Medallion Resources

Smart Production of Magnet Metals
Q1 2020

Rethinking Rare Earths
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**Medallion Resources**

- Shares Outstanding: 46.3 million
- Fully Diluted Shares: 69.9 million
- Options and Warrants ($0.22 weighted average price): 23.6 million
- Market capitalization: ~ $4 million
- 52-week low - high: $0.08 - $0.28

**Company Snapshot**

- Management & Insiders: 10%
- Institutional Investors: 15%
- Canadian Retail Investors: 40%
- USA Retail Investors: 25%
- EU Retail Investors: 10%
Smarter Rare Earth Production

Investment Overview

• Business model: process and extract rare-earths from by-product monazite sand, using a proprietary flow sheet, then market the chemical concentrate material to non-Chinese refineries

• Agreements for monazite feedstock and rare-earth concentrate offtakes in progress

• Significantly lower capex and time to market than traditional hard-rock projects

• Scalable and repeatable business model

• Monazite is rich in “NdPr” – critical input for lightweight and powerful rare-earth magnets
NdPr Market Demand Estimates

Industry Insights

- NdPr-based EV motors provide 15-20% battery capacity savings – improves range and usability.
- ~600 kg / MW of rare earth input is creating significant wind turbine demand as global capacity forecast to rise by 56% to 841 GW by 2022
- New role for NdPr in global miniaturisation – a US$100bn market by 2020

Source: UBS, SP Angel and public filings
Projected NdPr Shortages

- Lynas is the only significant producer outside China – all other development assets require large CapEx ($250 million - $2B) and are at least 3-5 years away from producing
- China has capped rare-earth mining production to protect resource, reduce pollution and control the market – but has had to import rare-earth ores recently
- NdPr has no current substitute for high performance magnets

Source: UBS, USGS and public filings
Extracting Magnet Metals

North American Rare Earth Value Chain

Medallion Plant
Location: TBD

Monazite Feedstock

Rare Earth Oxides

Rare Earth Concentrate

Separation Plant

Rare Earth Marketplace

Heavy Mineral Sands Operations

Main Products
Titanium, Zircon

Beach Sand Mining
Mineral Separation
Target NdPr Feedstock

- Monazite sand is typically 50-60% rare earths
- Available today from heavy mineral sands mines in SouthEast US –
- Magnet metals make-up
  - Neodymium 17%
  - Praseodymium 5%
  - Total 22% and > 80% of revenue
- Material upgrading circuit being implemented at mill – taking 20-40% monazite tailing to 90% pure feedstock
- Expected monazite feed:
  - Currently 1,200 tpa
  - New Feed (2021) 1,800 tpa
  - Total 3,000 tpa
Heavy Mineral Sands (Georgia, USA)
Medallion and Rare Earth Salts are cooperating:

- on customer acquisition
- technical interface
- US government (DoD, DoE)
A Smart Process

Proprietary enhanced “caustic crack” rare-earth extraction process

Key features

– **Highly automated** for low manpower requirements and increased worker safety;
– **Energy efficient** design for low operating costs;
– Option for a zero liquid discharge plant to provide additional flexibility on planning/permitting;
– Uses only “off-the-shelf” equipment which **saves costs** — unique innovations on their application.
## Project History

### RARE-EARTH PROCESSING AND PRODUCTION

<table>
<thead>
<tr>
<th>Date</th>
<th>Event Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>October 2019</td>
<td>Proprietary Flowsheet Complete</td>
</tr>
<tr>
<td>November 2018</td>
<td>REE Concentrate Validated with Rare Earth Salts</td>
</tr>
<tr>
<td>March 2018</td>
<td>Testwork produces: Magnet Metal Rich Concentrate + phosphate By-product</td>
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<tr>
<td>June 2017</td>
<td>Executed commercial agreement with Rare Earth Salts LLC</td>
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<tr>
<td>February 2017</td>
<td>Saskatchewan Research Council to lead Process Dev Work</td>
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### FINANCE / CORPORATE

