

ASX Release

25 August 2025

## Metallium Strengthens Rare Earth Element (REE) Strategy – Rice University Collaboration to Advance Next-Generation Separation

### HIGHLIGHTS

- **Proven today & traditional flowsheet compatible** – FJH upgrades REE intermediates (e.g. monazite, MREC) into high-grade solvent extraction (SX)-ready product, unlocking higher payables and avoiding foreign-owned toll refineries<sup>1</sup>.
- **New innovation pathway - beyond SX** – Metallium is now collaborating with Rice University to test whether FJH can go further and **directly separate individual REEs**. This research aims to simplify or even bypass SX altogether.
- **Why it matters** – Strengthens current refining today while building a pathway to reduce reliance on China, which controls over 90% of global rare earth refining<sup>2</sup>.
- Creates potential for **licensing & partnerships** with REE miners, developers, magnet makers and other REE participants.
- **Strategic role** – Aligns with nearly US\$1B in new U.S. Department of Energy funding for rare earth supply chain security<sup>2</sup>.
- **Fast & scalable** – Modular FJH units deployable in <12 months, far quicker than constructing new SX facilities.
- **Future REE Testing targeting waste streams and highly strategic heavy REEs** - Planned evaluation of hard-rock ores, waste tailings, NdFeB scrap, and heavy REE-rich intermediates, further broadening applications for REE extraction.

**Metallium Limited** (“Metallium” or the “Company”) (ASX: **MTM**; OTCQX: **MTMCF**) provides an update on its rare earth element (REE) processing strategy. Flash Joule Heating (FJH) technology has already demonstrated breakthroughs in upgrading REE feedstocks across traditional flowsheets. Unlike conventional sulphuric-acid circuits, FJH delivers a more elegant and efficient solution, producing high-value intermediates that are directly compatible with existing solvent extraction (SX) separation plants. This provides Western developers with a plug-in midstream solution today, while building a pathway to reduce reliance on China in the future<sup>1</sup>.

**Today, REE separation is dominated by SX** → huge industrial plants with very large footprints, high capital and operating costs, and commissioning timelines that can stretch for years. Over 90% of this capacity is in China. Recent Chinese export restrictions on magnet alloy exports forced automakers to suspend production, underlining the fragility of supply chains and the urgency of alternatives<sup>3</sup>. Metallium’s patented FJH technology addresses this problem on two fronts:

1. **Today – improving existing flowsheets:** FJH upgrades REE feedstocks into SX-ready products, removing unfavourable and low-value elements while enriching high-value magnet metals. This strengthens existing refining and improves payables without relying on Chinese toll refining<sup>1</sup>. See *Appendix* for extra details.
2. **Tomorrow – reducing reliance on SX:** Through its collaboration with **Rice University**, Metallium is evaluating the potential for FJH to separate individual REEs. If successful, this could dramatically reduce or even replace the need for large SX plants, giving Western projects a domestic refining solution.

**Metallium Managing Director & CEO, Michael Walshe, commented:** “FJH has already demonstrated its ability to upgrade multiple REE feedstocks into SX-ready products, giving Western supply chains a midstream solution today. In parallel, our Rice University collaboration is tackling the next frontier: using FJH to separate individual REEs directly, potentially bypassing solvent extraction. With SX plants taking years, vast capex and footprint, and massive solvent use, even partial success would be transformative. This positions Metallium for near-term revenues from partnerships and licensing, and long-term leadership in REE refining”.

**Tony Hadley, Non-Executive Director, added:** “Having spent over 20 years in rare earth metallurgy, I know the scale, cost, and complexity of solvent extraction plants. **Metallium’s FJH technology is the first credible midstream solution I’ve seen that improves existing flowsheets today while opening the door to entirely new separation methods.** This is exactly the kind of innovation needed to reduce reliance on China”.

<sup>1</sup> A: ASX: MTM announcements dated: 25/11/2024, ‘17/06/2025 & 06/05/2024. See also page 7.

<sup>2</sup> U.S. Department of Energy, 2025, ‘Energy Department announces actions to secure American critical minerals and materials supply chain’

<sup>3</sup> Business Insider 2025, ‘China is flexing its supply chain muscles — and the auto industry is freaking out’.

