

## APPENDIX B

This appendix contains a table of the exhibit contents on display, where the items were sourced, and the value of each item. This table also indicates whether each item was purchased, donated, loaned, or contributed from the museum’s collection. For the minerals in the museum’s collection, a value was estimated based on current market value of a similar specimen; the source of such value is notated in the table. The items are generally organized based on their positions within the exhibit display – minerals to ore processing to end products.

As highlighted in the report and in the table below, an estimated 88% percent of the items on display were donated, loaned or already in the museum’s collection. These contributions plus donated time and expertise total to a conservative value of \$29,508. That amount would certainly be higher if the value of 31 out of 75 items in the exhibit had a measurable value. Some of these items are ore samples, research samples, demo phones, dead batteries; such materials are often priceless and can only be attained from strategic partnerships. The estimated total cost of the exhibit is valued at \$87,313 which includes additional items such as cases, installation costs, and housing/staging materials.

Category	Item	Source	Cost	donation, loan, or discount value	Additional Details	purchased count	museum collection/ loaned count	source for estimated value
REE Minerals	Aeschynite	Kent Havens		\$35.00	Clora May Pegmatite, Trout Creek Pass Pegmatite District, Chaffee County, Colorado, USA		1	
	Allanite	museum collection		\$700.00	Olden Township, Frontenac County, Ontario, Canada (estimated value)		1	<a href="http://www.le-comptoir-geologique.com/allanite-en-allanite-dissakisite-ref-c41-01.html">http://www.le-comptoir-geologique.com/allanite-en-allanite-dissakisite-ref-c41-01.html</a>

Category	Item	Source	Cost	donation, loan, or discount value	Additional Details	purchased count	museum collection/ loaned count	source for estimated value
REE Minerals (Continued)	Apatite	museum collection		na	Hugo Pegmatite, Black Hills, South Dakota, USA		1	
	Bastnäsite	Crystal Classics	\$7,000.00	\$200.00	Warsak Complex, Zagi Mountains, Hameed Abad Kafoor Dheri, Khyber Pakhtunkhwa, North-West Frontier Province, Pakistan (discounted)	1		
	Donnayite	John Betts Fine Minerals	\$150.00		Poudrette Quarry, Mont Saint-Hilaire, Quebec, Canada	1		
	Eudialyte	Russian Minerals Co.	\$200.00	\$100.00	Kukisvumchorr Mt., Khibiny, Kola Peninsula, Russia (discounted)	1		
	Euxenite	museum collection		na	Alto Ligonha District (probably), Zambezia Province, Mozambique		1	
	Fluorite (Y-bearing)	The Collectors Edge Minerals, Inc.	\$575.00	\$375.00	Erongo Mt., Usakos-Omaruru District, Namibia (discounted)	1		
	Monazite	Sherm Marsh		\$1,000.00	Golden Gate Canyon, Jefferson County, Colorado, USA		1	

Category	Item	Source	Cost	donation, loan, or discount value	Additional Details	purchased count	museum collection/ loaned count	source for estimated value
REE Minerals (Continued)	Monazite	museum collection		\$100.00	Ambatofosikely Pegmatite, Betafo District, Vakinankaratra Region, Antananarivo Province, Madagascar (estimated value)		1	<a href="http://www.minfind.com/mineral-303591.html">http://www.minfind.com/mineral-303591.html</a>
	Parisite	John Betts Fine Minerals	\$150.00		Snowbird Mine, Fish Creek, Alberton Area, Mineral County, Montana, USA	1		
	Parisite		\$150.00		Muzo Mine, Vasquez-Yacopi District, Boyaca Dept., Colombia	1		
	Parisite with aegirine	The Collectors Edge Minerals Inc.	\$16,500.00	\$8,500.00	Mount Malosa, Zomba-Malosa Complex, East African Rift System, Malawi (discounted)	1		
	Xenotime	Crystal Classics	\$220.00		Novo Horizonte, Bahia, Brazil	1		
	Zircon (Y-bearing)	The Collectors Edge Minerals Inc.	\$750.00	\$500.00	Mount Malosa, Zomba-Malosa Complex, East African Rift System, Malawi (discounted)	1		

