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The Directors
Lumena Resources Corp.
2801, Shui On Centre
6-8 Harbour Road
Wanchai
Hong Kong

Subject: Independent Technical Review
Dahongshan, Guangji, and Muma Sodium
Sulfate Mining and Plant Operations
Sichuan Province, The People's Republic of China

Dear Sirs:

John T. Boyd Company (BOYD) was engaged in January 2008 by Lumena Resources Corp. (Lumena) to provide independent technical consultancy services relating to the review of Mirabilite mines and processing plants located in Sichuan Province, The People's Republic of China (PRC), and of the following:

- Sichuan Chuanmei Mirabilite Co., Ltd. (Chuanmei Mirabilite).
  - Dahongshan Mine and processing operation.
- Sichuan Chuanmei Special Glauber Salt Co., Ltd. (Chuanmei Glauber Salt).
  - Guangji Mine and processing operation.
  - Muma Mine and the proposed processing operation.

Dahongshan and Guangji mines and processing operations are located 20 km northwest of Meishan City; Muma Mine and the proposed processing operation are located 11 km northeast of Pengshan County in Sichuan Province, (PRC).

We have provided independent technical consultancy services for a review of the operating Mirabilite mines and plants of Chuanmei Mirabilite and Chuanmei Glauber Salt. The results of our review are discussed in the appended Independent Technical Review (ITR) report.

Lumena is an indirect shareholder in Chuanmei Mirabilite and Chuanmei Glauber Salt, and has established itself as a leader in the sodium sulfate (Thenardite) industry. Lumena applies proven solution mining production techniques with advanced processing technology to produce a high purity, medical and pharmaceutical grade Thenardite with high crystalline strength, stability, and granules of uniform sizes. Lumena employs an operating structure based on vertical integration. The company owns, designs, and operates its mines and processing facilities. Lumena has assembled an experienced and capable management team and a highly skilled and competent research and development group.

BOYD has prepared the ITR report in accordance with the requirements of Chapter 18 of the Rules Governing the Listing of Securities on the Stock Exchange of Hong Kong Limited (Listing Rules), save and except for Rule 18.09(8) of the Listing Rules. Lumena has represented that it is not an exploration company and we are not aware that it has conducted any exploration programs. All drilling and assay work was completed by third-party exploration teams, and to BOYD's knowledge, Lumena has not been involved in exploration activities to a material degree. Exploration activities on Lumena's resource holdings have been conducted in the past by independent geologic exploration teams. We are not aware of any past or future exploration plans for any of the subject mines on the part of Lumena. It is our understanding that Lumena's business activities are limited to mining and processing of sodium sulfate.

BOYD was provided the resource tonnage estimates for the subject mines prepared using Chinese Standards (Specifications for Geological Exploration of Salt-Lake and Salt Minerals, DZ/T0212-2002 issued by the Ministry of Land and Resources of the PRC) and are based on estimates of in-place Glauberite (ore) and equivalent Thenardite (Na_2SO_4) product. BOYD conducted an extensive review of the Mirabilite resources on the subject mining and exploration right areas and prepared resource estimates for Lumena using the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves also known as the JORC Code as published by Joint Ore Reserves Committee of The Australasian Institute of Mining and Metallurgy, Australian Institute of Geoscientists and Minerals Council of Australia. Resource and reserve definitions stated in the JORC Code are contained in the Glossary and Definitions section of the ITR report. Our independent resource and reserve estimates were developed from site visits, exploration and geologic reports, and exploration data.

In preparing the ITR report, we have relied on reserve, operating, and other data provided by Lumena and discussions and observations completed during the BOYD project team's visits to the respective operations.

A four-member BOYD team visited the underground facilities and operations of Dahongshan, Guangji, and Muma mines on January 24–27, 2008. A BOYD representative visited the underground facilities and operations of Guangji Mine on March 3, 2008. During such visits, BOYD senior technical specialists met with Lumena technical personnel who presented the geology and resources for the mine plan area and proposed expansion areas. Lumena provided BOYD with copies of the data presented in these meetings and follow-up data as requested. During the mine and plant site visits, detailed discussions were conducted with mine managers and personnel concerning ore resources, mining practices, and future mine and processing plans. Lumena subsequently provided future mine plan maps for Dahongshan, Guangji, and Muma. Three BOYD representatives subsequently visited Dahongshan and Guangji operations on June 4–7, 2008. We were also provided with output and capital spending projections for 2009 and 2010.

BOYD is a privately owned consultancy firm with headquarters in the United States. We are internationally recognized for our expertise in exploration, resource/reserve studies, mine development, and valuation. This ITR report was prepared by a project team with extensive professional experience in mineral resource and mine evaluations. The key professionals for this project are listed in the Summary section of this ITR report.

BOYD has no ownership or shareholding interest in the Dahongshan, Guangji, and/or Muma operations; Lumena; Chuanmei Mirabilite; Chuanmei Glauber Salt; or any related assets. There have been no transactions between BOYD and its employees either in the past or presently and Lumena, Chuanmei Mirabilite, Chuanmei Glauber Salt, or any related assets. BOYD does not have any claims outstanding with Lumena, Chuanmei Mirabilite, Chuanmei Glauber Salt, or any related assets. Payment for our services is not contingent upon our opinions regarding the merits of the project or approval of our work by Lumena or the outcome of the Global Offering. BOYD has completed its work in accordance with US and international ethical standards for professional engineering.

Drafts of this report were provided to Lumena and its advisors for the purpose of confirming the accuracy of the information in the document and presenting the conclusions developed from the project data.

We have exercised reasonable care in reviewing the information provided, but assumed all historic data have been accurately reported and all forward projections are prepared and/or approved by competent professionals and Lumena management. We have no reason to believe that any material facts have been withheld or that a more detailed analysis may reveal additional material information. Our ITR report has been completed in accordance with generally accepted standards and practices employed in the international mining industry. Although we have compared key information provided by Lumena with expected values, the accuracy of the results and conclusions of this ITR report are reliant on the accuracy of the information provided. We are not responsible for any material errors or omissions in the information provided.

The findings and conclusions presented in this ITR report represent the independent professional opinion of BOYD based on our review of available project information. We have made no attempt to verify the technical and geological information presented in the reference material documents. We assume the provided data has been prepared by competent engineers and geologists, although we have conducted our own limited due diligence in checking for consistency and reasonableness. Our expertise is in technical and financial mining issues, and we are not qualified to offer, nor do we represent that any of our findings include, matters of a legal or accounting nature. Aspects of Lumena's activities relating to legal issues and matters relating to commercial, enterprise accounting, surface land usage, and appraisal are expressly omitted, except to the extent of technical, operational, or cost aspects of the subject operations. BOYD's independent analyses of the available data have been developed in a manner consistent with industry standards and engineering practices. We believe our conclusions are reasonable assessments of the information provided.

The ability of Lumena, or any mine operator, to achieve the projections contained in this ITR report is dependent on numerous factors that are beyond the control of, and cannot be anticipated by, BOYD. These factors include mining and geologic conditions, the capabilities of management and employees, the securing of required approvals and permits in a timely manner, etc. Unforeseen changes in regulations could also impact performance. We believe all findings and conclusions to be reasonable but we do not warrant this report in any manner, express or implied.

This report only addresses technical (e.g., reserve, mining, etc.) issues. BOYD's review is limited to mines and processing plants and does not consider corporate or other downstream costs.

Respectfully submitted,

JOHN T. BOYD COMPANY
By:

John T. Boyd II
President and CEO

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GLOSSARY AND DEFINITIONS

Alluvium	Sediments that were deposited by a river or other moving water.
Anhydrous Sodium Sulfate	The water-free product produced from naturally sodium-sulfate-bearing brines and crystalline evaporate deposits.
Anticline	A fold in the earth's strata that is convex upwards.
Argillaceous	Rocks that contain a significant portion of clay materials.
Baumé Gravity	Designating or confirming to either of the scales used by the French chemist, Antoine Baumé (1728-1804). One scale, which is used with liquids heavier than water, sinks to 0º (B or Bé, for Baumé) in pure water and to 15º (B or Bé) in a 15% salt solution. The other scale for liquids lighter than water sinks to 0º (B or Bé) in a 10% salt solution and to 10º (B or Bé) in pure water.
Bord-and-Pillar	Method of underground mine extraction characterized by ore removal around non-mined pillars. Also known as room-and-pillar.
BOYD	John T. Boyd Company.
Cell or Block	A defined area of Glauberite ore bordered by roadways, usually rectangular in configuration, in which a series of roadways and crosscuts are developed; the remaining pillars and roof strata are drilled and blasted, with the resulting bulk blasted area subject to water inundation and recovery of Mirabilite.
Centrifuge	A device that uses centripetal acceleration to separate substances of different densities.
Chinese Standard	Specifications for Geological Exploration of Salt – Lake and Salt Minerals, DZ/T0212-2002, issued by the Ministry of Land and Resources of the PRC.
Chuanmei Glauber Salt	Sichuan Chuanmei Special Glauber Salt Co., Ltd.
Chuanmei Mirabilite	Sichuan Chuanmei Mirabilite Co., Ltd.
Cyclone	A device used to sort particles of the same density by size using centrifugal forces.
Desiccation	The removal of water by exposure to a chemical that attracts water molecules to itself.
Dip	Angle at which strata are inclined in relation to the horizontal plane.