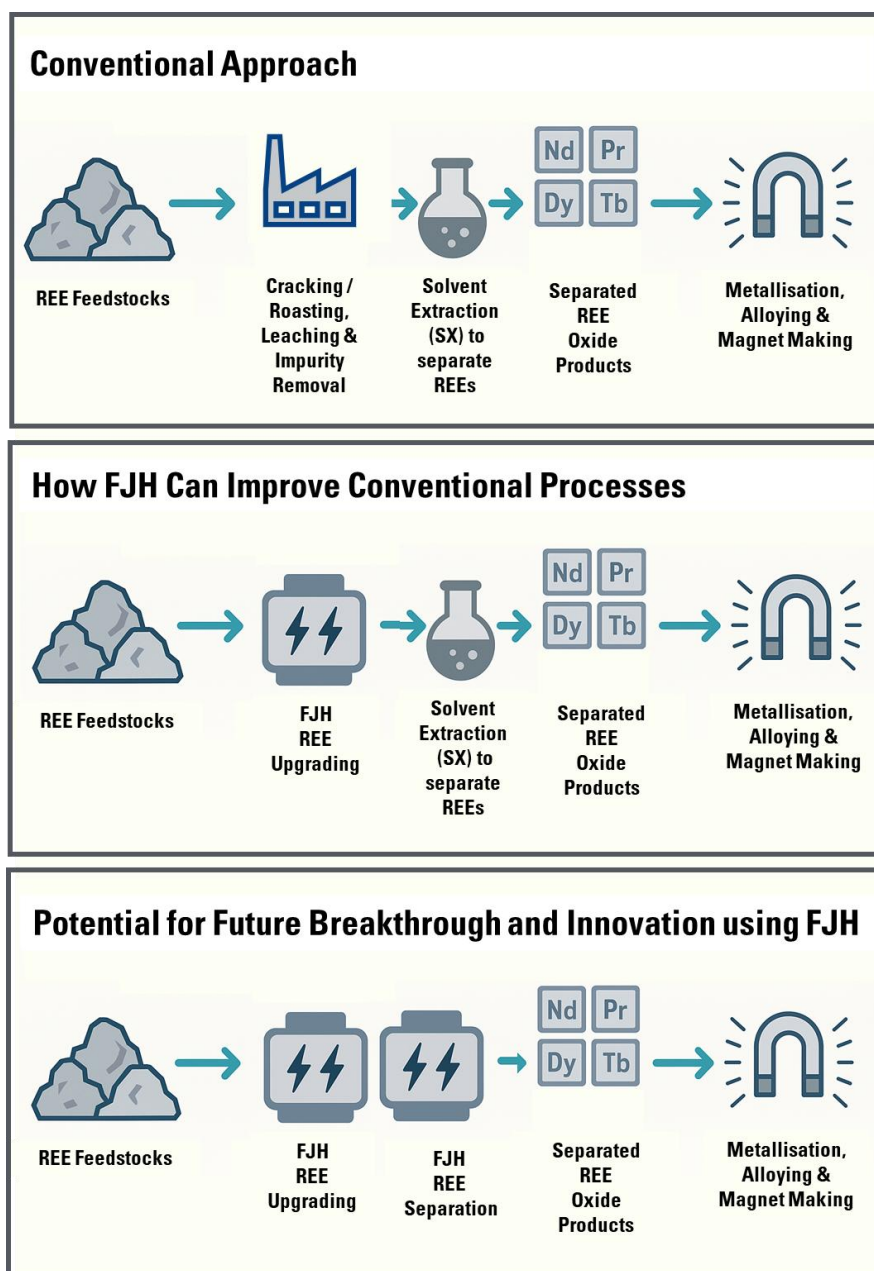
## Introduction

Metallium's patented **FJH is a multi-metal platform**: already proven in REEs, with parallel applications in Ga, Ge, In, gold, copper and red mud. Its dual business model - Build-Own-Operate in recycling and Licensing/Royalties in mining - provides both near-term revenues and scalable long-term growth.

**Rare earth metals** are the fundamental backbone of modern technology – essential for electric vehicles, wind turbines, defence systems and electronics. But separating them is extremely challenging: they always occur together in nature (orebodies) and have near-identical chemical and electrical properties. Today, separation is dominated by **solvent extraction (SX)** – enormous plants with large footprints, very high capital & operating costs, and commissioning timelines measured in years. **>90% of global SX capacity currently resides in China, leaving Western projects dependent on foreign refiners.**

Metallium's patented FJH technology has already **proven a breakthrough for traditional flowsheets**<sup>1</sup>. By removing contaminants and concentrating high-value rare earths, FJH produces high-grade chloride products that plug directly into SX plants, making them faster, cleaner, and more efficient.

Now, through a new collaboration with Rice University, Metallium is testing whether FJH can go further. If successful, FJH could perform direct separation of REEs, removing large parts of the highly capital- and energy-intensive SX process — a potential “missing piece” in Western rare earth supply chains. See *Appendix* for extra details



**Figure 1:** Simplified illustration of traditional REE vs. FJH potential flowsheets for REE enrichment and separation

## Strategic Context

China's dominance of rare earth refining remains one of the greatest vulnerabilities in global supply chains. In June 2025, China restricted NdFeB magnet alloy exports, forcing automakers like Ford and Suzuki to suspend production. Such disruptions underscore the urgency of establishing Western alternatives<sup>4</sup>.

The U.S. has responded with nearly US\$1B of new DOE<sup>5</sup> funding to build domestic REE refining capacity, demonstration plants, and recycling programs. Metallium's FJH technology directly aligns with these priorities: it provides a rapid, modular, low-footprint way to turn raw and secondary REE sources into SX-ready intermediates, creating the missing midstream link needed to secure supply.

## Technology Advantage

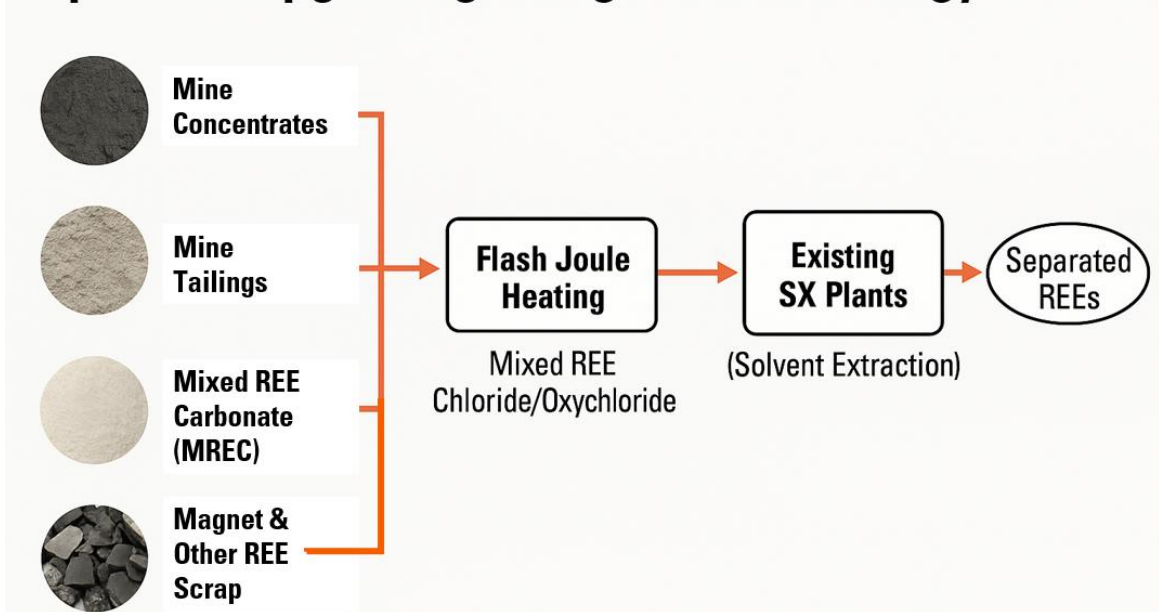
FJH applies direct electrical energy to feedstock in the presence of proprietary chlorination or carbochlorination chemistry. This enables:

