



Unearthing Australia's First Caesium Mine

David Crook, Managing Director
MINING AND EXPLORATION
Noosa, Queensland 18-20 July 2018



27
Co

55
Cs

3
Li

28
Ni

73
Ta



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Corporate Overview

Capital Structure

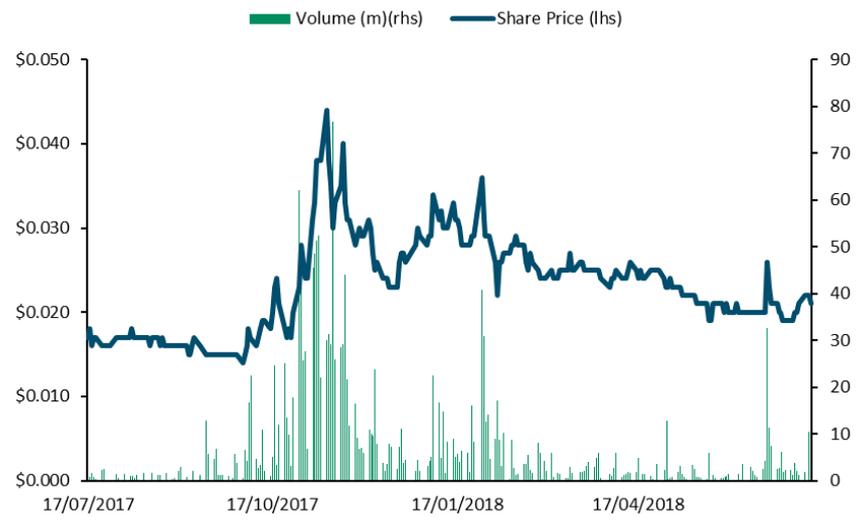
Share Price	\$0.021
Shares Outstanding (m)	1,449
Market Capitalisation	\$29
Cash (\$m) (approx. 31/03/2018)	\$3.76
Debt (\$m)	0.0
Options Outstanding (listed/unlisted(m))	44.3/16

Board of Directors

Craig McGown	Non-Executive Chairman
David Crook	Managing Director
Allan Trench	Non-Executive Director
Wayne Spilsbury	Non-Executive Director
Tim Spencer	CFO/Company Secretary



12 Month Share Price chart



Caesium is a Heavy Alkali Metal



1 IA 1A	1 H Hydrogen 1.008
3	Li Lithium 6.941
11	Na Sodium 22.990
19	K Potassium 39.098
37	Rb Rubidium 84.460
55	Cs Cesium 132.905
	Fr Francium 223.020