Evaporite	Water-soluble mineral sediments that are formed when surface water evaporates.
Face	Mine location where active ore extraction is taking place.
Feasibility Study	By international standards, assesses in detail the technical soundness and economic viability of an undeveloped mining project and serves as the basis for the investment decision and as a bankable document for project financing. The study is based on a detailed mine plan and constitutes an audit of all geological, engineering, environmental, legal, and economic information accumulated on the project. Generally, a separate environmental impact study is required.
Fm	Formation.
FSR	Feasibility Study Report.
GB/T 28001-2001 Occupational Safety and Health Management System	GB/T 28001-2001 is a set of standards adopted by the SAC for occupational safety and health management.
Glauberite	$Na_2SO_4 \cdot CaSO_4$ — the ore in the ground. Only the Na_2SO_4 is soluble and is recovered as product. Typically the Na_2SO_4 is 35% to 40% of the ore.
Glauberite Bed	Portion of the strata that contains Glauberite ore in a distinct layer.
Indicated Mineral Resource	That part of a Mineral Resource for which tonnage, densities, shape, physical characteristics, quality, and mineral content can be estimated with a reasonable level of confidence. It is based on exploration, sampling, and testing information gathered through appropriate techniques from locations such as outcrops, trenches, pits, workings, and drill holes. The locations are too widely or inappropriately spaced to confirm geological and/or quality continuity but are spaced closely enough for continuity to be assumed.
Inferred Mineral Resource	That part of a Mineral Resource for which tonnage, quality, and mineral content can be estimated with a low level of confidence. It is inferred from geological evidence and assumed but not verified geological and/or quality continuity. It is based on information gathered through appropriate techniques from locations such as outcrops, trenches, pits, workings, and drill holes, which may be limited or of uncertain quality and reliability.
ITR	Independent Technical Review.
JORC	Joint Ore Reserves Committee of The Australasian Institute of Mining and Metallurgy, Australian Institute of Geoscientists and Minerals Council of Australia.

JORC Code	Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves.
kg	Kilogram.
km	Kilometer.
kV	Kilovolt.
kW	Kilowatt.
kWh	Kilowatt-hour.
Leaching	The process of extracting Na_2SO_4 from Glauberite by dissolving the solid ore in water.
Lumena	Lumena Resources Corp.
m	Meter.
m^2	Square meter.
m^3	Cubic meter.
m^3/min	Cubic meters per minute.
Marketable Reserves	Saleable Thenardite product from Recoverable Reserves after accounting for mining and processing losses.
Marketable Ore Reserves	The tonnages of ore, at specified moisture and quality, available for sale after beneficiation of Ore Reserves. Marketable Ore Reserves should be reported in terms of Probable Marketable Ore Reserves or Proved Marketable Ore Reserves.
Measured Mineral Resource	That part of a Mineral Resource for which tonnage, densities, shape, physical characteristics, quality, and mineral content can be estimated with a high level of confidence. It is based on detailed and reliable exploration, sampling, and testing information gathered through appropriate techniques from locations such as outcrops, trenches, pits, workings, and drill holes. The locations are spaced closely enough to confirm geological and quality continuity.
Medical Thenardite	The Mirabilite bulk drug used for pharmaceutical purposes, which has a minimum $Na_2SO_4 \cdot 10H_2O$ purity of 99.4% and a Na_2SO_4 purity of 99.0%.
Mine Plan	By international standards includes the current documentation of the state of development and projected exploitation of a deposit during its economic, life, including current mining plans. It is generally made by the operator of the mine. The study takes into consideration the quantity and quality of the minerals extracted during the reporting time, changes in

	economic viability categories due to changes in prices and costs, development of relevant technology, newly imposed environmental or other regulations, and data on exploration conducted concurrently with mining. A map of the deposit is included showing the roadway layout, production cell areas, and the projected annual sequence of extraction.
Mineral Resource	A concentration or occurrence of material of intrinsic economic interest in or on the earth's crust in such form, quality and quantity that there are reasonable prospects for eventual economic extraction. The location, quantity, quality, geological characteristics, and continuity of Mineral Resource are known, estimated, or interpreted from specific geological evidence and knowledge. Mineral Resources are sub-divided, in order of increasing geological confidence, into Inferred, Indicated, and Measured categories.
Mining Rights	The rights to mine mineral resources and obtain mineral products in areas where mining activities are licensed.
Mirabilite	$Na_2SO_4 \cdot 10H_2O$ — the dissolved Na_2SO_4 that is piped out of the mine with some minor impurities.
MLR	Ministry of Land and Resources of the PRC.
mm	Millimeter.
MPa	Megapascal.
Mt	Million tonnes.
Mtpa	Million tonnes per annum.
mtu	Metric tonne unit.
NaCl	Sodium chloride.
Na_2SO_4	Sodium sulfate.
Ore	A naturally occurring solid material, from which metal or valuable mineral can be extracted.
Ore Processing	The process through which physical or chemical properties, such as density, surface reactivity, magnetism and color, are utilized to separate the useful components of ore from useless stones, and which are then concentrated or purified by means of flotation, magnetic selection, electric selection, physical selection, chemical selection, reselection, and combined methods.

Ore Reserve	The economically mineable part of a Measured or Indicated Mineral Resource. It includes diluting materials and allowances for losses that may occur when the material is mined. Appropriate assessments, which may include feasibility studies, have been carried out and include consideration of the modification by realistically assumed mining, metallurgical, economic, marketing, legal, environmental, social, and governmental factors. These assessments demonstrate at the time of reporting that extraction could reasonably be justified. Ore Reserves are sub-divided in order of increasing confidence into Probable Ore Reserves and Proved Ore Reserves.
Outcrop	The part of the Glauberite bed exposed to the surface.
Out-of-seam	Non-Glauberite material above and below the Glauberite bed recovered during mining.
Overburden	Waste material overlying the Glauberite bed.
Partings	Rock material within the Glauberite Bed.
PDR	Preliminary Design Report.
pH	A measure of acidity or alkalinity of a solution. Aqueous solutions at 25°C with a pH less than seven are considered acidic, while those with a pH greater than seven are considered basic (alkaline).
Pillar	Column of Glauberite zone left behind for support in a bord-and-pillar mine.
PLC	Programmable logic chips — computer controlled systems.
PRC	People's Republic of China.
Probable Ore Reserve or Probable Reserve	The economically mineable part of an Indicated and, in some circumstances, a Measured Mineral Resource. It includes diluting materials and allowances for losses that may occur when the material is mined. Appropriate assessments, which may include feasibility studies, have been carried out and include consideration of and modification by realistically assumed mining, metallurgical, economic, marketing, legal, environmental, social, and governmental factors. These assessments demonstrate at the time of reporting that extraction could reasonably be justified.
Processing Plant	Facility used to recover Thenardite product from Mirabilite, including removal of impurities and drying operations.
Productivity	Measurements of worker efficiency usually expressed in terms of tonnes per unit of time.

Proved Ore Reserve or Proved Reserve	The economically mineable part of a Measured Mineral Resource. It includes diluting materials and allowances for losses that may occur when the material is mined. Appropriate assessments, which may include feasibility studies, have been carried out and include consideration of and modification by realistically assumed mining, metallurgical, economic, marketing, legal, environmental, social, and governmental factors. These assessments demonstrate at the time of reporting that extraction could reasonably be justified.
Roadheader	A crawler-mounted electro-mechanical machine used to excavate underground passages by breaking and cutting the strata with mechanical force.
Roadway	Underground entry developed by drill and blast mining methods.
RMB	Renminbi/yuan — the lawful currency of the PRC.
ROM	Run-of-mine-the as-mined material during room-and-pillar mining operations as it leaves the mine site (mined Glauberite ore and out-of-seam dilution material).
Shotcrete	Concrete that has been pneumatically projected onto a surface at high pressures — used to stabilize loose or weak underground surfaces, including the roof, floor, and walls.
SOE	State-owned enterprise in the PRC.
Solution Mining	A method of mining where the underground ore area is divided into production cells which are flooded with water to dissolve desired materials and the resulting solution is removed from the cells by pumps.
Strike	The line representing the intersection of a stratum with the horizontal, typically expressed as the compass bearing along which the line lies.
Subcrop	Projected limit of mineral deposition where the bed outcrop is overlain by surface alluvial material (i.e., bed outcrop is obscured).
Subsidence	Lowering of the earth's surface as a result of the removal of a portion of the underlying strata.
Thenardite	Anhydrous Na_2SO_4, the dry product sold which has a minimum Na_2SO_4 purity of 95% or the part of the ore that is pure Na_2SO_4.
Tonne	Metric ton equal to 1,000 kilogram.
tpa	Tonnes per annum.

tph	Tonnes-Per-Hour.
UG	Underground.
USGS	United States Geological Survey.
Yield	Saleable portion of Thenardite recovered from Mirabilite during processing.