- **Selective impurity removal** (Fe, Al, P, alkalis and radionuclides) improving downstream separation efficiency.
- **High recoveries and purity** across a wide range of feedstocks as already demonstrated in pilot-scale tests.
- **Sustainability** – reduced reagent use, no large liquid waste streams, and potential for co-product recovery.
- **Future potential** – under fluorine atmospheres, FJH could potentially produce REE metals directly from intermediate feedstocks, potentially bypassing separation bottlenecks.

## Why Solvent Extraction (SX) is the Bottleneck

- **Only commercial option today:** SX is the sole method currently used to separate individual REEs at industrial scale.
- **China dominates:** Over 90% of global SX capacity is located in China, leaving Western projects dependent on Chinese refineries.
- **Slow and capital intensive:** SX plants require **hundreds of mixer-settler stages (often > 1,000,)** very large CAPEX, and take **years** to reach nameplate capacity / equilibrium operation.
- **High operating costs:** Large consumption of solvents, acids, and bases; significant waste management burden.
- **The result:** SX is a costly chokepoint, slow to scale, and controlled by China; any innovation that reduces SX reliance is strategically transformative.

## Rapid REE Upgrading Using FJH Technology



**Figure 2:** Illustrative Example of FJH's Versatility in Treating REE Feedstocks and Producing SX-compatible intermediates

<sup>4</sup> Business Insider 2025, 'China is flexing its supply chain muscles — and the auto industry is freaking out'.

<sup>5</sup> U.S. Department of Energy, 2025, 'Energy Department announces actions to secure American critical minerals and materials supply chain'

Metallium has already demonstrated that FJH can deliver SX-ready products across multiple feedstocks<sup>1</sup>:

- **Monazite concentrate** – 93% REE conversion into >90% mixed REE chloride in one flash, removing the need for acid baking and multi-stage leaching.
- **MREC (mixed rare earth carbonate)** – >80% La/Ce removed, high-value magnet REEs enriched, and 81% terbium recovered in a single flash, without solvents or acids. Metallium is collaborating with Meteoric Resources (ASX: MEI) to apply this pathway to Brazil's Caldeira Project.
- **Future testing** – Planned expansion to hard-rock ores, SEG intermediates and other challenging sources.

This confirms that FJH can improve existing flowsheets by producing cleaner, higher-value feedstock that integrates directly into current SX plants.

### Beyond SX – A Separate Innovation Track

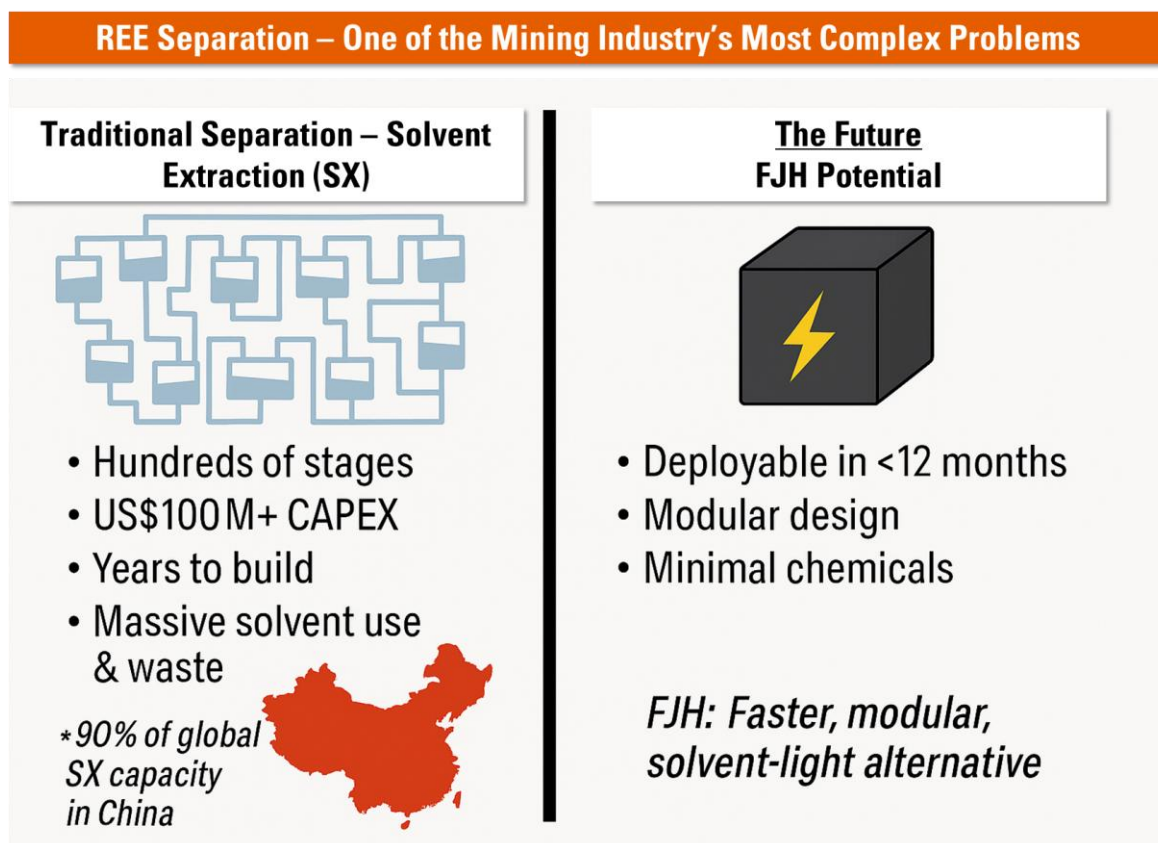
Metallium is investing in the **longer-term breakthrough of direct REE separation using FJH**.