Periodic Table of the Elements

1 IA 1A	2 IIA 2A											13 IIIA 3A	14 IVA 4A	15 VA 5A	16 VIA 6A	17 VIIA 7A	18 VIIIA 8A
1 H Hydrogen 1.008	2 He Helium 4.003											5 B Boron 10.811	6 C Carbon 12.011	7 N Nitrogen 14.007	8 O Oxygen 15.999	9 F Fluorine 18.998	10 Ne Neon 20.180
3 Li Lithium 6.941	4 Be Beryllium 9.012											13 Al Aluminum 26.982	14 Si Silicon 28.086	15 P Phosphorus 30.974	16 S Sulfur 32.066	17 Cl Chlorine 35.453	18 Ar Argon 39.948
11 Na Sodium 22.990	12 Mg Magnesium 24.305	3 III B 3B	4 IV B 4B	5 V B 5B	6 VI B 6B	7 VII B 7B	8 VIII 8	9 VIII 8	10 VIII 8	11 IB 1B	12 IIB 2B	13 Al Aluminum 26.982	14 Si Silicon 28.086	15 P Phosphorus 30.974	16 S Sulfur 32.066	17 Cl Chlorine 35.453	18 Ar Argon 39.948
19 K Potassium 39.098	20 Ca Calcium 40.078	21 Sc Scandium 44.956	22 Ti Titanium 47.88	23 V Vanadium 50.942	24 Cr Chromium 51.996	25 Mn Manganese 54.938	26 Fe Iron 55.933	27 Co Cobalt 58.933	28 Ni Nickel 58.693	29 Cu Copper 63.546	30 Zn Zinc 65.39	31 Ga Gallium 69.723	32 Ge Germanium 72.61	33 As Arsenic 74.922	34 Se Selenium 78.972	35 Br Bromine 79.904	36 Kr Krypton 83.80
37 Rb Rubidium 84.464	38 Sr Strontium 87.62	39 Y Yttrium 88.906	40 Zr Zirconium 91.224	41 Nb Niobium 92.906	42 Mo Molybdenum 95.95	43 Tc Technetium 98.907	44 Ru Ruthenium 101.07	45 Rh Rhodium 102.906	46 Pd Palladium 106.42	47 Ag Silver 107.868	48 Cd Cadmium 112.411	49 In Indium 114.818	50 Sn Tin 118.71	51 Sb Antimony 121.760	52 Te Tellurium 127.5	53 I Iodine 126.904	54 Xe Xenon 131.29
55 Cs Cesium 132.905	56 Ba Barium 137.327	57-71 Lanthanide Series	72 Hf Hafnium 178.49	73 Ta Tantalum 180.948	74 W Tungsten 183.85	75 Re Rhenium 186.207	76 Os Osmium 190.23	77 Ir Iridium 192.22	78 Pt Platinum 195.08	79 Au Gold 196.967	80 Hg Mercury 200.59	81 Tl Thallium 204.383	82 Pb Lead 207.2	83 Bi Bismuth 208.980	84 Po Polonium [209]	85 At Astatine 209	86 Rn Radon 222
87 Fr Francium [223]	88 Ra Radium 226	89-103 Actinide Series	104 Rf Rutherfordium [261]	105 Db Dubnium [262]	106 Sg Seaborgium [266]	107 Bh Bohrium [264]	108 Hs Hassium [269]	109 Mt Meitnerium [268]	110 Ds Darmstadtium [269]	111 Rg Roentgenium [272]	112 Cn Copernicium [277]	113 Uut Ununtrium [288]	114 Fl Flerovium [289]	115 Uup Ununpentium [288]	116 Lv Livermorium [293]	117 Uus Ununseptium [294]	118 Uuo Ununoctium [294]
		57 La Lanthanum 138.906	58 Ce Cerium 140.115	59 Pr Praseodymium 140.908	60 Nd Neodymium 144.24	61 Pm Promethium 144.913	62 Sm Samarium 150.36	63 Eu Europium 151.966	64 Gd Gadolinium 157.25	65 Tb Terbium 158.925	66 Dy Dysprosium 162.50	67 Ho Holmium 164.930	68 Er Erbium 167.26	69 Tm Thulium 168.934	70 Yb Ytterbium 173.04	71 Lu Lutetium 174.967	
		89 Ac Actinium 227.028	90 Th Thorium 232.038	91 Pa Protactinium 231.036	92 U Uranium 238.029	93 Np Neptunium 237.048	94 Pu Plutonium 244.064	95 Am Americium 243.061	96 Cm Curium 247.070	97 Bk Berkelium 247.070	98 Cf Californium 251.080	99 Es Einsteinium [254]	100 Fm Fermium 257.093	101 Md Mendelevium 258.1	102 No Nobelium 259.101	103 Lr Lawrencium [262]	

- Alkali Metal
- Alkaline Earth
- Transition Metal
- Basic Metal
- Semimetal
- Nonmetal
- Halogen
- Noble Gas
- Lanthanide
- Actinide

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Caesium and Pollucite: What is It



- Very rare in any volume: Known at approx 110 localities worldwide (but range in size from fist-size to small pods)
 - Two (now three) ‘commercial-sized’ pollucite deposits:
 - Tanco, Canada and
 - Bikita, Zimbabwe
 - Sinclair, Western Australia
- forms in the highly evolved core zone of LCT pegmatites
- co-exists with petalite, silica and lepidolite (lithium mica)

Most goes into Caesium Formate (CsFm)

- CsFm is a drilling fluid used in high temperature/high pressure oil and gas drilling
 - Ensures faster hole completion times, and
 - higher oil production rates
- The two main producers of Caesium are:
 - Tanco Mine (Cabot, Canada), produces ore for CsFm business and a lesser amount of Cs chemicals
 - Bikita Mine (Zimbabwe) delivers sporadically into the Cs chemical market
- CABOT Specialty Fluids:
 - 2010-2014 (5 years) EBITDA averages US\$37 million, or \$312 million between 2004 and 2016
 - CsFm **LEASED** to oil companies including Shell, Total, Statoil, ExxonMobil and BP, used in 30 wells per year (2008-2009)



June 2018: Offtake Secured with Cabot

- **PIONEER ENTERS BINDING OFFTAKE AND FUNDING AGREEMENT WITH CABOT CORPORATION FOR SINCLAIR ZONE CAESIUM PROJECT**
- **Includes US\$4.8 million financing arrangement to fully fund mining operations at the Sinclair Mine.**

