a “Qualified Person” for the purposes of NI 43-101.
- (f) I am a contract consulting engineer for the Issuer and landowner EMC Metals Corp. and have inspected the Springer Tungsten Mine from April 11 – 13, 2012. I last visited the Springer Tungsten Mine July 11, 2012.
- (g) I am responsible for preparing the Section 13, Section 16, Section 17, and Section 21 of the technical report.
- (h) I am independent of the Issuer within the meaning of Section 1.5 of NI 43-101.

- (i) I was paid a daily rate for engineering consulting services performed at the Springer Tungsten Mine and do not have any other interests relating to the project. I do not have any interest in adjoining properties in the Springer Tungsten Mine area.
- (j) I have read the Canadian Securities Administrator's National Instrument 43-101 (including the most recent CSA Staff Notice dated August 16th, 2012) and the technical report has been prepared in compliance with this instrument.
- (k) I consent to the filing of the Technical Report with any stock exchange and other regulatory authority and any publication by them for regulatory purposes, including electronic publication in the public company files on their websites accessible by the public, of the Technical Report.
- (l) At the effective date of the report, August 20th, 2012, to the best of my knowledge, information and belief, the technical report contains all scientific and technical information that is required to be disclosed to make the technical report not misleading.

Dated this 14th day of September, 2012 at Elko, Nevada.

“ORIGINAL SIGNED AND SEALED BY AUTHOR”

Mark A. Odell, P.E.

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