SIMBOL materials

Sustainable Extraction of Valuable Elements

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Outline

I. Characteristics of Sustainable Metals Recovery Operation
   A. Favorable Resource
   B. Process Selection and Design

II. Simbol's Salton Sea Lithium Recovery Project
   A. Imperial Valley Brine Resource
   B. Simbol's Lithium Extraction Process
   C. Future Extraction of Manganese, Zinc, and Potassium

Resource Selection: The resource will make the project. High elemental concentration is not enough.

- Key considerations include
  - Location
    - Accessibility
    - Country risk
  - Resource Type; solid mineral or solution
  - Recovery: surface/ subsurface, or solution mining
  - The global recovery process
    - Mining considerations
    - Separation chemistry and process
    - Process inputs such as energy, water and chemicals
    - Key infrastructure such as roads, power, water
  - Environmental Considerations
    - Surface disturbance such as open pits
    - Waste rock piles, tailings piles
    - Waste Salt piles
    - Waste water and rain water run off control and treatment
    - Acidic mine water drainage
    - Air emissions, including CO_2, NOX, SOX, and dust
    - Permitting

Process Selection: Once the resource has been identified, process chemistry drives everything.

- Key drivers for a successful process:
  - Hydrometallurgical processes for mineral concentration and dissolution
  - Chemical separation and concentration processes
  - Total chemical inputs
  - Energy requirements and cost
  - Water requirements and management, including waste water, and impacted ground water
  - Mine waste production and management
  - RCRA and non-RCRA waste production and management
  - Air emissions

The Ideal Project

- Resource
  - Minimal mining
  - High concentrations of desired elements, minimal concentrations of difficult impurities
  - Minimal hydrometallurgical processing
  - High efficiency extraction and separation processes
  - Fully developed infrastructure
  - Low cost energy
  - Access to motivated and skilled labor
- Process
  - Highly selective and efficient separation and recovery technology
  - Minimal chemical inputs
  - Minimal waste water

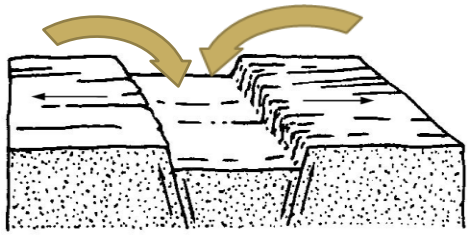
Company Overview – Simbol Materials

- Access to one of the largest untapped resource of lithium, manganese, zinc and potassium
- Proprietary extraction technologies provide low cost operations with minimal environmental impact
- Patent protected technology
- Management team with deep expertise in the targeted businesses, technology, operations and project management.

Resource: Unique geology has created an abundant source of lithium, manganese, zinc and potassium

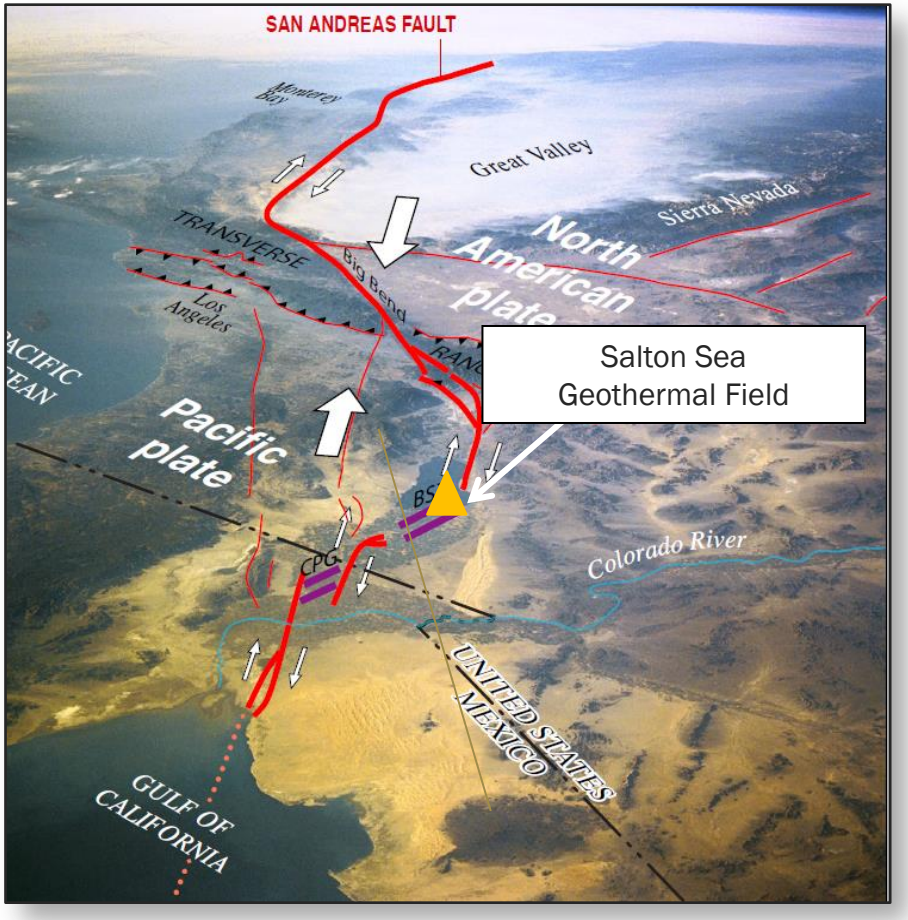
- The Salton Sea Geothermal Field lies within the Imperial Valley and contains hot hypersaline metalliferous brines
- Magmatism from continental rifting generates high heat flow and is causing the Valley to subside
- The Colorado River filled the Valley with metal-rich sediments and created a closed-basin evaporative lake setting
- Incoming waters evaporated and deposited salts
- Hot water dissolved the salts, and leached metals from the sediments and created a pool of hypersaline brine in the subsurface
- Geothermal plants access this mineral rich resource to generate power