July 2018: Project Management Plan Approved

- **PMP Approved 17 July 2018**
- **Mining Proposal – final review**
- **Preferred Mining Contractor Notified**

Binding offtake and loan agreement



- Cabot is a leading global specialty chemicals and performance materials company with a market capitalisation of US\$4 billion;
- US\$4.8 million interest-free loan facility will fully fund mining operations;
- Loan to be offset through the delivery of DSO pollucite, or by cash settlement; and
- Offtake agreement provides for the sale and purchase of 100% of the pollucite mined from proposed Sinclair Mine.

This is what the Sinclair Mine Could Look Like



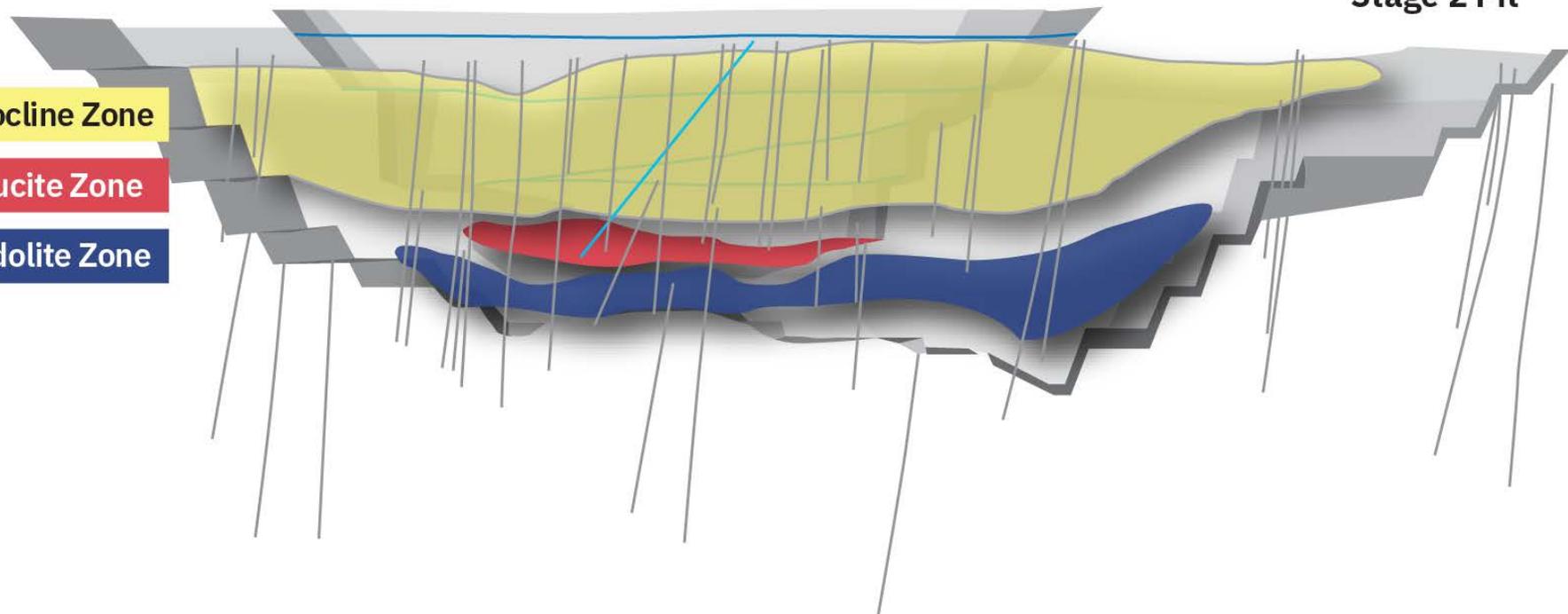
Stage 1 Pollucite Pit

Stage 2 Pit

Microcline Zone

Pollucite Zone

Lepidolite Zone

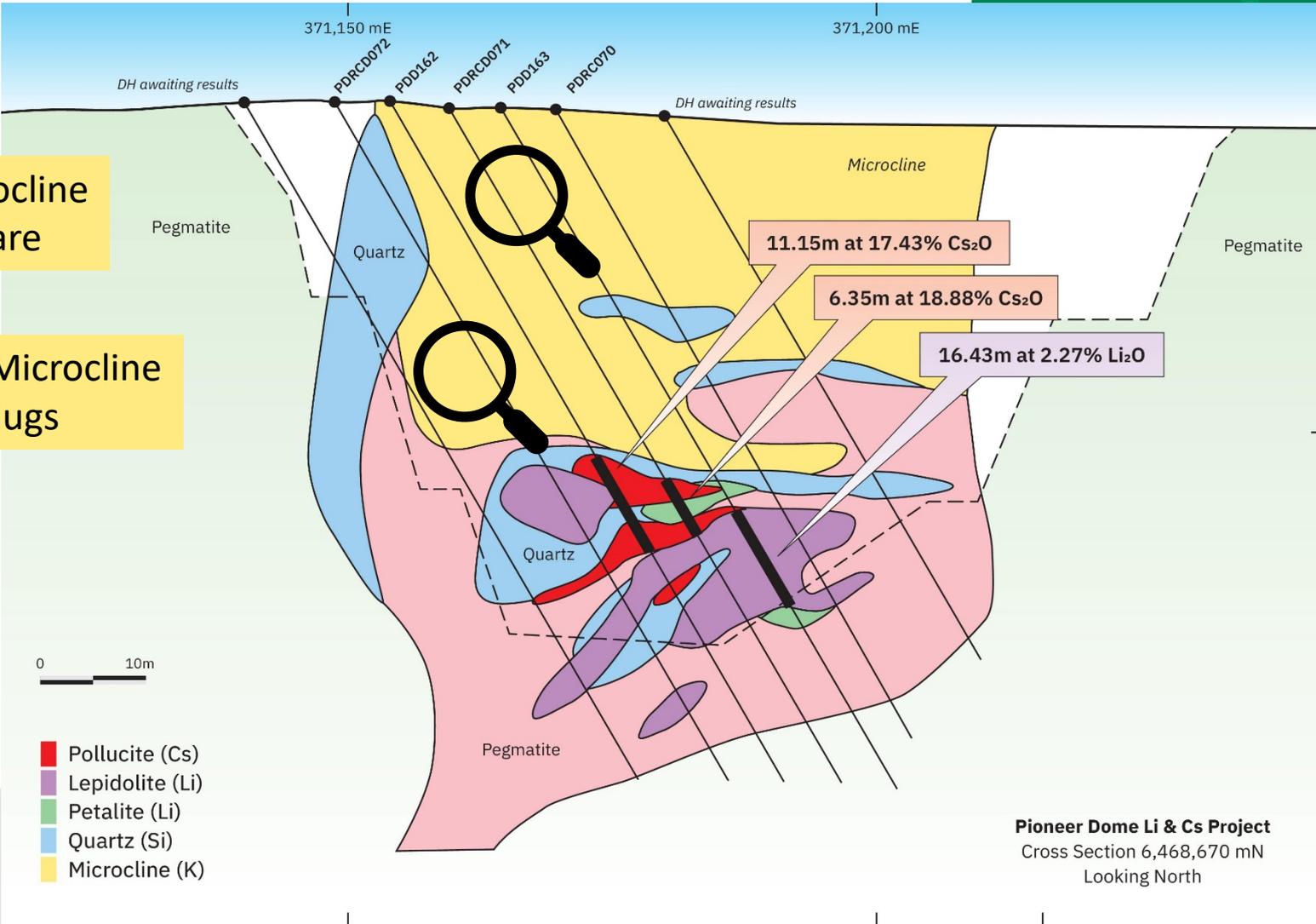


These are called 'Complex Pegmatites' with good reason