Through a **sponsored collaboration with Dr. James Tour at Rice University**, Metallium is supporting research to selectively separate Nd, Pr, Dy, Tb, Y, and Eu by flash processes, with additional work on Nb–Ta separation.

- **Funding contribution by MTM** – US\$379,000 over 12 months, with first tranche paid.
- **Scope** – Modelling and experimental validation on tailings and intermediates; benchmarking against SX in cost and lifecycle impact.
- **IP** – Metallium retains first rights to new patents, which can be integrated into its current global FJH commercialisation licence.

This program not only accelerates technical development but also strengthens Metallium's intellectual property position, while leveraging U.S. academic expertise to qualify for DOE-backed demonstration programs.

**If successful, this work could provide the “missing piece” for Western supply chains - a pathway to magnet metals that would shorten or even replace parts of the SX-dominated flowsheet. This would position Metallium to one day compete directly with China's refining capability and support U.S. and allied independence in magnet metals.**



**Figure 3:** Future REE Separation Potential of FJH under new collaboration with Rice University



**Mixed Rare Earth Carbonate (MREC) – and How Metallium’s FJH Unlocks New Pathways**
**What is MREC?**

Mixed Rare Earth Carbonate (MREC) is an intermediate product that contains a mixture of REEs in carbonate form, typically grading 40-60% total rare earth oxides (TREO). It is produced after the initial ore cracking and impurity removal stage for hardrock ores, or after leaching of ionic clays, but before the costly and complex solvent extraction (SX) separation stage.

**In most REE projects, producing MREC is seen as a lower-risk, lower-cost route to market because it:**

- Avoids the high capital and operating costs of building a full SX plant.
- Allows earlier production and revenue.
- Uses proven process steps already established in commercial flowsheets.

**The Catch – China’s Market Dominance**

While MREC is easier and cheaper to produce, it creates a dependency problem: China is currently the only large-scale, commercially viable buyer and refiner (or toll treater) of MREC. This means developers outside China have limited options, and it creates significant geopolitical exposure for Western REE supply chains.

**Where MREC Fits in Traditional Flowsheets** (See *Appendix* for extra details)

Almost all REE processing routes for hard rock ores (like monazite, xenotime and bastnaesite) and ionic clays pass through an MREC stage:

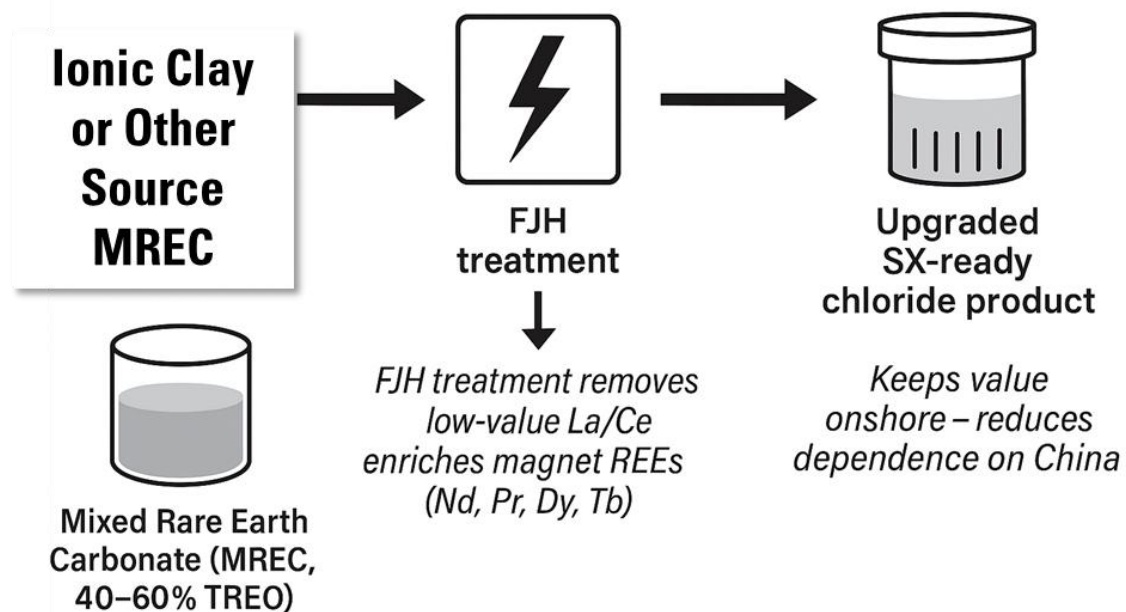
1. Ore is beneficiated to a concentrate.
2. Concentrate is chemically cracked and impurities removed.
3. The resulting MREC is either fed into an SX plant to produce separated REE oxides, or shipped (often to China) for further refining.