<table>
<thead>
<tr>
<th>Date</th>
<th>Event Description</th>
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<tbody>
<tr>
<td>October 2019</td>
<td>$790,000 Private Placement completed</td>
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<tr>
<td>April 2019</td>
<td>$630,000 Private Placement completed</td>
</tr>
<tr>
<td>March 2019</td>
<td>Federal government R+D funding received: $80,000</td>
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<tr>
<td>Summer 2018</td>
<td>$600,000 in Private Placements completed</td>
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<tr>
<td>June 2016</td>
<td>Mark Saxon (Leading Edge Materials) joins Advisory Board</td>
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### Focus and Newsflow

<table>
<thead>
<tr>
<th>Description</th>
<th>2019</th>
<th>2020</th>
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<tbody>
<tr>
<td><strong>Technology</strong></td>
<td></td>
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<td></td>
<td>Thermo dynamics</td>
<td>Piloting work</td>
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<tr>
<td>Economic Studies</td>
<td>Internal Study</td>
<td>Siting / costs</td>
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<tr>
<td></td>
<td></td>
<td>Scoping Study</td>
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<tr>
<td><strong>Business Development</strong></td>
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<tr>
<td>Monazite Feedstock</td>
<td>Georgia / Florida producers</td>
<td>Australian / African / SA producers</td>
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<tr>
<td>Customers (refiners)</td>
<td>Rare Earth Salts Cooperation</td>
<td>Explore Alternative Refinery Customers</td>
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<tr>
<td><strong>Corp Development</strong></td>
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<tr>
<td>Capital</td>
<td>Equity</td>
<td>Plant Financing Discussions</td>
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<tr>
<td>Personnel</td>
<td>Technical / Bus Dev / Operations</td>
<td>Board + Advisors</td>
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</tbody>
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**Looking Forward**
Leadership

Donald M Lay, BSc — President & CEO, Director — 20+ years of international experience in public and private venture-capital and project funding. Developed business and raised capital in technology and ag-bio processing fields. A number of successful investor exits.

Kurt Forrester, PhD — Metallurgist — Chartered Chemical Engineer (CEng MIChemE) and Chartered Professional Metallurgist (MAusIMM CP(Metallurgy)). 15+ years as engineering consultant mining - process development, feasibility and EPCM. Expertise on commodities including precious metals, REEs and industrial minerals.

David Shaw, PhD, PGeo — Director — Consulting Geologist, Director of First Majestic Silver (NYSE: AG), First Mining Finance (TSXV:FF), Great Quest Metals Ltd (TSXV:GQ), 30+ years in global exploration and mining finance.

Management / Board

[Images of Donald M Lay, Kurt Forrester, and David Shaw]
Leadership

David Haber, IDD — Chairman — Business / succession consultant; Honorary Consul General, Republic of Austria. Career in insurance: built, operated and sold benefits consultancy in 2006 to Morneau Shepell (TSX: MSI).

Rod McKeen, LLb — Director — co-founding partner at Axium Law Corporation, 25+ years practising mining-related securities and corporate law. Formerly partner at Gowling Lafleur Henderson LLP and Montpellier McKeen Varabioff Talbot and Giuffre.

Andy Morden, CA — Director — President & CEO Fatigue Science, Vancouver. 25+ years of operations and finance experience in public and private companies in high-tech field. Formerly with Intrawest Corporation and KPMG.

Tom Arnould, CA — CFO & Secretary — 30+ years in private companies including merger and acquisitions and senior finance roles.
Add’l Support

Advisors / Consultants

• **Mark Saxon**, B.Sc. (Hons) GDipAppFin, MAusIMM, MAIG — **Advisor** — 23+ years of experience in exploration and geology with junior and senior companies in gold, base and REEs. Previous CEO at REE junior Tasman Metals – now Leading Edge Materials.

• **Anthony Mariano**, PhD — **Advisor** — Internationally renowned rare-earth consultant, 50+ years experience in mineral exploration, former advisor to Molycorp Inc and currently advises Rare Element Resources Ltd and other potential rare-earth producers.

• **James G. Clark**, PhD, LGeo — **Advisor** — 30+ years of exploration – strong field and laboratory orientation. Has managed exploration programs for REE’s, niobium, gold, base metals, and industrial minerals. Former VP Exploration Rare Element Resources / consultant to Molycorp.