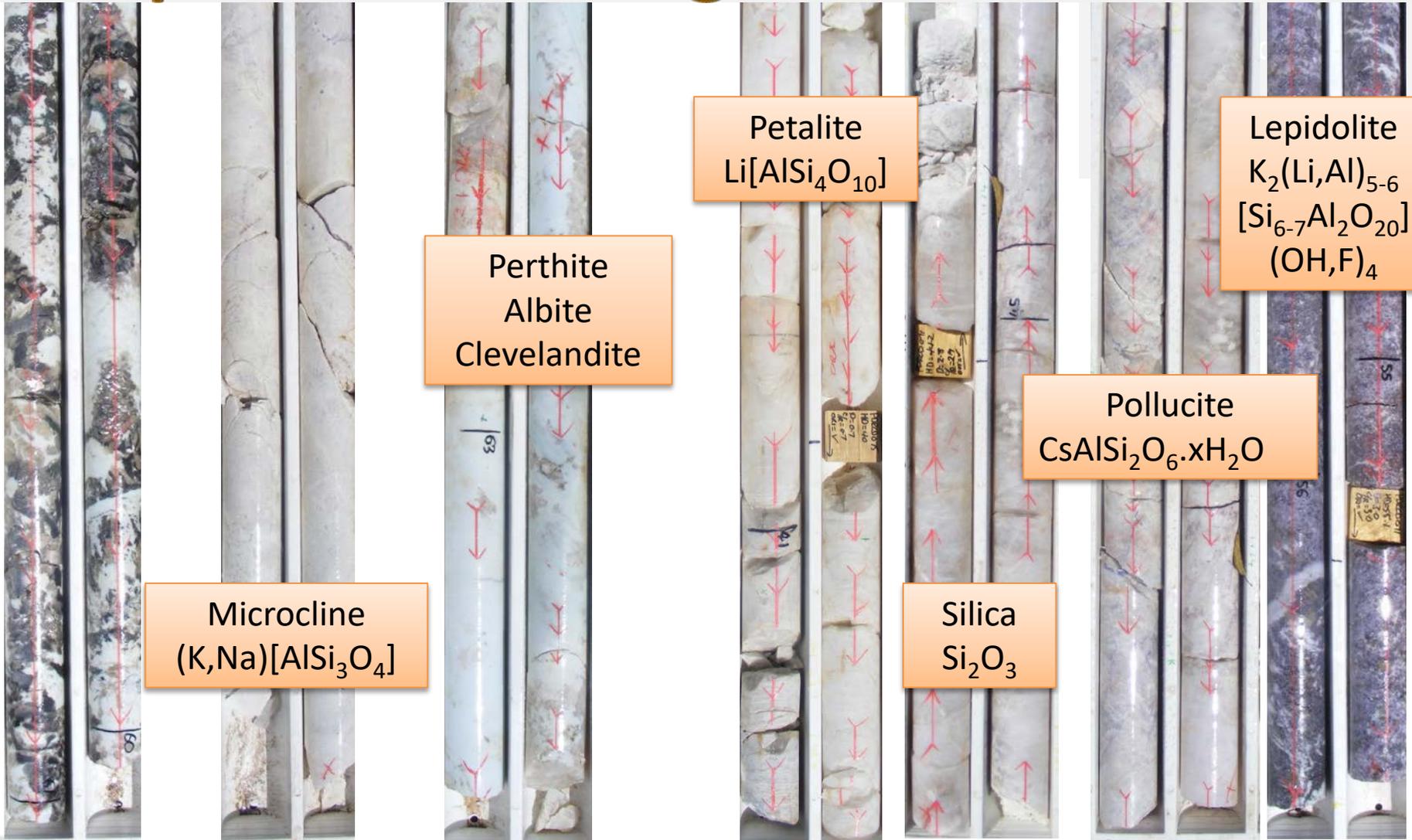
A-Grade Microcline
Sanitary Ware

Hi Rubidium Microcline
Spark Plugs



Pioneer Dome Li & Cs Project
Cross Section 6,468,670 mN
Looking North

Complex Zoned Pegmatite more akin to Tanco



Microcline
 $(K,Na)[AlSi_3O_4]$

Perthite
Albite
Clevelandite

Petalite
 $Li[AlSi_4O_{10}]$

Pollucite
 $CsAlSi_2O_6 \cdot xH_2O$

Silica
 Si_2O_3

Lepidolite
 $K_2(Li,Al)_{5-6}[Si_{6-7}Al_2O_{20}](OH,F)_4$

GP2:

GP4:

GP6:

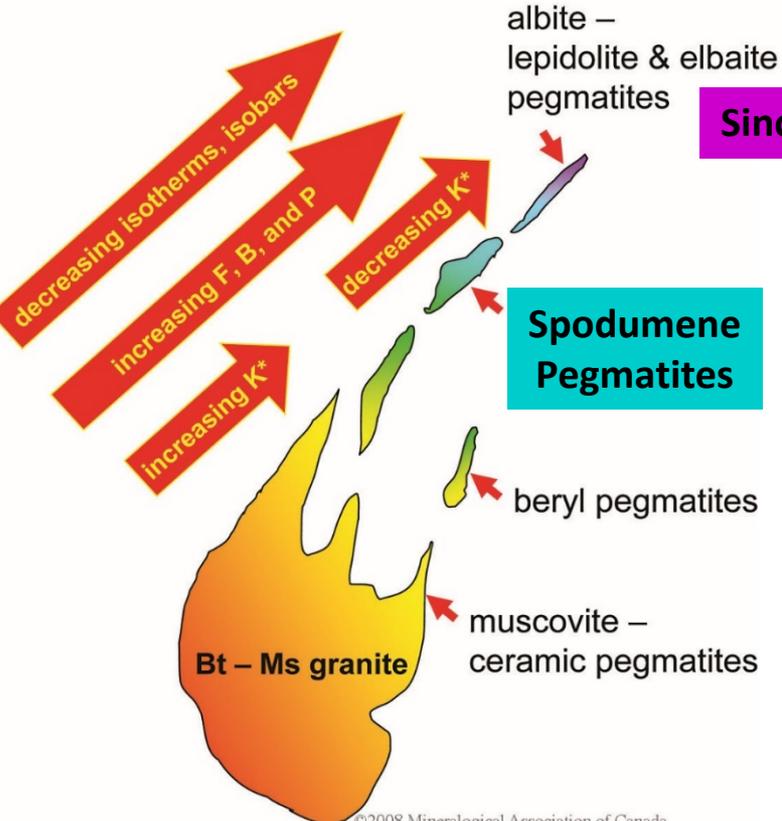
GP5:

GP7:

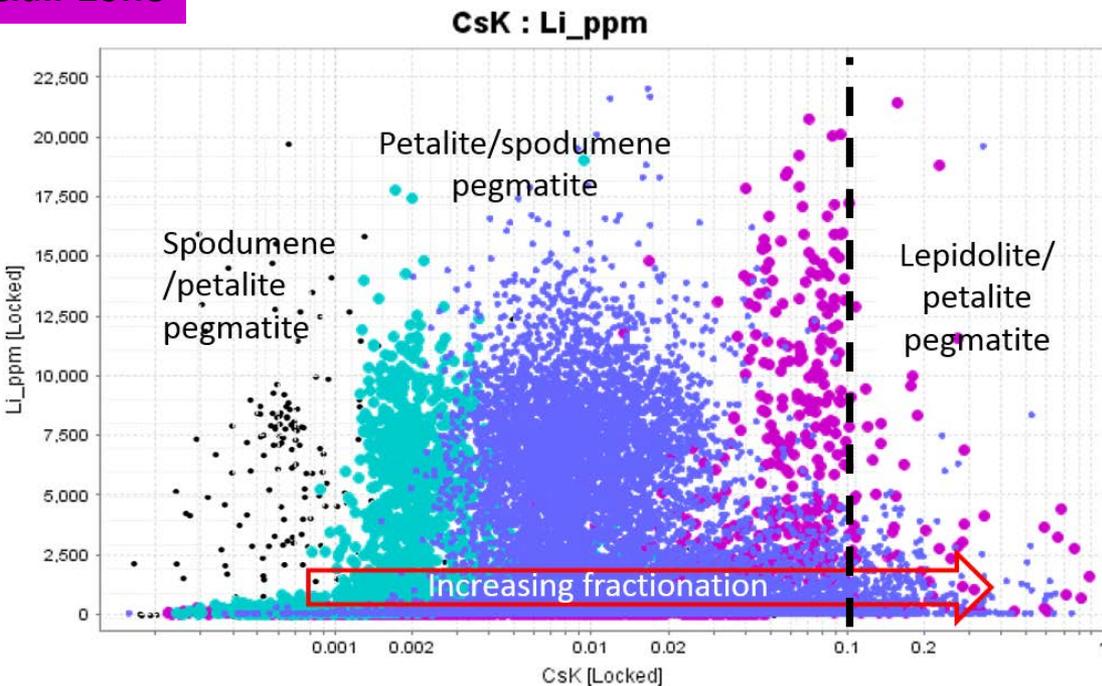
GP8:

GP9:

Charting Pegmatite Evolution (and Caesium Vectors)



