### Magnesium Restructuring

<table>
<thead>
<tr>
<th>Sector: Chemical</th>
<th>Project Value: JD20M</th>
<th>Location: Karak</th>
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#### Potential Opportunity

The Jordanian Magnesium Co. (JORMAG) owns a mothballed facility designed to produce 60,000 TPY of a high purity (97.5%) magnesium oxide for the refractory market. The plant commissioned in late 2003 is not cost competitive (with plants based on carbonate raw material) and has been dogged by process plant failures. Escalating demand for lightweight magnesium alloys in the automotive industry creates an opportunity to switch production from refractory product to magnesium metal feedstock production. This would be achieved by: (i) simplifying JORMAG’s production process, and (ii) switching energy use from fuel oil to natural gas.

#### I. Description of the Business

This is the revival of the present production line excluding the high cost boron cleaning processes and final furnace used in the original refractory production line. The restructured process would use natural gas and will need to be adapted to provide magnesium oxide in flakes suitable for bulk handling. The quality of magnesium oxide for production of magnesium metal is less demanding than for refractory use. Output will be exported for use in magnesium smelters which are generally located in areas that have low electricity costs.
Zeolite Cement Production

<table>
<thead>
<tr>
<th>Sector: Chemicals</th>
<th>Project Value: JD21M</th>
<th>Location: Karak, Amman, Aqaba</th>
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**Potential Opportunity**

Natural zeolites, which occur in deposits throughout Jordan, can be used to produce cement with superior properties when compared to Portland cement: lightweight (up to 40% reduction), superior curing times, less energy needed, similar hardness and strength, increased compressive strength, resistance to underwater corrosion, and smooth surfaces for finishing.

Currently 60% of the world’s total Zeolite production is used in concrete mix where rapid construction is required (mainly in China) and for lighter weight concrete structural items, bridge structures, underwater piles or partitions, lintels, pipes and blocks.

Jordan with large deposits of limestone, a growing cement production industry, and increasing regional demands is well placed to diversify into specialist cements using Zeolite raw materials.

**I. Description of the Business**

Design, build and construction (or modification of an existing) cement factory for the production of Zeolite pozzolanic cement. This project is likely to be based on a smaller scale approach at the outset, < US$30M project costs, likely as an ‘add on’ or refurbishment of a current facility, utilising the existing infrastructure.
Uranium mining

| Sector: Mining and processing | Project Value: JoD10M | Location: Karak, Ma’an, Aqaba |

Potential Opportunity

Jordan has 67,000 tonnes of Uranium ore, some 2% of the world’s reserves, which have yet to be explored. The nuclear industry has undergone resurgence in recent years, with 67 new reactors planned or likely to come on line during the next decade, and join the current 440 existing reactors in operation. Currently 10 countries provide some 90% of the Nuclear Industry’s needs. The costs of recovering the ore can vary significantly and reserves are often measured against exploration costs of <US$40 and < $80/kg (known as the ‘Red Book’) - so far some US$7Billion has been spent on worldwide exploration. Uzbekistan is one of the ten and like Jordan has only 2% reserves. India has less than 1% of the World’s reserves and is investing JoD30M in two combined mines and milling facilities.

The price for uranium has doubled since 1996 and currently is at US$35/Kg. Enriched Uranium (UF6) prices have also climbed and as they do so will the opportunities for further exploration, currently US$209/kg and predicted to rise to by 31% this year.

I. Description of the Business

Uranium exploration and mining company. Traditionally this would be an existing international player from Canada, USA or Australia. However, countries with limited natural resources and growing nuclear industries such as China may also be interested.
Table Salt Production

<table>
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<tr>
<th>Sector: Mining and Processing</th>
<th>Project Value: JD10 -15M</th>
<th>Location: Dead Sea / Balqa</th>
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Potential Opportunity
The USA, China and Germany are the largest producers of salt. Japan is the largest importer. Asia currently accounts for 30% of the world’s consumption and for the most significant increases in demand. Some 140 countries produce their own salt for personal consumption hence the market is competitive, but transportation costs are increasing and the product is a bulky low value item.