**Summary**

- 80% + of monazite processing economics is tied to key magnet metals market: NdPr
- Minimal technical risk – modern, efficient continuous metallurgical process utilizing all material – “no tailings” plant
- Monazite feedstock available from the Southeast United States and relationships established
- Potential to produce 2,000 tpa REO in US (global market: 150,000 tpa) very soon
- Very low capex – ~10-15% of hard-rock mining / processing
- Growth can be implement incrementally – modular design
- Near-term NdPr production from substantially de-risked business model
Rare Earths Power EVs

Bolt E-Motor Cost Breakdown (total = $1,200)

EV Batteries need:
- Lithium
- Cobalt
- Graphite
- Nickel

EV motors need permanent REE magnets:
- 1 - 1.5 kg of NdPr needed for traction motors
- AC / Windows
- Wipers
- Seats

Source: UBS estimates

The Chevy Bolt motor
- weight of only 38 kg (88lbs)
Rare Earths in xEVs

- UV cut glass
  - Cerium
- Glass and mirror polishing powder
  - Cerium
- LCD screen
  - Europium
  - Yttrium
  - Cerium
- Component sensors
  - Yttrium
- Diesel fuel additive
  - Cerium
  - Lanthanum
- Catalytic converter
  - Cerium
  - Lanthanum
- Electric motor and generator
  - Neodymium
  - Praseodymium
  - Dysprosium
  - Terbium
- Headlight glass
  - Neodymium
- 25+ electric motors throughout vehicles
  - Cerium
Historical Rare-Earth Production

- USA
- China
- Australia
- Other
Demands for Rare Earths

Market Overview

**ENERGY PRODUCTION**

- **La** (Lanthanum), Petroleum Refining
- **Nd** (Neodymium), **Dy** (Dysprosium), **Tb** (Terbium), High-Powered Electric Motors
- **La**, New Generation Vehicles

**ENERGY REDUCTION**

- **Ce** (Cerium), UV Filters in Glass
- **Nd**, Reducing Fuel Consumption
- **Dy**, Lighter Vehicles - Improved Performance

**ENERGY EFFICIENCY**

- **Nd**, **Sm**, New Generation Vehicles
- **La**, Rechargeable Batteries
- **Pr**, **Eu**, Energy-Efficient Lighting

**LIFESTYLE**

- **Eu**, **Tb**, **Y**, Colour Screen LCDs/PDPs
- **Nd**, Components to Hardware
- **Nd**, **Gd**, **Ce**, Medical Services

La (Lanthanum), Nd (Neodymium), Dy (Dysprosium), Tb (Terbium), Ce (Cerium), Sm (Samarium), Pr (Praseodymium), Eu (Europium), Y (Yttrium), and Gd (Gadolinium)
Specific uses of Rare Earths

**MAGNETS**
- Motors
- Disc Drives & Disc Drive Motors
- Power Generation
- Actuators
- Microphones & Speakers
- MRI
- Anti-lock Brake System
- Automotive Parts
- Communications Systems
- Electric Drive & Propulsion
- Frictionless Bearings
- Magnetic Storage Disk
- Microwave Power Tubes
- Magnetic Refrigeration
- Magnetostrictive Alloys

**METAL ALLOYS**
- Hydrogen Storage
  (NiMH Batteries, Fuel Cells)
- Steel
- Lighter Flints
- Aluminum/Magnesium
- Cast Iron
- Superalloys

**AEROSPACE**
- Fly-by-Wire
- Guidance Systems
- Energy/Engines
- Structure
- Instruments
- Opto-electronics

**ELECTRONICS**
- Display phosphors (CRT, PDP, LCD)
- Medical Imaging Phosphors
- Lasers
- Fiber Optics
- Optical Temperature Sensors

**CERAMICS**
- Capacitors
- Sensors
- Colorants
- Scintillators

**GLASS**
- Polishing Compounds
- Optical Glass
- UV-Resistant Glass
- Thermal Control Mirrors
- Colorizers/Decolorizers

**OTHER**
- Water Treatment
- Fluorescent Lighting
- Pigments
- Fertilizer
- Medical Tracers
- Coatings
Scalable and Repeatable Business

Monazite Sources

- Senegal
- South Korea
- Vietnam
- Australia
- US Southeast
- India
- Sri Lanka
- Brazil
- Madagascar
- Mozambique
- South Africa
- Indonesia
- Malaysia

Source: US Geological Survey, Medallion Resources
Long term demand for REEs

Industry Insights