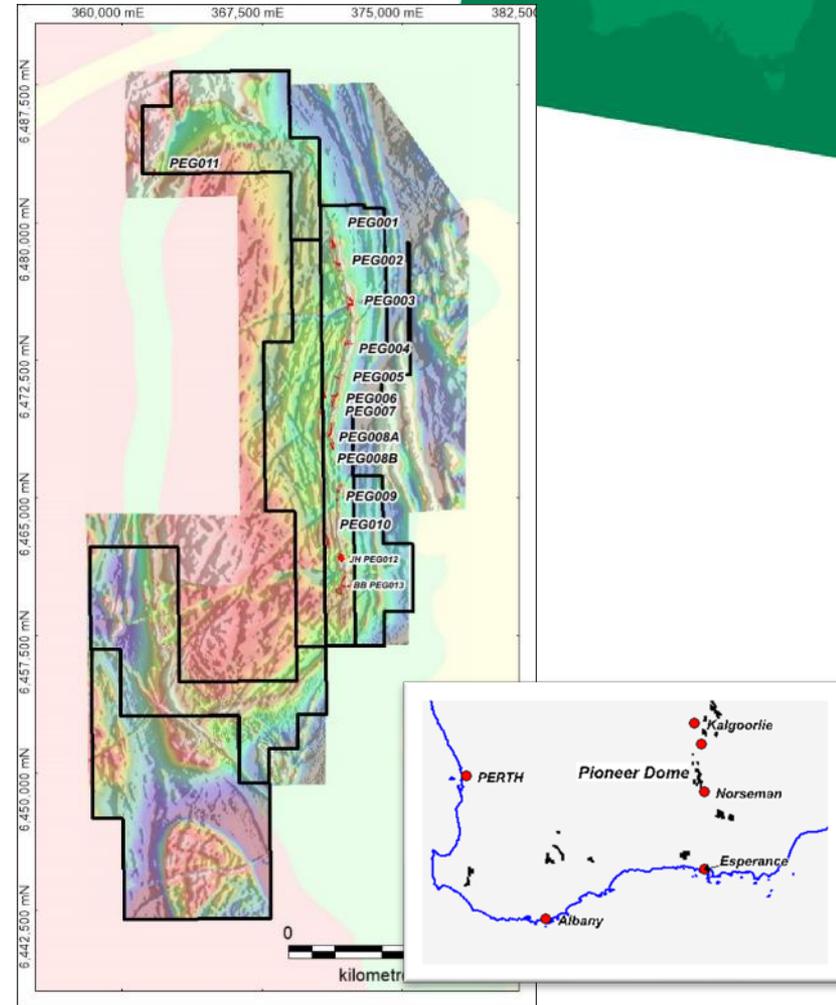
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Caesium and Lithium