**How Metallium’s FJH Changes the Game**

Metallium’s Flash Joule Heating (FJH) technology offers a rapid, solvent-free upgrade path for MREC that:

- Removes unwanted contaminants such as radionuclides, iron, aluminium, and phosphorus.
- Selectively rejects low-value REEs (e.g., Ce & La) that make up the bulk of MREC mass but add little or no value.
- Enriches high-value magnet REEs like Nd, Pr, Dy & Tb into a cleaner intermediate product.

The upgraded product can then be fed directly into existing chloride-based SX plants for separation into individual REEs - meaning developers can capture more value domestically without building their own full SX facility and without having to sell to China.



**Figure 4:** MREC Upgrading (“super concentrating”) utilising FJH

See *Appendix* for extra details

**This opens a pathway for:**

- Western REE developers – to monetise production without relying on Chinese buyers.
- Government-backed supply chain initiatives – to integrate more domestic REE upgrading capacity.
- Investors – to participate in a technology that removes one of the largest bottlenecks in the non-Chinese REE supply chain.

Metallium's FJH enables developers to upgrade MREC by:

- Selectively removing contaminants (Fe, Al, P, radionuclides),
- Rejecting low-value REEs (La, Ce),
- Enriching magnet REEs (Nd, Pr, Dy, Tb) into a cleaner product.

The upgraded product can then be processed domestically in existing SX facilities, creating a new pathway for non-Chinese developers to monetise REEs without building their own SX plants or selling to China.

**Next Steps - Building Out Metallium's Rare Earth Program**

Metallium's dual-track strategy focuses on:

- **Track 1 – Proven Today:** FJH as a plug-in midstream step, upgrading feedstocks into SX-ready products that capture higher payables and reduce reliance on Chinese toll refining.
- **Track 2 – Future Innovation:** Rice University collaboration to test direct REE separation, unlocking a potential breakthrough that could reduce reliance on SX and provide the missing piece for Western supply chains.

**Near-term programs target multiple feedstocks:**

- **Mining ores** – Scale-up testwork to validate cost and efficiency versus conventional acid-bake flowsheets.
- **Industrial residues & mine tailings** – Pilot testing with partners; aligned with recent U.S. federal funding initiatives.
- **MREC (ionic clay and other potential projects)** – Ongoing Meteoric Resources Ltd collaboration, optimising La/Ce removal and magnet REE enrichment.
- **Magnet scrap & recycling** – Planned programs will replicate successful magnet REE recovery efforts undertaken by Rice University, extending FJH into high-value recycling applications and supporting U.S. EV and defence supply chains.
- **Heavy REE intermediates (SEG) and other potential heavy REE-rich feedstocks** – Planned trials to unlock higher-value heavy REEs (Sm, Eu, Gd, Y) plus the highly strategic heavy magnet REEs Dy & Tb.

**Path forward:** Deliver case studies across these feedstocks to secure licensing and partnership revenues in the near term, while Rice University research builds long-term upside from direct separation.

---

**This announcement has been authorised for release by the Board of Directors.**

**For further information, please contact:**

**Michael Walshe**

Managing Director & CEO

*Metallium Ltd*

info@MetalliumInc.com | +61 8 6391 0112

**Andrew Keys**

Investor Relations & Corporate Communications

*Keys Thomas Associates*

Andrew.keys@keysthomas.com | +61 400 400 380

## ABOUT METALLIUM LIMITED



**Metallium Ltd** (ABN 27 645 885 463), is pioneering a low-carbon, high-efficiency approach to recovering critical and precious metals from mineral concentrates and high-grade waste streams. The company's patented **Flash Joule Heating (FJH)** technology enables the extraction of high-value materials - including **gallium, germanium, antimony, rare earth elements, and gold** - from feedstocks such as refinery scrap, e-waste, and monazite.

Aligned with U.S. strategic supply chain objectives, Metallium has recently secured its first commercial site in Texas via its wholly owned subsidiary, **Flash Metals USA Inc.**, marking a major step toward near-term production and revenue generation.

To learn more, visit:

<b>Website:</b>	metalliuminc.com
<b>Contact:</b>	info@metalliuminc.com   +61 8 6391 0112
<b>Investor Hub:</b>	investorhub.metalliuminc.com
<b>X</b>	x.com/Metallium_MTM
<b>in</b>	www.linkedin.com/company/metalliumltd
<b>USA Office:</b>	12 Greenway Plaza, Suite 1100, Houston, Texas USA 77046
<b>Australia Office:</b>	Unit 4, 22 Railway Road, Subiaco, Western Australia

## METALLIUM'S BUSINESS MODEL

*Metallium's FJH technology is a true multi-metal platform. In waste recycling ('urban mining'), Metallium can recover high-value metals such as gallium, germanium, indium, gold and copper under a Build-Own-Operate model. In mineral processing, FJH upgrades complex feedstocks including rare earths and red mud, with revenues driven by technology licensing and royalties linked to production. This dual business model provides diversified exposure across multiple critical and high-value metals, positioning Metallium as a scalable and sustainable leader in clean-metals processing.*



## REFERENCED Metallium ASX Announcements:

ASX: MTM announcement dated 25/11/2024, 'Breakthrough in Rare Earth Element (REE) Processing'.

ASX: MTM announcement dated 17/06/2025, 'MTM & Meteoric Sign MOU After Successful REE Testwork'.

ASX: MTM announcement dated 06/05/2024, 'Flash Joule Heating Prototype Tests Increase REE recovery'.