1.0 SUMMARY

1.1 Introduction

John T. Boyd Company (BOYD) was engaged in January 2008 by Lumena Resources Corp. (Lumena) to provide independent technical consultancy services relating to the review of Mirabilite mines and processing plants located in Sichuan Province, PRC, of the following subsidiaries of Lumena:

- Chuanmei Mirabilite.
- Chuanmei Glauber Salt.

Lumena applies proven solution mining production techniques with advanced processing technology to produce a high purity, medical and pharmaceutical grade Thenardite with high crystalline strength, stability, and uniform size granules. Lumena employs an operating structure based on vertical integration. Lumena owns, builds, and operates its mines and processing facilities, and it has assembled an experienced and capable management team and a highly skilled and competent research and development group.

1.2 Summary of Operations

The scope of this review includes the Dahongshan, Guangji, and Muma areas as identified by Lumena, and located in the northwestern part of Sichuan Province. A majority of China's Thenardite output is concentrated in Sichuan and Jiangsu provinces. There are approximately 200 producers with natural Thenardite production facilities, 59 of which are considered major producers. The average output from the major producers ranges from 30,000 to 500,000 tpa per producer and the average output among small producers ranges from 150 to 200 tpa. A summary of operations included in this review is as follows:

Present Controlling Company Mining Right Area	Operating Status	Design Production Capacity (Thenardite-tpa) December 2008	Planned
Chuanmei Mirabilite			
Dahongshan	Active	600,000	600,000
Chuanmei Glauber Salt			
Guangji	Active	1,000,000	1,000,000
Muma	Idle[(a)]	0	1,200,000[(b)]
Total		1,600,000	2,800,000

(a) Former operations now idle and new operations under development.

(b) From the third quarter of 2010 onward. A 200,000 tpa medical grade Thenardite-producing facility is projected to be completed first by the end of 2009.

The Dahongshan operation is located approximately 20 km northwest of Meishan City in Sichuan Province. The Guangji operation is located approximately 12 km south-southwest of the Dahongshan area, and the Muma operation is located approximately 11 km northeast of Pengshan County, Sichuan Province.

Forward plans developed by Lumena include: (1) maintaining the Dahongshan operation at 0.6 Mtpa with the expansion of the mining area, (2) maintaining the Guangji underground mine/processing operation (1.0 Mtpa), and (3) developing the Muma operation (0.2 Mtpa by the end of 2009 and 1.2 Mtpa capacity by the third quarter of 2010). Annual Thenardite production capacity of all three operations is planned to expand to 2.8 Mtpa from the fourth quarter of 2010 onward.

Detailed information on the Authorized Mining Right Areas is:

Mining Right Area	Mining Right Certificate No.	Output Capacity (Mtpa) Present	Output Capacity (Mtpa) Authorized	Authorized Seams To be Mined	Authorized Mining Elevation (m)	Mining Method	Area (km²)	(Month/Year) Mining Right Grand Date	(Month/Year) Expiration
Dahongshan	5100000820458	0.6	1.2	1, 2	+380 +175	UG	3.69	09/2008	09/2038
				6,7,8	+425 +206				
Guangji	5100000810456	1.0	2.4	1	+318 -87	UG	3.88	09/2008	09/2038
				2	+353 -60				
Muma	5100000820457	0	2.8	1	+302 +218	UG	3.70	09/2008	09/2038
				2	+332 +220				
				3	+340 +228				

1.3 Reserves/Resources

BOYD has prepared JORC Code compliant resource estimates for the Mining Right areas as of January 1, 2009. Our estimates of the Proved and Probable Reserves are presented as follows:

		JORC Code January 1, 2009							
		Thenardite (Mt)							
		In-Place Resource				Marketable Reserves			
Ore Zone	Average Thickness (m)	Measured	Indicated	Inferred	Total	Proved	Probable	Total	% of Reserves
Dahongshan Mine									
6,7,8,	6.1	13.80	2.69	—	16.49	8.28	1.62	9.90	51
1,2	5.8	11.68	4.14	—	15.82	7.01	2.49	9.50	49
Total		25.48	6.83	—	32.31	15.29	4.11	19.40	100
Guangji Mine									
2L	5.7	11.85	8.05	0.96	20.86	7.10	4.83	11.93	58
1L	4.8	8.80	5.71	0.65	15.16	5.27	3.43	8.70	42
Total		20.65	13.76	1.61	36.02	12.37	8.26	20.63	100
Muma Mine									
3	5.7	9.70	3.10	—	12.80	5.82	1.57	7.39	43
1	4.9	—	16.26	—	16.26	—	9.75	9.75	57
Total		9.70	19.36	—	29.06	5.82	11.32	17.14	100
Total									
Total		55.83	39.95	1.61	97.39	33.48	23.69	57.17	100

As shown, 4% of the total Guangji resources are in the Inferred Resource category due to the limited amount of exploration drilling. While Inferred Resources reflect a low degree of confidence of existence of the resources, based on the stability of the depositional environment, we expect that additional exploration is likely to upgrade the majority of the resources to Measured or Indicated status. Inferred tonnage cannot be included in JORC compliant estimates of Marketable Reserves shown above due to the low degree of geologic assurance of Inferred Resources. BOYD has prepared estimates of the Marketable Inferred Resources at Guangji to provide guidance as to what the marketable tonnage would be if the Inferred Resources exist as projected. These estimates were prepared using the same methodology as in adjacent Indicated areas. We estimate there are approximately 1 Mt of Inferred Marketable Resources. Additional drilling would be required to potentially upgrade the Inferred Resource tonnage to Indicated status. It is important to understand that it is not appropriate to combine Inferred Resources with any Reserve estimates, as there is no direct connection between Inferred Mineral Resources and any category of Ore Reserves in the JORC Code.

There are significant additional undeveloped Glauberite resources at the mine sites. At Dahongshan and Guangji, potentially mineable upper ore zones overlie the zones but are not included in our resource estimates since they are not included in the mining rights. There are also additional undeveloped resources adjacent to all mining right areas.

BOYD recommends some additional exploratory drilling be completed on the Guangji (two drill core holes) and Muma (two drill core holes) areas.

1.3.1 Mine Service Life

Mine service life estimates are as follows:

Mine Area	Marketable Reserves Thenardite (Mt)	Mine Life (Years)
Dahongshan	19.40	32
Guangji	20.63	21
Muma	17.14	14

There are significant undeveloped Glauberite resources adjacent to the mining right areas. If Lumena is successful in obtaining the mining rights to these adjacent areas, then the mine service lives could be extended.

1.4 Present Dahongshan Operation

The Dahongshan operation is fully developed and has an existing capacity of 0.6 Mtpa of Thenardite product (mining/processing). Underground operation mining and Mirabilite solution recovery, and processing used by Chuanmei Mirabilite are effective and consistent with industry practices. The operation has a good safety record and is in compliance with environmental protection guidelines of the PRC. Although mining rights to the other (beyond Nos. 1 and 2 beds) Glauberite underlying the original mining right area and to all beds underlying the adjacent Dahongshan Expansion Area has been granted, the operation's capacity is planned to be maintained at 0.6 Mtpa. It is BOYD's opinion that Dahongshan, based on its successful operating history, has no foreseeable obstacles to maintain the current production level.

1.5 Present Guangji Operation

Guangji area is located 12 km south-southwest of Dahongshan, and the construction of the 1.0 Mtpa processing plant and other surface facilities were completed in 2007. As of December 2008, Guangji had achieved the 1.0 Mtpa Thenardite output capacity. Chuanmei Glauber Salt plans to maintain the Guangji Thenardite operation at 1.0 Mtpa capacity. A dual-circuit power supply system was installed in April 2008. Construction of the three inclines was finished in June 2007. Roadheaders are used in the development of main roadways and part of the air-return incline.