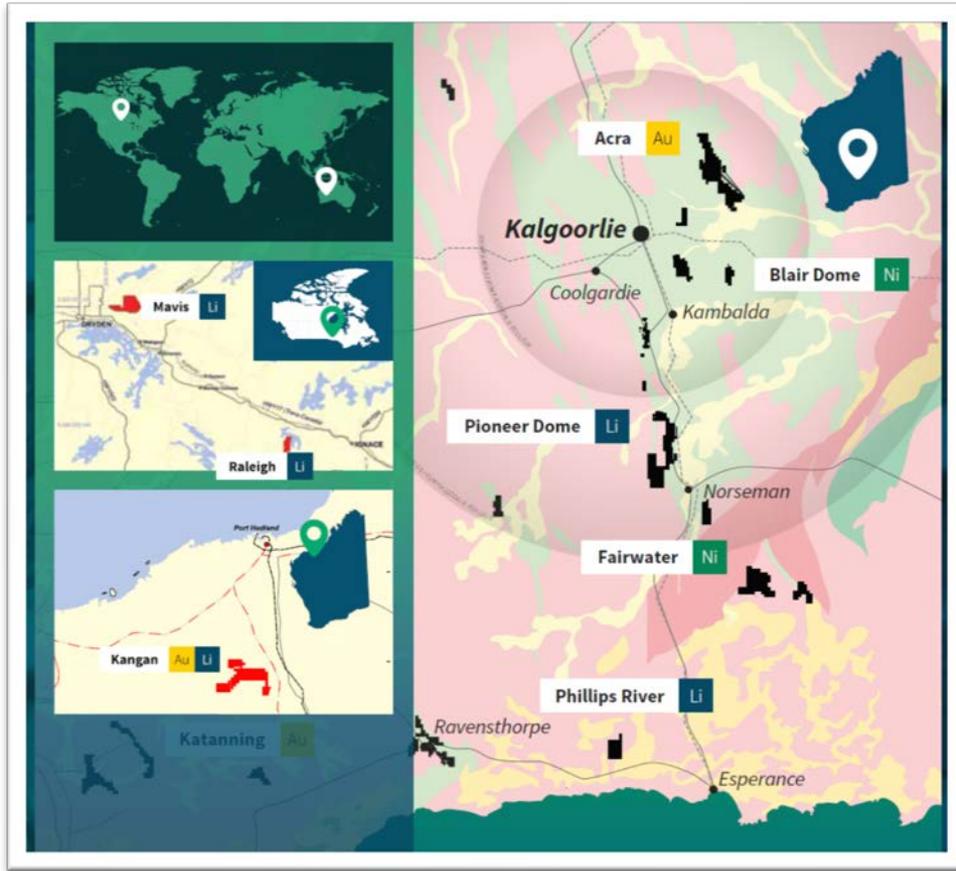
We've Just Started

- One of the few significant Pollucite deposition environments known – so why not more?
- Lithium (**Spodumene / Petalite**) intersected in drilling: Conventional lithium exploration model to be followed
- **Lepidolite** widespread
 - PEG009 Farm-in agreement with Lepidico (ASX: LPD) **Gives L-Max® exposure**
 - Much Chinese lithium derived from lepidolite



Key Assets Overview

Project	Location	Commodity	Ownership	Status
Pioneer Dome	Eastern Goldfields	Caesium	100%	Mine Plan in development
Pioneer Dome	Eastern Goldfields	Lithium, Tantalum	100%	Widespread lepidolite Spodumene indications Tantalum indications
Mavis Raleigh	Ontario	Lithium	Earning 80%	Spodumene intersected in Pioneer Drilling
Blair Dome	Eastern Goldfields	Cobalt/NiS	100%	Prospectivity for Cobalt
Acra	Kalgoorlie	Gold	80%	NST farming-in to project (up to 75%)



Value Proposition

Pioneer Dome Strategy

- ❑ ***Cash from Sinclair Zone Caesium Mine - 2018***
- ❑ ***Commercialise Co-Products i.e. Lepidolite, Microcline***
- ❑ ***Drill for further discoveries***
 - ❑ Drill Lithium (Spodumene and Lepidolite) Targets
 - ❑ Watch for Caesium vectors and drill for Pollucite
- ❑ ***Then.....***
 - ❑ Golden Ridge: - Drilling for Cobalt Resources
 - Further Drilling for Ni Sulphides
 - ❑ Mavis Lake, Raleigh, Canada: - Spodumene Results Returned this year

“Why should you invest in Pioneer?”



- Our 14 years since listing means that we understand our capabilities, and we’ve filtered a lot of ground. We are seeing the benefits of that now.
- With good projects and better funding we can provide ‘Bang for your Buck’ – we have already completed 10,000m of RC and Diamond drilling this year.
- And we are approaching a sea-change point as we transition into an income-generating company.

References



- **References**

- **Projects**

- Golden Ridge/Blair Dome: Refer Company's announcements to ASX dated 18 November 2013 (Blair Resource Estimate), May 2014, 27 January 2015, 18 May 2015, 20 July 2015, 13 April 2017, 24 January 2018, 25 January 2018.
- Mavis Lake and Raleigh: Refer Company's announcements to ASX dated 15 March 2016, 20 April 2016, 13 July 2016, 26 July 2016, 12 October 2016, 7 February 2017, 8 February 2017, 10 March 2017, 11 April 2017, 23 January 2018, 6 April 2018.
- Pioneer Dome: Refer Company's announcements to ASX 19 May 2016, 27 July 2016, 28 August 2016, 1 September 2016, 4 October 2016, 17 October 2016, 14 November 2016, 2 December 2016, 13 December 2016, 13 January 2017, 24 January 2017, 23 February 2017, 20 March 2017, 22 March 2017 (Sinclair Measured Resource Statement), 20 June 2017, 22 August 2017, 9 October 2017, 17 January 2018, 21 February 2018, 19 April 2018, 20/21 June 2018
- Kangan: WAMEX A No, 26936, 79608, 81531, Note 1. The Continent of Ur and the Beginning of the Crustal Gold Cycle—Hennigh, Q.T., IGC35, September 1, 2016, Note 2. Company announcement to ASX dated 6 October 2017, 24 October 2017.
- Internal documents by Brand N. W. of Geochemical Services Pty Ltd
- Plus Company quarterly reports.

- **Pegmatites**

- London, D. (2008): Pegmatites. *The Canadian Mineralogist Special Publication 10*.

- **Microcline**

- Charles River Associates (May 10, 2013). Potassium Feldspar Study: Market Assessment Report to I-Minerals, May 10, 2013

The Company it is not aware of any new information or data that materially affects the information included in this Report

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