Metal-Rich Colorado River sediments



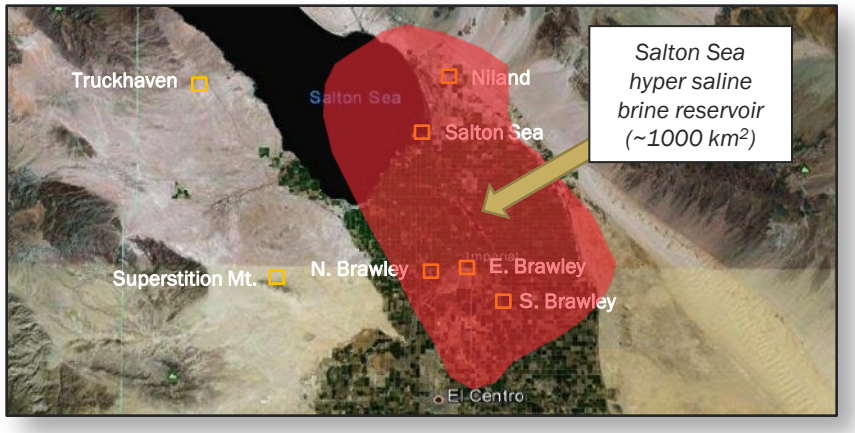
Imperial Valley

Salton Sea Geothermal Field



Recharging resource provides abundant and reliable brine supply

Potentially the Largest Lithium Resource in the World



- Within the 100 km^2 drilled out portion of the Salton Sea Field alone, total quantities of dissolved metal resources have been estimated at:(1)
  - 10.6 million MT of lithium LCE
  - 15 million MT of manganese
  - 36 million MT of zinc (based on current zinc analyses)
- Total lithium resource potential estimated between 106 - 325 million MT LCE(2)
- Additionally, we estimate about 150 million MT of manganese oxide, 390 million MT of zinc oxide, and 5 billion MT of potassium chloride

- Assuming annual production rates of 15,000 MT of lithium carbonate, 21,222 MT of manganese and 50,943 MT of zinc, the brine metal depletion of the reservoir would only be 0.13% per year if no recharge occurred(1)
- No evidence of significant geothermal resource, entrained gas concentration or metal concentration decline after 20 years of > 250 MW of geothermal power production

Source: Hulen, 2002.
(1)McKibben 2010, applicable to 100km^2 drilled out portion.
(2) 106 million MT LCE extrapolated from McKibben 2010 estimate for drilled-out area. 325 million MT LCE based on Simbol extrapolation of GeothermEx [2008] estimate of a 3km thickness.

Imperial Valley Brine Offers Significant Advantages for Mineral Extraction

- Low operating cost
  - High elemental concentrations, Li, Mn, Zn, K
  - Desired elements are available in solution, ready for chemical processing
  - No mine development
  - No mining
  - No ore processing
  - No hydrometallurgical extraction
- Negligible Environmental Foot Print
  - Depleted brine is returned deep into the geothermal formation, eliminating
    - Tailings ponds
    - Salt piles
    - Mine closure and remediation costs
- Low Country Risk
- Excellent Transportation Logistics
  - Interstate highway system
  - Rail
  - Easy access to California ports

Simbol's Process

1. Brine is delivered from an associated power plant
2. Brine is purified to selectively remove high concentrations of silica and iron
   - The recovered solids can be packaged and sold, paying for the purification process
3. Selective Adsorption (SA) Process for Lithium Recovery and Purification
   - The SA process extracts LiCl from hot brine into a lithium aluminate crystalline matrix. When the crystal is saturated, it is regenerated by flushing it with water.
   - This process is quite efficient. In one process step, it recovers > 95% of the lithium from the brine. It increases the lithium concentration by a factor of 12, and it rejects over 99% of the unwanted cations, greatly simplifying down stream purification.
4. The lithium depleted brine is returned to the power plant for reinjection into the geothermal resource

Simbol's Processes, continued

5. The SA product is purified and concentrated to a 42% LiCl liquor, recovering about 75% of the water, and producing 99.995% pure LiCl, on a dry LiCl basis
6. The purified lithium chloride is sent through an electrolysis unit that produces lithium hydroxide solution and hydrochloric acid (32%, ready for sale)
7. A portion of the lithium hydroxide is crystalized to $LiOH \cdot H_2O$. CO_2 is sparged through the rest to produce Li_2CO_3. These compounds will be our primary products for sale.

Sustainability– A sustainable process must meet its environmental and financial objectives

The combination of the Imperial Valley Geothermal Brine and Simbol's proprietary process will produce:

- Minimal land disturbance and environmental impact
- Efficient use of the geothermal resources for power and heat minimize the carbon foot print and reduce energy cost
- Very low chemical inputs. Most of the process chemical demands are generated within the process
- Due to efficient internal use of dilute salt streams, the process will produce no waste water or waste solid streams
- Efficient selective recovery of lithium to produce high purity products at low cost