1.6 Present Muma Operation

Chuanmei Glauber Salt acquired Muma mining and processing operations in September 2007. Muma had the authorized producing level at 0.3 Mtpa before the acquisition. Chuanmei Glauber Salt expanded the No. 3 Glauberite Bed mining right area by adding the Nos. 1 and 2 Glauberite beds.

The original Muma mine had a limited mining right area of 0.3898 km^2. Chuanmei Glauber Salt demolished the old processing facilities completely after acquisition and plans to complete the construction of a new plant with a processing capacity of 0.2 Mtpa by the end of 2009 and 1.2 Mtpa of Thenardite products by the fourth quarter of 2010. The new mining right certificate covering 3.6971 km^2 was issued in September 2008.

Similar mining practices as used in Dahongshan are employed by Muma. The original two inclines accessing the existing underground workings will be kept, but relegated to ventilation and service duties, with a new main incline constructed. Expansion of the operation to 1.2 Mtpa will require some infrastructure upgrades and construction of new processing facilities. BOYD observed during our visit to the site in June 2008, demolition work was completed and preparation for new plant construction was under way. Based on Lumena's recent experience at Guangji, BOYD opines the RMB406 million for the 0.2 Mtpa facilities and RMB646 million for the 1.0 Mtpa facilities' capital budget and construction schedule for Muma Mine and processing plant are reasonable, on the assumption that the construction of the 1.0 Mtpa facilities commences in early 2010.

1.7 Processing Technology

Processing technology is one of the principal strengths, which provides Lumena a competitive advantage. Chuanmei Mirabilite and Chuanmei Glauber Salt do not manufacture the individual process equipment and control circuitry utilized in the facilities, but integrate the equipment supplied by several manufacturers into its own proprietary system that enables production of anhydrous sodium sulfate. The technology was primarily developed internally, led by the research and development group of Lumena, headed by Mr. Li Chunxian. Mr. Li has focused his 40-plus years of experience in solution mining and Mirabilite processing on raising the standards of purity and improving crystalline structure and process control. Significant research and development has occurred in these areas over the past 10 to 15 years. The technology focuses on the application of Thenardite production, energy efficiencies, pre-treatment, recirculation, extraction, and refinement.

The significant differences between the technologically advanced process used at Guangji plant and more conventional processes are:

- The research and development efforts advanced by Lumena have been applied in the process to improve the purity, size, and stability of the granule crystalline structure. The ability to control the physical and chemical properties of Thenardite is essential for commercial production of specialty Thenardite.

- Higher energy efficiencies have been achieved by the technological rationalizations and process control circuitry implemented by Lumena.

- Mirabilite processing, as is typical with most extractive and distillation technologies, requires significant amounts of energy to recover the target product. The Lumena process at Guangji consumes approximately 33% less energy per tonne of anhydrous sodium sulfate produced than more conventional processes.

- Energy efficient and corrosive resistant materials such as titanium and stainless steel have been incorporated into process equipment design, which provide for lower operating cost and longer asset life.

- Lumena is environmentally conscious and has developed their process without having any effluent discharge to the ground water system.

1.8 Two-Year Output Plan

Lumena's internally prepared two-year output plan reflects robust growth in total Thenardite production and sales. The focus on lowering costs through enhanced processing technology (Guangji and Muma) and economies of scale are key drivers to Lumena's expanded output projections.

Lumena's Thenardite sales by product are as follows:

Thenardite Product	Location	Product Tonnage (tonnes-000) Actual 2008	Projected 2009	Projected 2010
Powder	Dahongshan	478	500	550
	Guangji	—	—	—
	Muma	—	—	200
	Subtotal	478	500	750
Specialty	Dahongshan	—	—	—
	Guangji	927	1,000	1,000
	Muma	—	—	300
	Subtotal	927	1,000	1,300
Medical Grade	Dahongshan	99	100	50
	Guangji	—	—	—
	Muma	—	—	200
	Subtotal	99	100	250
Total — Lumena		1,504	1,600	2,300

1.8.1 Thenardite Production

As shown in the following table, the projected growth of Lumena from 0.69 Mt in 2007 to 2.3 Mt in 2010 is based on:

- Maintaining Dahongshan's production at 0.6 Mtpa.
- Maintaining Guiangji's production at 1.0 Mtpa.
- Developing Muma operations to 1.2 Mtpa capacity in 2010 (rehabilitation and expansion of the existing underground mine and construction of the new processing plant and surface facilities planned in 2009 and 2010).

Lumena's performance in developing Guangji provides confidence that it can achieve its production forecast. Projected Thenardite production (Mt) is as follows:

Mine	Thenardite Production (Mt) Actual 2007	Actual 2008	Projected 2009	Projected 2010
Dahongshan	0.61	0.58	0.60	0.60
Guangji	0.09	0.93	1.00	1.00
Muma	—	—	—	0.70
Total	0.7	1.51	1.60	2.30

1.8.2 Capital Spending

The Lumena 2-Year Output Plan includes RMB406 million in capital spending to develop a 0.2 Mtpa medical Thenardite production facility at Muma in 2009 and RMB646 million capital spending to develop an additional 1.0 Mtpa production facility at Muma in 2010. BOYD concludes the combined RMB1,052 million capital budget is reasonable.

1.9 Conclusion

It is BOYD's opinion that there is substantial potential to significantly increase Lumena's currently planned production levels via further acquisitions and new operations development. Lumena has the established experience to become a dominant sodium sulfate producer.

1.10 Scope of Work

Based on source data provided by Lumena and mine site observations and discussions, our scope of work for completing an independent technical review included an assessment of:

- Thenardite resources and reserves as of January 1, 2009 according to the JORC Code. It should be noted that to be designated as a reserve, the estimated tonnage must be technically, legally, and economically mineable as of the date of the estimate.
- Mining and processing operating, including:
  - Current mining practices and technology.
  - Current employment levels.
  - Historical capital investment and operating costs.
  - Existing mine infrastructure.
  - Current status of compliance with environmental regulations/standards.
- Future two-year mine output plans, as prepared by or for Lumena, and reasonableness of reported mine plans regarding:
  - Consistency of mining plan and forecasts based on reserve estimate.
  - Output assumptions.
  - Projected capital costs.
  - Proposed mine infrastructure.

1.11 Work Program

A four-member BOYD team (Messrs. Anderson, Han, Li, and Rohanna) visited the underground facilities and operations of Dahongshan, Guangji and Muma mines on January 24-27, 2008. A BOYD representative (Mr. Zhao) visited the underground facilities and operations of Guangji Mine on March 3, 2008. During such visits, BOYD senior technical specialists met with Lumena technical personnel, who presented the geology and resources for the mine plan area and proposed expansion areas. Lumena provided BOYD with copies of the data presented in these meetings and follow-up data as requested. In addition, BOYD geologists and engineers visited the Dahongshan and Guangji Mines and processing plants. In addition, the Muma mine and the proposed processing plant location were visited. During the mine and plant site visits detailed discussions were conducted with mine managers and personnel concerning salt resources, mining practices, and future mine and processing plans. Messrs. Zhong, Li, and Zhao subsequently visited the Dahongshan and Guangji facilities on June 4-7, 2008.

BOYD addressed the specified scope of work using source data as provided by Lumena. Available reserve (resource) tonnage estimates for the various properties are prepared using Chinese Standards

(Specifications for Geological Exploration of Salt-Lake and Salt Minerals, DZ/T0212-2002 issued by the Ministry of Land and Resources of the PRC) and are based on estimates of in-place Glauberite (ore) and equivalent Thenardite (Na_2SO_4) product. The available resource estimates were re-estimated by BOYD using the JORC standards.

We were also provided with output and capital spending projections for 2009 and 2010.

1.12 Project Team

The BOYD project team has extensive professional experience in mineral resource and mine evaluations. Key professionals for this project include:

Mr. Ronald L. Lewis — Chief Operating Officer and Managing Director, BS (Civil Engineering)

Mr. Lewis has 38 years of experience in assessment and evaluation of coal mining companies, with specialized expertise in the areas of coal/mineral reserve estimation, opencut and underground mine analysis, and economic assessment of mining operations. He is a Registered Professional Mining Engineer and a recognized expert in mining property valuation. Mr. Lewis is a Registered Member of the Society for Mining, Metallurgy, and Exploration, Inc., and is qualified as a Competent Person as defined in the JORC Code.

Mr. David L. Rohanna — Managing Director — EurAsia, BS (Economics/Geology), MS (Mining Engineering)

Mr. Rohanna has over 36 years of experience at the executive/senior manager level in the mining and materials handling industries with a broad and extensive background in engineering and project management with specialized worldwide expertise in coal and mineral preparation, ports, and bulk materials handling and transportation. Mr. Rohanna is a member of the Society for Mining, Metallurgy, and Exploration, Inc., the American Iron and Steel Engineering Society and the Cranes Manufacture's Association (CMA) Mechanical and Electrical Sub-Committees. Effective October 31, 2008, Mr. Rohanna left the employment of John T. Boyd Company.