Category	Item	Source	Cost	donation, loan, or discount value	Additional Details	purchased count	museum collection/ loaned count	source for estimated value
REE Minerals (Continued)	Zircon Pseudomorph after calcite (?), aegirine, and microcline	The Collectors Edge Minerals, Inc.	\$3,250.00	\$1,750.00	Mount Malosa, Zomba-Malosa Complex, East African Rift System, Malawi (discounted)	1		
	Zircon with arfvedsonite and microcline		\$1,200.00	\$800.00	Mount Malosa, Zomba-Malosa Complex, East African Rift System, Malawi (discounted)	1		
Li-minerals	Elbaite in Lepidolite	museum collection		\$150.00	Pala District, San Diego, California, USA (estimated value)		1	<a href="http://www.minfind.com/mineral-393854.html">http://www.minfind.com/mineral-393854.html</a>
	Lepidolite			\$125.00	Minas Gerais, Brazil (estimated value)		1	<a href="http://www.minfind.com/mineral-333869.html">http://www.minfind.com/mineral-333869.html</a>
	Lithiophyllite			na	Branchville Quarry, Redding, Fairfield County, Connecticut, USA		1	
	Montebrasite	John Betts Fine Minerals	\$1,277.50	\$1,277.50	Telino Mine, Linopolis, Divino de Laranjeras, Minas Gerais, Brazil	1		
	Spodumene	museum collection		\$3,250.00	Pech, Nuristan Province, Afghanistan (estimated value)		1	<a href="http://www.minfind.com/mineral-92491.html">http://www.minfind.com/mineral-92491.html</a>

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Te-minerals	Calaverite with fluorite	museum collection		\$2,650.00	Cripple Creek District, Teller County, Colorado, USA (estimated value)		1	<a href="http://www.minfind.com/mineral-143879.html">http://www.minfind.com/mineral-143879.html</a>
	Sylvanite	museum collection		\$800.00	Cresson Mine, Cripple Creek District, Teller County, Colorado, USA (estimated value)		1	<a href="http://www.minfind.com/mineral-211206.html">http://www.minfind.com/mineral-211206.html</a>
	Tellurium	museum collection		\$131.00	Cananea District, Municipio de Cananea, Sonora, Mexico (estimated value)		1	<a href="http://www.minfind.com/mineral-394435.html">http://www.minfind.com/mineral-394435.html</a>
	Tellurium	museum collection		\$2,400.00	Boulder County, Colorado, USA (estimated value)		1	<a href="http://www.minfind.com/mineral-111871.html">http://www.minfind.com/mineral-111871.html</a>
	Tellurium	museum collection		\$1,500.00	Mountain Lion Mine, Magnolia District, Boulder County, USA (estimated value)		1	<a href="http://www.minfind.com/mineral-111870.html">http://www.minfind.com/mineral-111870.html</a>
REE Ore Materials	Carbonatite Ore	USGS		na	Mtn Pass, CA Sulfide Queen		1	
	Carbonatite Ore			na	Mtn Pass, CA Birthday Vein		1	
	Weathered Carbonatite Ore	John Ray, Rare Element Resources		na	Bear Lodge Wyoming		1	

Category	Item	Source	Cost	donation, loan, or discount value	Additional Details	purchased count	museum collection/ loaned count	source for estimated value
Li-ore materials	Spodumene Ore - Spodumene, with Quartz and Alabaite	Rockwood Lithium		\$100.00	Kings Mountain, North Carolina, USA; 2 ore samples total, plus book about Lithium		3	
REE Metallurgical Process Samples	Rare earth concentrate (6.2%)	Rare Element Resources		na			1	
	REE/Th oxalate precipitate (49.3%REE)			na			1	
	Th-free 99.99%REO concentrate			na			1	
	RE-oxide, Th-free, Ce-reduced (99.99%REE)			na			1	
	Ce-oxide (99.7% CeO)			na			1	
REE-oxides	Yttrium oxide	Dr. Bajendra Mishra and Mark Strauss, Kroll		\$7.00			1	
	Europium oxide	Institute for Extractive Metallurgy, CSM		\$75.00			1	
	Dysprosium Oxide		\$121.00		Additional 25g dysprosium oxide was ordered from Alfa Aesar	1	1	

Category	Item	Source	Cost	donation, loan, or discount value	Additional Details	purchased count	museum collection/ loaned count	source for estimated value
REE-oxides (Continued)	Neodymium Oxide	Dr. Bajendra Mishra and Dr. Alyaa Elramady, Kroll Institute for Extractive Metallurgy, CSM		\$99.30			1	
	Terbium oxide		\$130.00	\$150.00	Additional 10g terbium oxide was ordered from Alfa Aesar	1	1	
Rare earth Phosphates and Acetates	Neodymium Sulfate	Stephen Zahony		\$100.00	lab grown crystal		1	
	Samarium Sulfate			\$100.00			1	
	Praseodymium Sulfate			\$100.00			1	
	Europium Sulfate			\$100.00			1	
	Erbium Acetate			\$100.00			1	
REE phosphors	Blue Phosphor	Sigma Aldrich	\$69.30		Barium magnesium aluminate: Eu 25g 99.99%	1		
	Green Phosphor		\$95.30		Cerium magnesium aluminate: Tb 25g 99.99%	1		
	Red Phosphor		\$104.50		Yttrium oxide : Eu 25g 99.99%	1		
	Trichromatic mixture		\$81.30		25g 99.99%	1		