## Appendix - Additional Technical Information

### RARE EARTH ELEMENTS – INTRODUCTION AND TERMINOLOGY

- **Rare Earth Elements (REEs)** are a group of metals essential to modern technologies, from electric vehicles to renewable energy and advanced electronics. They are usually sold and traded as rare earth oxides (REOs), the purified form of each element used in downstream processing.
- The first step in the supply chain is typically **MREC (mixed rare earth carbonate)**, an intermediate product from mining that contains all REEs blended together and requires further refining.
- Because REEs occur together in nature, with very similar chemistry, they are difficult to separate and are often found with radioactive elements like thorium and uranium.
- Within the REEs, the magnet REEs (Nd, Pr, Dy, Tb) are especially valuable for high-performance permanent magnets.
- Another grouping is **SEG (samarium–europium–gadolinium)**, which lies between the light and heavy REEs; most processing and separation options for SEG today are concentrated in China, underscoring Western reliance on Chinese refining capacity.

### Rare Earth Elements

- Used ubiquitously in modern technologies → **‘Strategic’ & ‘Critical’ Metals**
- Group of elements with similar chemistry → **complicated metallurgy**
- Always occur together in nature, proportions different in different deposits
- Typically found with Thorium and Uranium → **radioactivity issues**

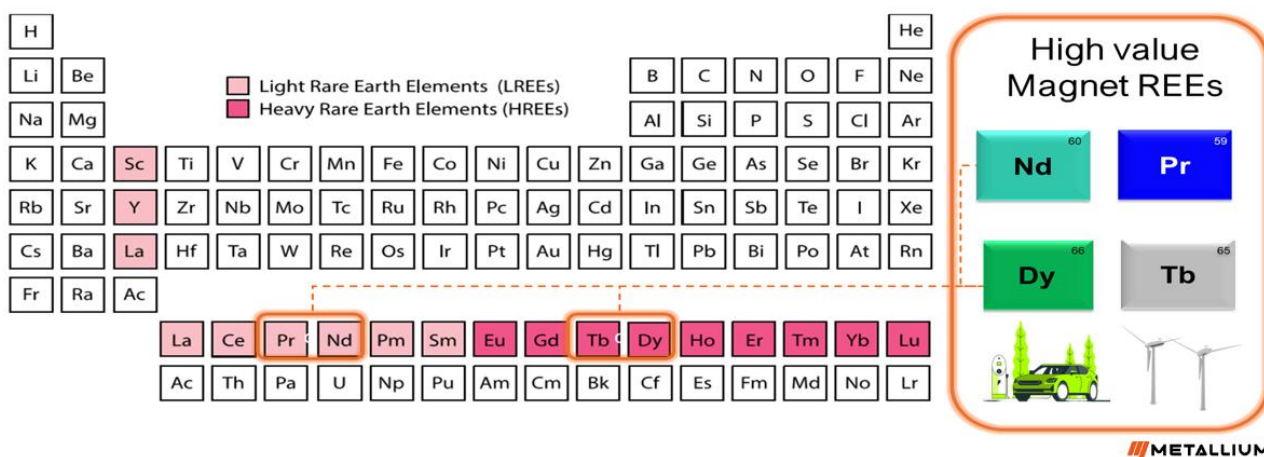


Fig 5: REE Overview<sup>6</sup>

<sup>6</sup> Gupta, C.K. & Krishnamurthy, N. 2005, *Extractive Metallurgy of Rare Earths*, CRC Press, Boca Raton, p. 191; ASX: MTM announcement 17/06/2025, 'MTM & Meteoric Sign MOU After Successful REE Testwork'



## RARE EARTH ELEMENTS – USES & STRATEGIC IMPORTANCE

- Broad and important applications in National Defense, Aerospace and Satellite Technology, High-tech Devices, Clean Energy Technologies, Catalysts and Metallurgy because of their unique chemical and physical properties.



F-35 fighter jet  
(~0.41 t REEs)



DDG-51 destroyer  
(~2.36 t REEs)



Virginia-class submarine  
(~4.18 t REEs)



Missile



UAV



Smart bomb



Radar



EV



Wind Turbine



Motor



Phosphor



Solar panel

## MILITARY APPLICATIONS



**Predator Drone**  
Neodymium, Samarium  
Electric Motors and Guidance



**Smart Bomb**  
Neodymium, Samarium  
Electric Motors and Guidance



**Tomahawk Cruise Missile**  
Neodymium, Samarium  
Electric Motors and Guidance



**Night Vision Goggles**  
Terbium, Erbium, Gadolinium  
Optical Lenses



**F-22 Fighter Jet**  
Europium, Yttrium Terbium, Erbium  
Optical Systems, Visuals and Fiber Optics



**Bullet Proof Vest**  
Yttrium  
Hardened Ceramics



**Bradley Tank**  
Yttrium  
Hardened Ceramics



**Radar Detection**  
Europium, Lutetium  
Signal Amplification



**Nuclear Submarine**  
Europium, Lutetium  
Sonar Detection

**Fig 6: REE Usage in Modern Economies<sup>7</sup>**

<sup>7</sup> Adamas Intelligence 2024, *Rare-Earths Market Outlook & Opportunities 2024-2035*, Adamas Intelligence, Toronto