Mr. Paul Anderson — Director of Geological Services, BS (Geology)

Mr. Anderson is a Certified Professional Geologist (AIPG) with 31 years of professional experience in exploration, evaluation, and development of coal and mineral deposits. Mr. Anderson is a Registered Member of the Society for Mining, Metallurgy, and Exploration, Inc., and a member of the American Institute of Professional Geologists, and is qualified as a Competent Person as defined in the JORC Code.

Mr. Jisheng Han — Mining Engineer, BS/MS (Mining Engineering)

Mr. Han has 12 years of mining industry experience in both China and the United States.

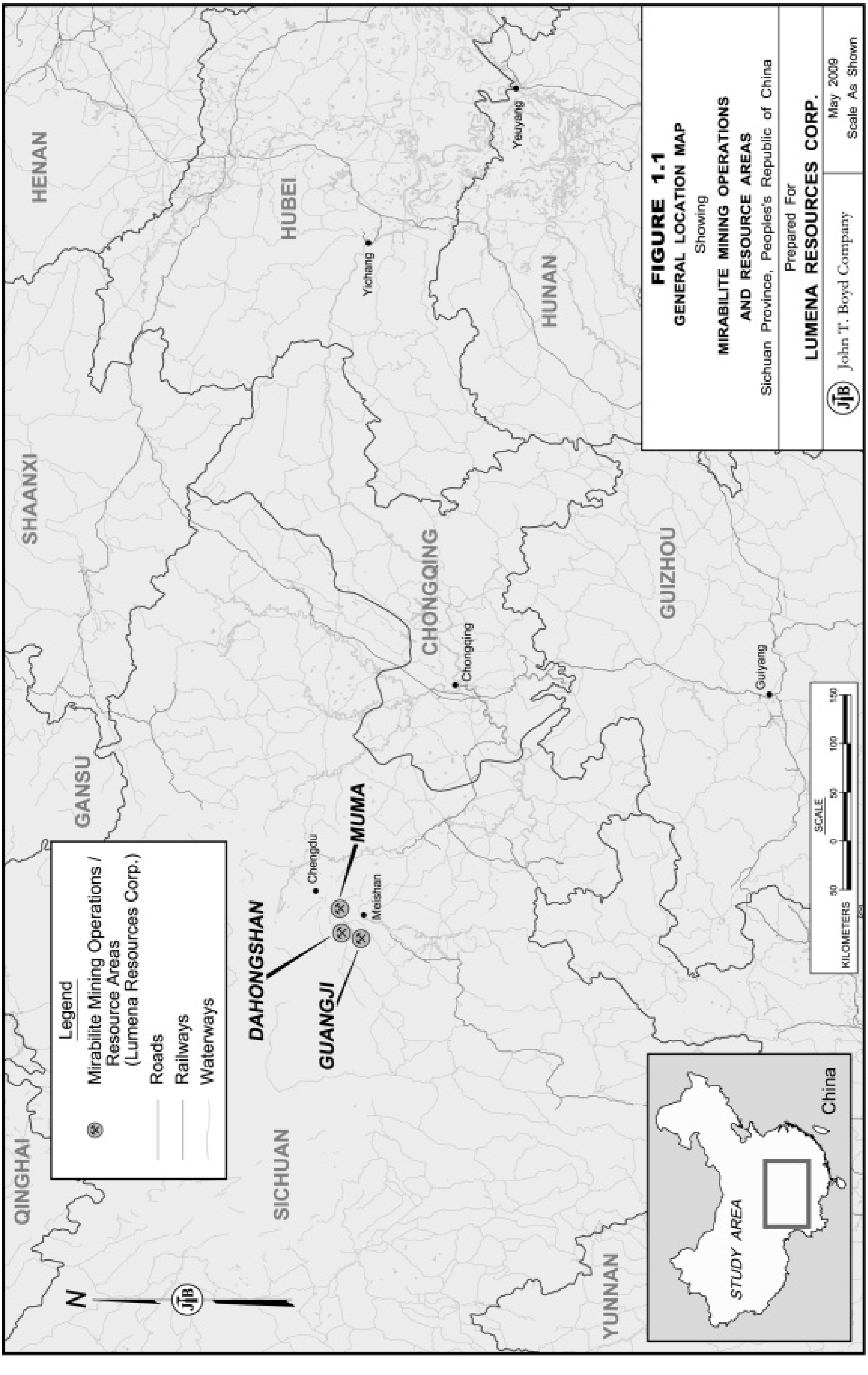
Mr. Li Rongjie — Geologist — China, M.E. (Geochemistry), B.E. (Geology)

Mr. Li has over one year of consulting experience in China.

Mr. Zhao Liang — Mining Engineer BS (Coal Mine Technology)

Mr. Zhao has 9 years of mining industry experience with a broad base of knowledge of coal mine design and feasibility gained at the Beijing Huayu Engineering Co. Ltd.

Following this page is Figure 1.1, General Location Map.


HENAN
SHAANXI
GANSU
QINGHAI
HUBEI
HUNAN
CHONGQING
GUIZHOU
SICHUAN
YUNNAN
Yichang
Yeuyang
Chongqing
Guiyang
Chengdu
Meishan
MUMA
DAHONGSHAN
GUANGJI
N
Legend
Mirabilite Mining Operations / Resource Areas (Lumena Resources Corp.)
Roads
Railways
Waterways
China
STUDY AREA
KILOMETERS
SCALE
50 0 50 100 150
FIGURE 1.1
GENERAL LOCATION MAP
Showing
MIRABILITE MINING OPERATIONS
AND RESOURCE AREAS
Sichuan Province, People's Republic of China
Prepared For
LUMENA RESOURCES CORP.
John T. Boyd Company
May 2009
Scale As Shown
DRAFT

2.0 GEOLOGY AND RESOURCES

2.1 Site Characteristics

As shown on Figure 1.1, the Dahongshan, Guangji, and Muma areas are located in the northwest part of Sichuan Province within the Chuanxi Mirabilite Field. While farming is the primary land use, the Mirabilite/Thenardite chemical industry accounts for the largest contribution to the local economy. Climate of the region is subtropical. With an average of 990 mm of rainfall annually, the rainy season occurs between June–August, when 63% of the total annual rainfall is received. Temperatures range from 3.7º C to 39.6º C and average 16º C.

Within the Dahongshan area, the topography is hilly, with three rivers crossing the region. Terrain within the Guangji mining right area ranges from hilly to the northwest to a gently sloping plain to the southeast. The Muma area is hilly.

Alluvial deposition occurs within the river valley areas within the Dahongshan area and overlies the bedrock throughout the Guangji and Muma areas. The presence of alluvium is significant because it is water-bearing and complicates the construction of inclines and/or shafts needed to access the underlying Glauberite beds. Also since the Glauberite beds are partly soluble, the beds are partially dissolved when exposed to ground water. Therefore, where the overburden depth is below (less than) 50 m, the beds are normally collapsed and also contain a considerable amount of water that complicates incline and shaft construction. These complications can result in short-term (several days) disruptions of operations. These water-bearing strata (overburden depths of less than 50 m) must also be avoided when mining the beds to avoid unstable roof and wet mining conditions.

2.2 Property Control

BOYD has prepared estimates of mineral resources for the areas and ore zones listed below:

Mining Right Area	Area km²	Ore Zone(s)
Dahongshan Mine	3.69	1,2 – 6,7,8
Guangji Mine	3.88	1 – 2
Muma Mine	3.70	1 – 3

Detailed information on the Authorized Mining Right Areas is:

		Output Capacity (Mtpa)						(Month/Year)	
Mining Right Area	Mining Right Certificate No.	Present	Authorized	Authorized Seams To be Mined	Authorized Mining Elevation (m)	Mining Method	Area (km²)	Mining Right Grand Date	Expiration
Dahongshan	5100000820458	0.6	1.2	1, 2	+380 +175	UG	3.69	09/2008	09/2038
				6, 7, 8	+425 +206				
Guangji	5100000810456	1.0	2.4	1	+318 -87	UG	3.88	09/2008	09/2038
				2	+353 -60				
Muma	5100000820457	0	2.8	1	+302 +218	UG	3.70	09/2008	09/2038
				2	+332 +220				
				3	+340 +228				

As shown, Lumena was granted the Mining Rights for the areas until 2038.