Jordan has had a chequered history in salt production and it’s possible that the current facilities’ problems can be overcome. The two producers of table salt, Amra and Dub’ah may also not provide the most competitive opportunity for table salt production in Jordan.

The opportunity will be to review the potential of the table salt market for a modern manufacturing facility and investment. It’s possible the outcome maybe investment into the current facility.

I. Description of the Business
Table salt producer, with the capability of producing and marketing quantities of table salt for the domestic and export markets. The investment will be capital intensive and be subject to size and output.
Railway Outsourcing

| Sector: Chemical / Transport | Project Value: JD15-20M | Location: Amman |

Potential Opportunity

Jordan’s phosphate industry is based on the Jordan Phosphate Mining Company’s license for extraction of phosphate minerals from the El Shidya mine, where reserves stand at 200 years use at current levels. Phosphate sales are highly cost competitive and the railway’s master plan is therefore planning for a dedicated rail line to transport phosphates from El Shidya to link into the line to the export terminal at Aqaba. The project will reduce internal freight costs and can be considered as a dedicated or integral component of the Phosphate Industry. The opportunity is the outsourcing of the operations and the ownership of the link line and rolling stock requirements for deliveries from El Shidya to Aqaba under a long term contract.

I. Description of the Business

Outsourcing of the assets and operations of the facilities used for transporting phosphates from El Shidya to the main rail network (the link line) and for use on the network line to Aqaba. The business would own the rolling stock and maintenance facilities for the phosphate rock and phosphate product freight business. The volume of phosphate rock freight business alone is of the order of 3 million tons per annum and expected to grow.
Poly carbonate Production Facility

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<tr>
<th>Sector</th>
<th>Project Value</th>
<th>Location</th>
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<tbody>
<tr>
<td>Chemicals</td>
<td>JD5M</td>
<td>Karak, Irbid</td>
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Potential Opportunity

75% of the World’s polycarbonate production is held by General Electric or Bayer, specifically targeted at the high volume industry, PC, TV screens, Electrical, Medical, Vehicular, and sheet applications. The remaining 25% of the market is occupied by small organisations producing niche products. The construction sector represents an opportunity for use as safety, security glazing, roofing, greenhouses, signs, bush shelters, lighting fixtures etc. Fairly bespoke applications but of interest to Jordan. Currently sheet material is imported from Israel, Saudi Arabia and China. Lehem (Saudi Arabia) distributed US$50M of GE’s material into the region last year. Yapsercom (UAE) also distributes GE’s products. Generally a high volume but bulky relatively low value material and therefore distribution costs are likely to be high. There doesn’t appear to be a significant regional producer of polycarbonate sheet but Spyro (Israel) provides an interesting business model to be applied in Jordan

I. Description of the Business

Extruded Thermoplastic Sheet Manufacturer. Capital intensive business with the ability to support its products with post sales equipment, cutting, finishing and handling tools. This business is likely to produce bespoke batches of (colored) material to meet niche opportunities.
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<th>Mineral Exploration Consortium</th>
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<td><strong>Sector:</strong> Mining and Processing</td>
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**Potential Opportunity**

According to the Natural Resources Authority (NRA) there are many potential mineral occurrences in Jordan that remain to be identified, surveyed, and proven.

Development of reliable data and information on the nature and extent of mineral reserves could greatly accelerate the development of the mining and processing sector in Jordan.

The opportunity is the creation of a specialist mineral exploration company with a mandate to explore, prove, and map mineral resources throughout Jordan.

**I. Description of the Business**

The approach is to establish a mining exploration company that would have a non-exclusive mandate to explore for minerals on behalf of the NRA/Government of Jordan. The company would have wide-ranging rights (geographically and not limited to specific minerals) to explore for minerals and exploit the resulting finds. The company could auction the resulting mining rights to its discoveries, with returns to Government being by way of a royalty formula on actual amounts mined.

An alternative approach is the British Geological Survey (BGS) Special Purpose Unit (PPP) model. BGS operates on an annual budget of JD41M, half provided by HM Government and the other half from private and public surveys. Jordan could establish a similar approach by combining the geological skills of the NRA, ownership and licensing with financial support from investors. Licensing fees, potential further mining investments, and contract geological surveys fees would be the revenue source.