## CONVENTIONAL REE PROCESS FLOWSHEETS

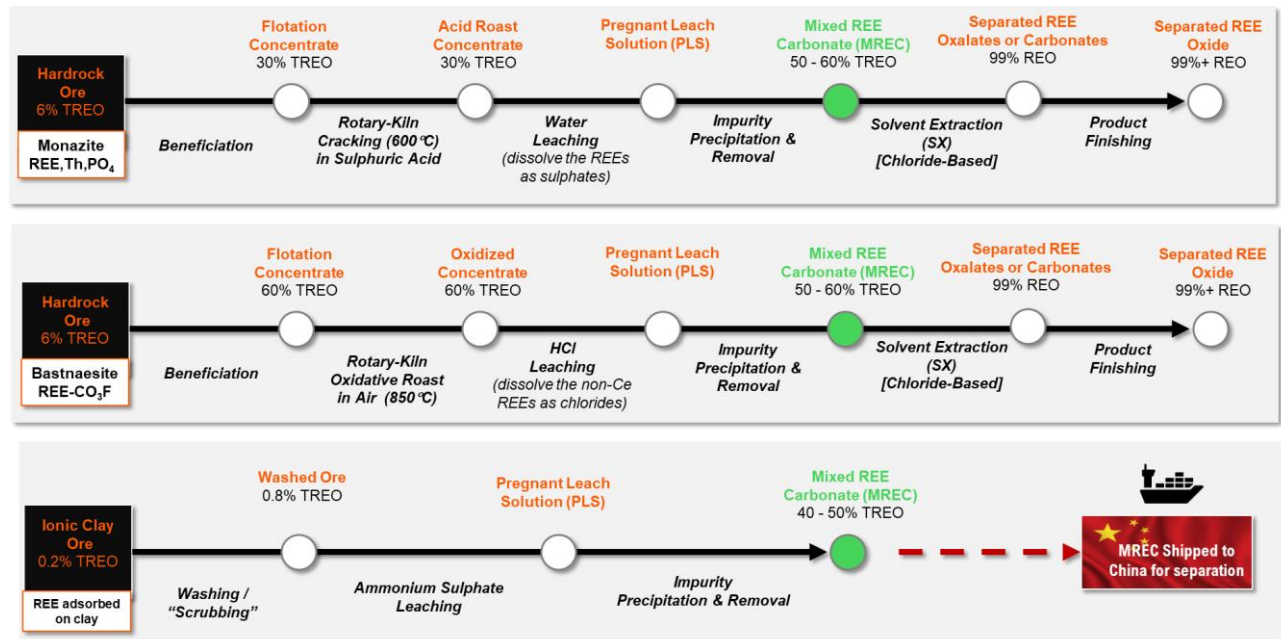


Fig 7: Typical REE Flowsheets – Hard Rock Minerals & Ionic-Clay – and how all involve producing an intermediate product called MREC<sup>8</sup>

## WHY SEPARATE REEs?

### REE Metallurgy = Very Complex

- Chemically very similar elements – highly challenging to separate
- Commercial method: Multiple Stages of Solvent Extraction (~1000 stages of SX required for clean separation of 16 elements)
- No standard process due to orebody uniqueness
- Radioactive tailings & concentrate
- Refractory Minerals – require thermal and chemical 'sledgehammer' via conventional methods
- Variable Gangue Minerals = more complex processing = higher CAPEX & OPEX