The Chinese Standard (Specifications for Geological Exploration of Salt–Lake and Salt Minerals, DZ/T0212-2002, issued by the Ministry of Land and Resources of the PRC) for mineral resource reporting includes all ore beds greater than 0.5 m and greater than 14% Na_2SO_4 content. There have been estimates prepared for the respective areas using the Chinese Standard methodology. These Chinese standard values are intended to provide an inventory of in situ ore occurrence but do not, and are not intended to, consider current mining economics, extraction recoveries, mining barriers, and losses due to geologic considerations. Since these estimates represent an in-place inventory and not the recoverable saleable product, the Chinese standard estimate values are significantly larger than estimates of Marketable Reserves and Resources presented in this report, which include all mining and processing considerations and are prepared in compliance with the JORC Code.

BOYD has prepared the ITR report in accordance with the requirements of Chapter 18 of the Rules Governing the Listing of Securities on the Stock Exchange of Hong Kong Limited (Listing Rules), save and except Rule 18.09(8) of the Listing Rules. Lumena has represented that it is not an exploration company and we are not aware that it has conducted any exploration programs. All drilling and assay work was completed by third-party exploration teams, and to BOYD's knowledge, Lumena has not been involved in exploration activities to a material degree. Exploration activities on Lumena's resource holdings have been conducted in the past by independent geologic teams. We are not aware of any past or future exploration plans for any of the subject mines on the part of Lumena. It is our understanding that Lumena's business activities are limited to mining and processing of sodium sulfate.

2.3 Geology

Areas of salt occurrence for the mining areas evaluated in this report are located in the Upper Cretaceous-age Guankou Formation and primarily consist of the mineral Glauberite ($Na_2SO_4 \cdot CaSO_4$). Typical composition of this ore is:

Chemical Constituent	Weight (%)
Na_2SO_4	37
$CaSO_4$	37
$MgSO_4$	<1
NaCL	<1
Other Insolubles	25

There are three mineral names that are applied to the in situ ore, the dissolved ore, and the final dry product after processing, as follows:

1. Glauberite — $Na_2SO_4 \cdot CaSO_4$ — This is the in situ ore. The Na_2SO_4 is the soluble part of the ore that is recovered as product. Typically the Na_2SO_4 is 35% to 40% of the ore.

2. Mirabilite — $Na_2SO_4 \cdot 10H_2O$ — This is the dissolved Na_2SO_4 portion of the ore (with minor impurities) recovered primarily from the underground solution mine cells and from surface leaching of ore removed during mine development.

3. Thenardite — Na_2SO_4 — This is the dry (anhydrous) product produced from the processing plant after impurities and water are removed (98% plus pure).

Since solution recovery is the primary method to recover Mirabilite from the underground mine, it is important to note that of the constituents of Glauberite, only a trace amount of $CaSO_4$, the minor amount of NaCl, and the Na_2SO_4, which is the marketable product, are readily soluble in water. Since Na_2SO_4 forms the majority of the soluble part of ore, it is possible to extract relatively pure Thenardite product (plus 95%) from the ore without extensive processing to remove impurities.

The Glauberite deposits were formed by the evaporation of large fresh water lakes. The deposition of thick beds of evaporite salts occurs slowly and requires a stable depositional environment. The exploration data in the area shows a very stable environment, and individual beds can be correlated for over 40 km. The salt beds occur in distinct zones separated by mudstone partings that represent the influx of mud into the lake during flooding events. The deposition of the mudstone intervals is also uniform and can be correlated over large distances.

The Glauberite deposition was cyclical, with zones of ore deposited within a 250 m vertical interval separated by mudstone and siltstone intervals. The Guankou Formation is subdivided into three major intervals, as follows:

- K_2g^1 is the oldest Cretaceous unit (K_2g^1) is about 60 m thick and consists of mudstone containing some anhydrite ($CaSO_4$) and minor amounts of Glauberite. Secondary calcite is common on surface outcrops. K_2g^1 in the area is about 220 m thick (base not exposed).

- K_2g^2 — K_2g^2 is a 227-to 243-m-thick sandstone-siltstone-mudstone unit containing the mineral-bearing Glauberite beds. K_2g^2 is divided into a lower mineral-bearing unit (K_2g^2-^{1}), an interbedded mudstone unit (K^2g^{2-2}), and an upper mineral-bearing unit (K_2g^{2-3}).

- K_2g^3 is the youngest Cretaceous unit (K_2g^3) consists of 70 to 85 m of argillaceous siltstone with sandy mudstone partings.

The ore-bearing K_2g^2 unit is further subdivided into three intervals as follows:

- K_2g^{2-1} is the lower ore-bearing unit (K_2g^{2-1}) is the most extensive part of the K_2g^2 interval and contains all Glauberite beds being mined at Dahongshan, Guangji, and Muma. All estimates of reserves and resources presented in this report are from ore zones within this interval.

  The K_2g^{2-1} unit ranges from 40 to 50 m in thickness and is subdivided into three groups:

  — The lower ore group is 10 to 20 m thick and consists of two ore zones. The lowermost zone (1,2) is being mined at Dahongshan, and mining is also planned at Guangji. Only a trace of this zone is present at Muma. This zone consists of two contiguous and thick Glauberite beds separated by a thin siltstone parting. The upper zone lies approximately 3 to 5 m above the lower zone and consists of three Glauberite beds separated by thin mudstone and siltstone partings. Mining of this interval is planned at Muma. Mining is not planned at Dahongshan and Guangji due to the close vertical interval to the thicker lower ore zone currently being mined.

  — The middle interburden group consists of 13 to 15 m of mauve, gypsum-bearing sandy mudstone with several unmineable (less than 1 m) Glauberite beds.

  — The upper mineral group is approximately 20 m thick with six layers of bedded Glauberite and partings that form two ore zones separated by a thin layer of sandy mudstone and siltstone. Due to the close vertical interval between the zones, only one ore zone can be mined. Therefore, only the thicker lower ore zone is being mined at Dahongshan and Guangji, while at Muma the overlying upper zone is thicker and is being mined.

- K_2g^{2-2} — K_2g^{2-2} is an approximately 110 m thick predominantly mudstone section between the main mineral-bearing zones of K_2g^2 and K_2g^{2-3}. There are several thin, scattered Glauberite beds in this interval and only one zone attains mineable thickness at Dahongshan.

- K_2g^{2-3} —K_2g^{2-3} is 70 to 80 m thick and is divided into three groups:

  — The lower group is approximately 20 m thick, with five Glauberite beds in two zones separated by partings of mudstone and siltstone. The lower zone consists of two thin unmineable beds, separated by a thick siltstone layer. The thick upper zone is potentially mineable at Dahongshan and Guangji.

— The middle group consists of 25 m of sandy mudstone and siltstone with several thin Glauberite beds

— The upper group is 20 to 25 m thick with five to six layers of Glauberite that form two ore zones with interbedded layers of sandy mudstone and siltstone. The lower zone consists of two beds that are thin and split. The upper zone beds form a thick potentially mineable occurrence of Glauberite at Dahongshan and Guangji but are split at Muma.

- K_2g^3 is the youngest Cretaceous unit and consists of 70 to 85 m of argillaceous siltstone with sandy mudstone partings.

Different ore zone designations are used at each deposit; however, the zones are easily correlated between deposits. Although the Dahongshan and Guangji deposits are 6 km apart, the ore zones and most of the individual ore beds can be correlated. The Muma deposit lies 30 km northwest of Dahongshan, and as shown below, most of the middle ore zones were not deposited.

The correlation of the zones in the areas is as follows:

Dahongshan	**Guangji**	**Muma**
25, 26, 27 Zone	6U Zone	Not Named
22, 23 Zone	6L Zone	Not Named
19, 20, 21 Zone	5U Zone	Not Present
17, 18 Zone	5L Zone	Not Present
16	4U Zone	Not Present
15	4M Zone	Not Present
14	4L Zone	Not Present
12, 13 Zone	3U Zone	Not Present
9, 10, 11 Zone	3L Zone	Not Present
Not Present	3U Zone	Not Present
12, 13 Zone	3L Zone	Not Present
9, 10, 11 Zone	2U Zone	**3**
6, 7, 8 Zone	**2L Zone**	2
3, 4, 5 Zone	1U Zone	**1**
1, 2 Zone	**1L Zone**	Not Present

Zones shown in bold are either currently being mined or are to be recovered in the mine plans, and are included in the estimates of reserves and resource presented in this report. While some of the upper zones shown above attain mineable thickness at Dahongshan and Guangji, they are not included in the mining right applications and, therefore, are not included in our estimates of ore reserves.