Category	Item	Source	Cost	donation, loan, or discount value	Additional Details	purchased count	museum collection/ loaned count	source for estimated value
Substitutes	Phosphate Rock Sample	Patrick Zhang, FIPR		\$280.00	Florida phosphate mining and beneficiation samples		1	
	Clay Sample				Florida phosphate mining and beneficiation samples		1	
	Phospho-gypsum Sample				Florida phosphate mining and beneficiation samples		1	
	Sand Sample				Florida phosphate mining and beneficiation samples		1	
	Phosphate Pebble Sample				Florida phosphate mining and beneficiation samples		1	
	Additional Samples (Overburden, Matrix, Diammonium Phosphate, Fertilizer, Animal Feed)				Florida phosphate mining and beneficiation samples		5	
Recycling Research Samples CFLs	Crushed CFL fines	Dr. Bajendra Mishra and Dr. Patrick Eduafo, Kroll Institute for Extractive Metallurgy CSM		na	from PhD research		1	
	Ce,La oxide precip			na			1	
	Y, Eu oxide precip			na			1	
	Te, Ce, La oxide precip			na			1	

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Recycling Research Samples Magnets	SmCo magnet swarf from US manufacturing plant	Ikenna Nlebedim, Ames Laboratory		na	from Ames Lab research		1	
	Cobalt salt			na			1	
	Samarium salt			na			1	
	Banded Permanent Magnet			na			1	
	Cobalt Oxide			na			1	
	Nd-Fe-B magnet swarf			na			1	
	Didymium Oxide			na			1	
Te-materials	Te powder	Rockwood Lithium		\$18.44	1lbs		1	
	Te tablets			\$3.68	0.2lbs		1	
	Te ingots			\$120.31	4 ingots; 3.46lbs total		1	

Category	Item	Source	Cost	donation, loan, or discount value	Additional Details	purchased count	museum collection/ loaned count	source for estimated value
Product – Light bar	LED bulbs	Home Depot	\$22.97		2 60W replacement		1	
	CFL bulbs		\$6.00		1 60W replacement		1	
	Halogen bulbs		\$10.97		4 60W replacement		1	
	Incandescent bulbs	Maureen Allen	\$1.00		2 60W bulbs, Dollar Store		1	
	Metering System	Voltking Electric		\$115.00	Elite Wireless Energy Monitor from efergy (www.efergy.com)		1	
Product - Tech and Storage	Li-ion computer battery	Mandi Hutchinson		na	from old computer		1	
	Li-ion cell phone battery			na	found on sidewalk		1	
	Demo Smartphone	Best Buy		na			1	
	Hard drive disk	Matthais Johnson		na	2 hard drives, taken apart		2	
	Magnet Orb	Rattlesnake Magnets	\$39.00			1		

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Product - Solar PV	CdTe thin film sample	Tim Ohno lab, CSM		na	research sample		1	
	CdS thin film sample			na	research sample		2	
	CdTe + CdCl thin film sample			na	research sample		1	
	ZnTe:Cu thin film sample			na	research sample		1	
	CdTe thin film research samples with Au conductor			na	research sample		3	
	CIGS panel	EPRI, Joe Beach, Cara Libby		\$46.50	155W		1	
	CdTe panel	First Solar, Gang Xiong		\$150.00	87.5W		1	<a href="http://www.freecleansolar.com/87W-solar-panel-First-Solar-FS-387-CdTe-p/fs-387.htm">http://www.freecleansolar.com/87W-solar-panel-First-Solar-FS-387-CdTe-p/fs-387.htm</a>

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Product- Wind/ Magnets	Demo Wind Turbine with Nacelle cut-out	Primus Windpower		\$1,500.00			1	
Basic Components	Video Display Stand with Speakers	Blue Goose, Inc.	\$3,611.00			1		
	Dell Tablet, Monitor and Components	Dell	\$1,193.70			1		
subtotal			\$36,908.54	\$29,508.73	\$66,417.27	9.00	66.00	75.00
<b>total cost</b>	<b>\$66,417.27</b>		56%	44%	total cost	12%	88%	total items
			<i>percent of total cost</i>			<i>percent of total items</i>		