Processing complexity the highest amongst all Metals

Variable Gangue Minerals = more complex processing = higher CAPEX & OPEX

87	88	89	90	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239	240	241	242	243	244	245	246	247	248	249	250	251	252	253	254	255	256	257	258	259	260	261	262	263	264	265	266	267	268	269	270	271	272	273	274	275	276	277	278	279	280	281	282	283	284	285	286	287	288	289	290	291	292	293	294	295	296	297	298	299	300	301	302	303	304	305	306	307	308	309	310	311	312	313	314	315	316	317	318	319	320	321	322	323	324	325	326	327	328	329	330	331	332	333	334	335	336	337	338	339	340	341	342	343	344	345	346	347	348	349	350	351	352	353	354	355	356	357	358	359	360	361	362	363	364	365	366	367	368	369	370	371	372	373	374	375	376	377	378	379	380	381	382	383	384	385	386	387	388	389	390	391	392	393	394	395	396	397	398	399	400	401	402	403	404	405	406	407	408	409	410	411	412	413	414	415	416	417	418	419	420	421	422	423	424	425	426	427	428	429	430	431	432	433	434	435	436	437	438	439	440	441	442	443	444	445	446	447	448	449	450	451	452	453	454	455	456	457	458	459	460	461	462	463	464	465	466	467	468	469	470	471	472	473	474	475	476	477	478	479	480	481	482	483	484	485	486	487	488	489	490	491	492	493	494	495	496	497	498	499	500	501	502	503	504	505	506	507	508	509	510	511	512	513	514	515	516	517	518	519	520	521	522	523	524	525	526	527	528	529	530	531	532	533	534	535	536	537	538	539	540	541	542	543	544	545	546	547	548	549	550	551	552	553	554	555	556	557	558	559	560	561	562	563	564	565	566	567	568	569	570	571	572	573	574	575	576	577	578	579	580	581	582	583	584	585	586	587	588	589	590	591	592	593	594	595	596	597	598	599	600	601	602	603	604	605	606	607	608	609	610	611	612	613	614	615	616	617	618	619	620	621	622	623	624	625	626	627	628	629	630	631	632	633	634	635	636	637	638	639	640	641	642	643	644	645	646	647	648	649	650	651	652	653	654	655	656	657	658	659	660	661	662	663	664	665	666	667	668	669	670	671	672	673	674	675	676	677	678	679	680	681	682	683	684	685	686	687	688	689	690	691	692	693	694	695	696	697	698	699	700	701	702	703	704	705	706	707	708	709	710	711	712	713	714	715	716	717	718	719	720	721	722	723	724	725	726	727	728	729	730	731	732	733	734	735	736	737	738	739	740	741	742	743	744	745	746	747	748	749	750	751	752	753	754	755	756	757	758	759	760	761	762	763	764	765	766	767	768	769	770	771	772	773	774	775	776	777	778	779	780	781	782	783	784	785	786	787	788	789	790	791	792	793	794	795	796	797	798	799	800	801	802	803	804	805	806	807	808	809	810	811	812	813	814	815	816	817	818	819	820	821	822	823	824	825	826	827	828	829	830	831	832	833	834	835	836	837	838	839	840	841	842	843	844	845	846	847	848	849	850	851	852	853	854	855	856	857	858	859	860	861	862	863	864	865	866	867	868	869	870	871	872	873	874	875	876	877	878	879	880	881	882	883	884	885	886	887	888	889	890	891	892	893	894	895	896	897	898	899	900	901	902	903	904	905	906	907	908	909	910	911	912	913	914	915	916	917	918	919	920	921	922	923	924	925	926	927	928	929	930	931	932	933	934	935	936	937	938	939	940	941	942	943	944	945	946	947	948	949	950	951	952	953	954	955	956	957	958	959	960	961	962	963	964	965	966	967	968	969	970	971	972	973	974	975	976	977	978	979	980	981	982	983	984	985	986	987	988	989	990	991	992	993	994	995	996	997	998	999	1000	1001	1002	1003	1004	1005	1006	1007	1008	1009	1010	1011	1012	1013	1014	1015	1016	1017	1018	1019	1020	1021	1022	1023	1024	1025	1026	1027	1028	1029	1030	1031	1032	1033	1034	1035	1036	1037	1038	1039	1040	1041	1042	1043	1044	1045	1046	1047	1048	1049	1050	1051	1052	1053	1054	1055	1056	1057	1058	1059	1060	1061	1062	1063	1064	1065	1066	1067	1068	1069	1070	1071	1072	1073	1074	1075	1076	1077	1078	1079	1080	1081	1082	1083	1084	1085	1086	1087	1088	1089	1090	1091	1092	1093	1094	1095	1096	1097	1098	1099	1100	1101	1102	1103	1104	1105	1106	1107	1108	1109	1110	1111	1112	1113	1114	1115	1116	1117	1118	1119	1120	1121	1122	1123	1124	1125	1126	1127	1128	1129	1130	1131	1132	1133	1134	1135	1136	1137	1138	1139	1140	1141	1142	1143	1144	1145	1146	1147	1148	1149	1150	1151	1152	1153	1154	1155	1156	1157	1158	1159	1160	1161	1162	1163	1164	1165	1166	1167	1168	1169	1170	1171	1172	1173	1174	1175	1176	1177	1178	1179	1180	1181	1182	1183	1184	1185	1186	1187	1188	1189	1190	1191	1192	1193	1194	1195	1196	1197	1198	1199	1200	1201	1202	1203	1204	1205	1206	1207	1208	1209	1210	1211	1212	1213	1214	1215	1216	1217	1218	1219	1220	1221	1222	1223	1224	1225	1226	1227	1228	1229	1230	1231	1232	1233	1234	1235	1236	1237	1238	1239	1240	1241	1242	1243	1244	1245	1246	1247	1248	1249	1250	1251	1252	1253	1254	1255	1256	1257	1258	1259	1260	1261	1262	1263	1264	1265	1266	1267	1268	1269	1270	1271	1272	1273	1274	1275	1276	1277	1278	1279	1280	1281	1282	1283	1284	1285	1286	1287	1288	1289	1290	1291	1292	1293	1294	1295	1296	1297	1298	1299	1300	1301	1302	1303	1304	1305	1306	1307	1308	1309	1310	1311	1312	1313	1314	1315	1316	1317	1318	1319	1320	1321	1322	1323	1324	1325	1326	1327	1328	1329	1330	1331	1332	1333	1334	1335	1336	1337	1338	1339	1340	1341	1342	1343	1344	1345	1346	1347	1348	1349	1350	1351	1352	1353	1354	1355	1356	1357	1358	1359	1360	1361	1362	1363	1364	1365	1366	1367	1368	1369	1370	1371	1372	1373	1374	1375	1376	1377	1378	1379	1380	1381	1382	1383	1384	1385	1386	1387	1388	1389	1390	1391	1392	1393	1394	1395	1396	1397	1398	1399	1400	1401	1402	1403	1404	1405	1406	1407	1408	1409	1410	1411	1412	1413	1414	1415	1416	1417	1418	1419	1420	1421	1422	1423	1424	1425	1426	1427	1428	1429	1430	1431	1432	1433	1434	1435	1436	1437	1438	1439	1440
----	----	----	----	----	----	----	----	----	----	----	----	----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------

**CAUTIONARY STATEMENT REGARDING VALUES & FORWARD-LOOKING INFORMATION**

The figures, valuations, forecasts, estimates, opinions and projections contained herein involve elements of subjective judgment and analysis and assumption. Metallium does not accept any liability in relation to any such matters, or to inform the Recipient of any matter arising or coming to the company's notice after the date of this document which may affect any matter referred to herein. Any opinions expressed in this material are subject to change without notice, including as a result of using different assumptions and criteria. This document may contain forward-looking statements. Forward-looking statements are often, but not always, identified by the use of words such as "seek", "anticipate", "believe", "plan", "expect", and "intend" and statements that an event or result "may", "will", "should", "could", or "might" occur or be achieved and other similar expressions. Forward-looking information is subject to business, legal and economic risks and uncertainties and other factors that could cause actual results to differ materially from those contained in forward-looking statements. Such factors include, among other things, risks relating to property interests, the global economic climate, commodity prices, sovereign and legal risks, and environmental risks. Forward-looking statements are based upon estimates and opinions at the date the statements are made. Metallium undertakes no obligation to update these forward-looking statements for events or circumstances that occur subsequent to such dates or to update or keep current any of the information contained herein. The Recipient should not place undue reliance upon forward-looking statements. Any estimates or projections as to events that may occur in the future (including projections of revenue, expense, net income and performance) are based upon the best judgment of Metallium from information available as of the date of this document. There is no guarantee that any of these estimates or projections will be achieved. Actual results will vary from the projections and such variations may be material. Nothing contained herein is, or shall be relied upon as, a promise or representation as to the past or future. Metallium, its affiliates, directors, employees and/or agents expressly disclaim any and all liability relating or resulting from the use of all or any part of this document or any of the information contained herein.

For personal use only