Regional dip of the strata and changes in topographic elevation impact the depth of cover over the primary Glauberite beds (zone), as follows:

Mining Right Area	Depth of Cover (range - m)
Dahongshan	75 – 375
Guangji	150 – 550
Muma	130 – 220

Depth of cover at Dahongshan increases downdip from the existing mine area. However, upper ore zones are present at shallower depths. At Guangji and Muma, based on the mine plans, mining will also progress downdip into the deeper part of the area. Due to the stable conditions associated with the deposit and the mining method employed, we do not anticipate any difficulties associated with underground mining at any of the Lumena mining operations/mine areas at these depths.

2.3.1 Dahongshan Mine Area Geology

The mine area lies on the southeastern flank of the Xiongpo Anticline, an asymmetric 81-km-long, 8-to 10-km-wide anticline that trends N30º to N50ºE. Dip of beds, on the anticline flank, in the mine area is 8 to 10 degree southeast. Secondary folds, fractures, and faults are absent in the area.

Exploration drilling (13 core holes) has Identified 27 Glauberite-bearing beds that occur within six distinct ore zones within the Mine Area. These six zones are within three Cretaceous-aged units, with aggregate thickness in excess of 500 m. From oldest to youngest, they are K_2g^1, K_2g^2, and K_2g^3 (see Figure 2.1, following this text).

The Cretaceous units dip to the southeast at about 9 degrees and either outcrop in the hilly areas in the northern portion of the mine area or are unconformably overlain by Quaternary-age alluvium in the narrow river valleys that bisect the area. The Cretaceous strata are typically fractured, weathered, and leached in an upper 30 to 70 m thick layer over the area and act as an aquifer causing water to enter the underground mine inclines.

2.3.2 Guangji Area Geology

The Guangji area is 6 km south-southwest of the Dahongshan Mine. The geologic setting is similar to the Dahongshan Mine area. The Guangji resource area also lies along the southeastern flank of the Xiongpo anticline, an asymmetric 81-km-long, 8-to 10-km-wide structure that trends N30^o to N50^{o}E. In the resource area, beds strike to the northeast, and dips range from 14 to 18 degree to the southwest. In general, dip angle is greatest in the northwest part of the area, and decreases toward the southeast, and averages about 16 degrees. Exploration drilling (six core holes) in the general area shows that Glauberite occurs in numerous beds that form six distinct zones (see Figure 2.2). Three Cretaceous units with aggregate stratigraphic thickness of more than 445 m are present in the area. From oldest to youngest, they are K_2g^1, K_2g^2, and K_2g^3. Beds containing Glauberite ($Na_2SO_4 \cdot CaSO_4$) occur in K_2g^2, which is further subdivided into three units, K_2g^{2-1}, K_2g^{2-2}, and K_2g^{2-3} as follows:

The Cretaceous-age units dip to the southeast at about 16 degrees and outcrop in the hilly areas in the northern part of the area. In the remaining portion of the Guangji area, they are unconformably overlain by Quaternary-age alluvium. The Cretaceous strata are typically fractured, weathered, and leached in the upper 50-m to 90-m-thick layer that acts as an aquifer.

Two Quaternary formations are mapped in the resource area.

2.3.2.1 Q_{2+3}

An impermeable muddy gravel containing quartzite, granite, and some lava fragments with mud interstitial filling is widely distributed over the northwest and central parts of the resource area. The gravel is 20.4 to 112.0 m (average 64.4 m) thick and is unconformably underlain by the Cretaceous units.

2.3.2.2 Q_4

In the plains of the southeastern part of the area and the hills in the northwest, there are extensive silty clay soils that are up to 50 m thick (average 40 m). The top of the soils is rich in organic compounds and is extensively farmed.

2.3.3 Muma Area Geology

The geology and Glauberite bed occurrence is similar to the lower beds at Dahongshan and Guangji. The ore beds dip at approximately 3 degrees to the southwest. Surface alluvium ranges from 10 to 30 m in depth.

The Glauberite resources in the areas are defined by six drill holes. Detailed core descriptions and analyses of the ore beds were available for all holes. The exploration drilling has identified nine Glauberite-bearing beds in the areas that occur within two distinct ore zones within the area. Figure 2.3 shows a stratigraphic section for the Muma area.

2.4 Resource Evaluation Data

BOYD was provided with detailed data for the mine areas. This data included:

1. Mine design report.
2. Geologic report, including tables detailing available drill hole and mineral assay data.
3. Resource tonnage tables and maps for each ore zone.
4. Mine plan maps.
5. Other information.

The geologic report typically contained information for the following items:

1. Location and geography.
2. Regional geology, ore bed geology.
3. Ore quality.
4. Hydrology.
5. Engineering geology.
6. Environmental geology.
7. Exploration status.

8. Resource assessment.

9. Resource calculations.

The reports also contained various supporting maps, sections, and figures.

Lumena resources are defined by exploration drilling. Typical drill hole data included drill hole logs and assays. All drilling and assay work was completed by third-party exploration teams, and to BOYD's knowledge, Lumena has not been involved in exploration activities to a material degree.

The Dahongshan deposit is relatively well defined by drilling; however, we recommend a limited amount of additional drilling be conducted at Guangji and Muma. At Guangji, we recommend two holes be drilled in the center of the deposit. At Muma, we recommend the two holes be drilled in the southern part of the area. While we expect the ore zones will be present at the proposed drill hole sites, the additional data is needed to better define ore bed thickness and percent Na_2SO_4 for mine planning purposes.

BOYD received resource tables and maps for each ore zone in the respective resource areas. The resource maps show the hole locations, seam thickness and structure, area limits, current mining, and surface features. Resource polygons were shown with polygon identification number, area, bed thickness density, percent Na_2SO_4, and in-place tonnage data.

Polygon tables were also provided that corresponded to the maps. These tables showed the polygon identification, area, thickness, and in-place tonnes. The table also shows the classification of the resources based on the classification system used by Chuanmei Mirabilite and Chuanmei Glauber Salt.

Chuanmei Mirabilite and Chuanmei Glauber Salt provided mine plan maps for each of the mines. These plans were reviewed by BOYD engineers with Chuanmei Mirabilite's and Chuanmei Glauber Salt's technical personnel and mine management.

During our review of this data BOYD personnel contacted Chuanmei Mirabilite and Chuanmei Glauber Salt to clarify and to verify our understanding of the data provided. Additional information, including maps and tables, was provided as needed. This interaction with Chuanmei Mirabilite's and Chuanmei Glauber Salt's technical personnel was an important source of information during our evaluation.

Chuanmei Mirabilite and Chuanmei Glauber Salt prepared in-place resource tonnage estimates for each area by ore zone according to standards established by the PRC Government for this type of salt deposit. Under these standards, all Glauberite beds greater than 0.5 m in thickness and greater than 15% Na_2SO_4 content are included in the resource estimates. Chuanmei Mirabilite and Chuanmei Glauber Salt geologists use a polygon method to define individual area subdivisions used to calculate in-place resources. The PRC Government requires detailed accounting of all in-place tonnage to establish resource fee requirements and to track exploitation of a strategic national asset.

BOYD has reviewed the in-place resource estimates prepared by Chuanmei Mirabilite and Chuanmei Glauber Salt and others and concluded that the estimates were reasonable based on the Chinese Standards and available source exploration data. However, these estimates did not conform with the JORC Code, and therefore, for the purposes of this study, BOYD independently prepared new estimates for the specified resources areas.

2.5 Resource Classification

In reporting resources for the valuation of mining properties, most international classification systems require two major factors be considered, namely:

- Geologic assurance of existence.
- Economic viability.

All systems require that the degree of geological assurance of the subject ore occurrence and definition be separated into various categories based on the spacing of points of observation (drill holes, mine measurements, and outcrop measurements).

Economic viability of resources is usually reported in economic and subeconomic categories.

The terms Resource and Reserve are commonly used in the reporting of ore tonnage, but the usage or definition supplied to these terms can vary between parties.

BOYD has prepared resource estimates for Lumena using the JORC Code. The resource and reserve definitions stated in the JORC Code are contained in the Glossary of this ITR report.

In this report Measured, Indicated, and Inferred Resources and Proved and Probable Reserves are defined by points of observation spaced as follows:

	Drill Hole Spacing (m)		
Mine/Area	**Measured/Proved**	**Indicated/Probable**	**Inferred**
Dahongshan	1,000	2,000	Not Applicable
Guangji	1,000	2,000	> 2,000
Muma	1,000	2,000	Not Applicable

The deposition of the salt deposits is stable, uniform, and persistent and correlation of beds between deposits (from 6 to 30 km) is relatively simple. Due to the stable depositional environment, BOYD has a high degree of confidence of ore occurrence in areas interpolated between drill holes; however, we are less confident in projecting (extrapolating) resources from the holes into unexplored areas. Therefore, along outer boundaries of defined resource areas, we have reduced the normal extrapolation distance of 1/2 of the drill hole spacing to 375 m for Measured and 750 m for Indicated.

It is important to understand that it is not appropriate to combine Inferred Resources with any Reserve estimates, as there is no direct connection between Inferred Mineral Resources and any category of Ore Reserves in the JORC Code. Estimates of Measured and Indicated and Inferred Mineral Resources and Proved and Probable Ore Reserves presented in this report are JORC Code compliant.

2.6 Economic Criteria

BOYD has developed criteria to assess the economic viability of each ore zone resource area. Economic viability is based on:

1. Current mining practices.
2. Current mining economics.

3. Ore thickness and areal extent.

4. Geological considerations.

We have developed the following thickness criteria:

Thickness Limits			Remarks
Minimum ore zone thickness	—	3.5 m	Includes combined thickness of ore beds, within an ore zone, excluding partings.
Maximum recoverable thickness	—	10 m	Thickness includes partings and ore beds.

The maximum zone thickness is based on the current mining method and blasting practices.

Based on these limits, the following ore zones were evaluated as follows:

Ore Zone	Included In Mine Plans	Remarks
Dahongshan Area		
24, 25, 26	No	Potentially mineable
22, 23	No	Too thin, split
19, 20, 21	No	Potentially mineable
17, 18	No	Too thin, split
16	No	Too thin
15	No	Too thin
14	No	Too thin
13	No	Too thin
12	No	Too thin
11	No	Too thin
9, 10	No	Too thin
6, 7, 8	Yes	
3, 4, 5	No	Too close to 1,2,
1, 2	Yes	
Guangji Area		
6U	No	Potentially mineable
6L	No	Too thin, split
5U	No	Potentially mineable
5L	No	Too thin, split
4U	No	Too thin
4M	No	Too thin
4L	No	Too thin
3U	No	Potentially mineable
3L	No	Too thin, split
2U	No	Too thin, split
2L	Yes	
1U	No	Too thin, split
1L	Yes	
Muma		
3	Yes	
2	No	Too thin
1	Yes	

While several of the upper zones at Dahongshan and Guangji are potentially mineable, only those seams that are to be included in the mining rights have been included in our estimates of resources and reserves.

2.7 Reserve and Resource Estimating Methodology

Resource areas were mapped for each ore zone that met the preceding economic criteria. The areal limits of potential resources were initially determined according to the existing mining right boundaries and the subcrop of the seams. As described in the geology section of this chapter the upper portion of the ore zones are weathered, fractured, and leached near the surface and act as aquifers. In portions of the resource areas, these weathered strata are also overlain by varying thicknesses of alluvium. These water-bearing strata must be avoided in the mining process to prevent mine flooding, and therefore, minimum mining depth criteria were established to exclude these areas from tonnage estimates and provide a mining barrier. The minimum depth limits used for the areas are as follows:

Area	Minimum Mining Depth (m)
Dahongshan	75 m underlying hilly areas 100 m underlying drainage areas
Guangji	150 m

The increased depth used at Guangji is due to the extended depths of alluvium that overlie the weathered Cretaceous strata. There are no shallow weathered resource areas in the proposed mining right area at Muma.

Once the mineral resource areas were mapped, estimates of in-place Glauberite and marketable Thenardite tonnage were prepared for each mineral resource area, by ore zone and resource classification using the ore zone maps provided by Lumena.

In-place estimates of equivalent Thenardite tonnage were prepared within each mapped resource area by using the thickness of the Glauberite ore defined by the drilling data, a 2.72 specific gravity factor for the Glauberite ore, and the weight percent Na_2SO_4 in the ore as determined by the laboratory analyses for each the drill hole.

Estimates of Marketable or Product tonnes of Na_2SO_4 (Thenardite) were then prepared by first applying the 60% estimated extraction recovery anticipated in the mining operation. This factor is based on historic recovery at Dahongshan Mine and represents an overall factor allowing for losses in barrier pillars, recovery of the excavated mine material that is leached on the surface, and recovery in the underground solution mining cells.

2.8 Lumena Resources

BOYD has prepared JORC Code compliant resource estimates for the Mining Right areas as of January 1, 2009. Our estimates of the Proved and Probable Reserves are presented as follows:

		JORC Code January 1, 2009							
		Thenardite (Mt)							
		In-Place Resource				Marketable Reserves			
Ore Zone	Average Thickness (m)	Measured	Indicated	Inferred	Total	Proved	Probable	Total	% of Reserves
Dahongshan Mine									
6,7,8,	6.1	13.80	2.69	—	16.49	8.28	1.62	9.90	51
1,2	5.8	11.68	4.14	—	15.82	7.01	2.49	9.50	49
Total		25.48	6.83	—	32.31	15.29	4.11	19.40	100
Guangji Mine									
2L	5.7	11.85	8.05	0.96	20.86	7.10	4.83	11.93	58
1L	4.8	8.80	5.71	0.65	15.16	5.27	3.43	8.70	42
Total		20.65	13.76	1.61	36.02	12.37	8.26	20.63	100
Muma Mine									
3	5.7	9.70	3.10	—	12.80	5.82	1.57	7.39	43
1	4.9	—	16.26	—	16.26	—	9.75	9.75	57
Total		9.70	19.36	—	29.06	5.82	11.32	17.14	100
Total									
Total		55.83	39.95	1.61	97.39	33.48	23.69	57.17	100

Lumena currently controls an estimated 57.2 million marketable tonnes of Thenardite. The three mine areas contain similar tonnage and average bed thickness ranges from 4.7 to 6.1 m. Approximately 59% of the reserves are in the Proved classification. These estimates are also presented in Table 2.1 of this report.

As shown, 4% of the total Guangji resources are in the Inferred Resource category due to the limited amount of exploration drilling. While Inferred Resources reflect a low degree of confidence of existence of the resources, based on the stability of the depositional environment, we expect that additional exploration is likely to upgrade the majority of the resources to measured or indicated status. Inferred tonnage cannot be included in JORC Code compliant estimates of Marketable Reserves shown above due to the low degree of geologic assurance of Inferred Resources. BOYD has prepared estimates of the Marketable Inferred Resources at Guangji to provide guidance as to what the marketable tonnage would be if the Inferred Resources exist as projected. These estimates were prepared using the same methodology as in adjacent Indicated areas. We estimate there are approximately 1 Mt of Inferred Marketable Resources. Additional drilling would be required to potentially upgrade the Inferred Resource tonnage to Indicated status. It is important to understand that it is not appropriate to combine Inferred Resources with any Reserve estimates, as there is no direct connection between Inferred Mineral Resources and any category of Ore Reserves in the JORC Code.

There are significant additional undeveloped Glauberite resources at the mine sites. At Dahongshan and Guangji, potentially mineable upper ore zones overlie the zones but are not included in our resource estimates since they are not included in the mining rights. There are also additional undeveloped resources adjacent to all mining right areas.

2.9 Mine Service Life

Mine service life estimates, assuming the Dahongshan mining right is renewed, are as follows:

Mine Area	Marketable Reserves Thenardite (Mt)	Mine Life (Years)	Projected Output (Mtpa)
Dahongshan	19.40	32	0.6
Guangji	20.63	21	1.0
Muma	17.14	14	1.2

Mine service lives could be extended if Lumena is successful in obtaining the mining right to the additional undeveloped Glauberite resources adjacent to the current mining right areas.

2.10 Ore Quality

Ore quality for the Dahongshan and Guangji areas is similar and is relatively uniform between and within the ore zones. Typical Glauberite ore is as follows:

Chemical Constituent	Weight %
Na_2SO_4	37
$CaSO_4$	37
$MgSO_4$	<1
NaCL	<1
Other Insolubles	25

The percent Na_2SO_4, or Thenardite, in the ore by ore zone is a follows:

Ore Zone	% Na_2SO_4 Range	% Na_2SO_4 Average
Dahongshan Mine Area		
6, 7, 8	38 - 42	40
1, 2	36 - 40	38
Guangji Mine Area		
2L	39 - 40	40
IL	31 - 39	35
Muma Area		
3	33 - 37	34
1	35 - 40	36

Typically, the Na_2SO_4 is 34% to 40% of the ore within the Lumena properties. Glauberite in Sichuan Province reportedly averages around 35% of Na_2SO_4; however, Glauberite in other parts of China have a lower Na_2SO_4 content of approximately 25% on average.

Following this page are:

Figures

2.1: Generalized Stratigraphic Section — Dahongshan Mine Area

2.2: Generalized Stratigraphic Section — Guangji Area

2.3: Generalized Stratigraphic Section — Muma Area

Table 2.1, Reserve Estimate

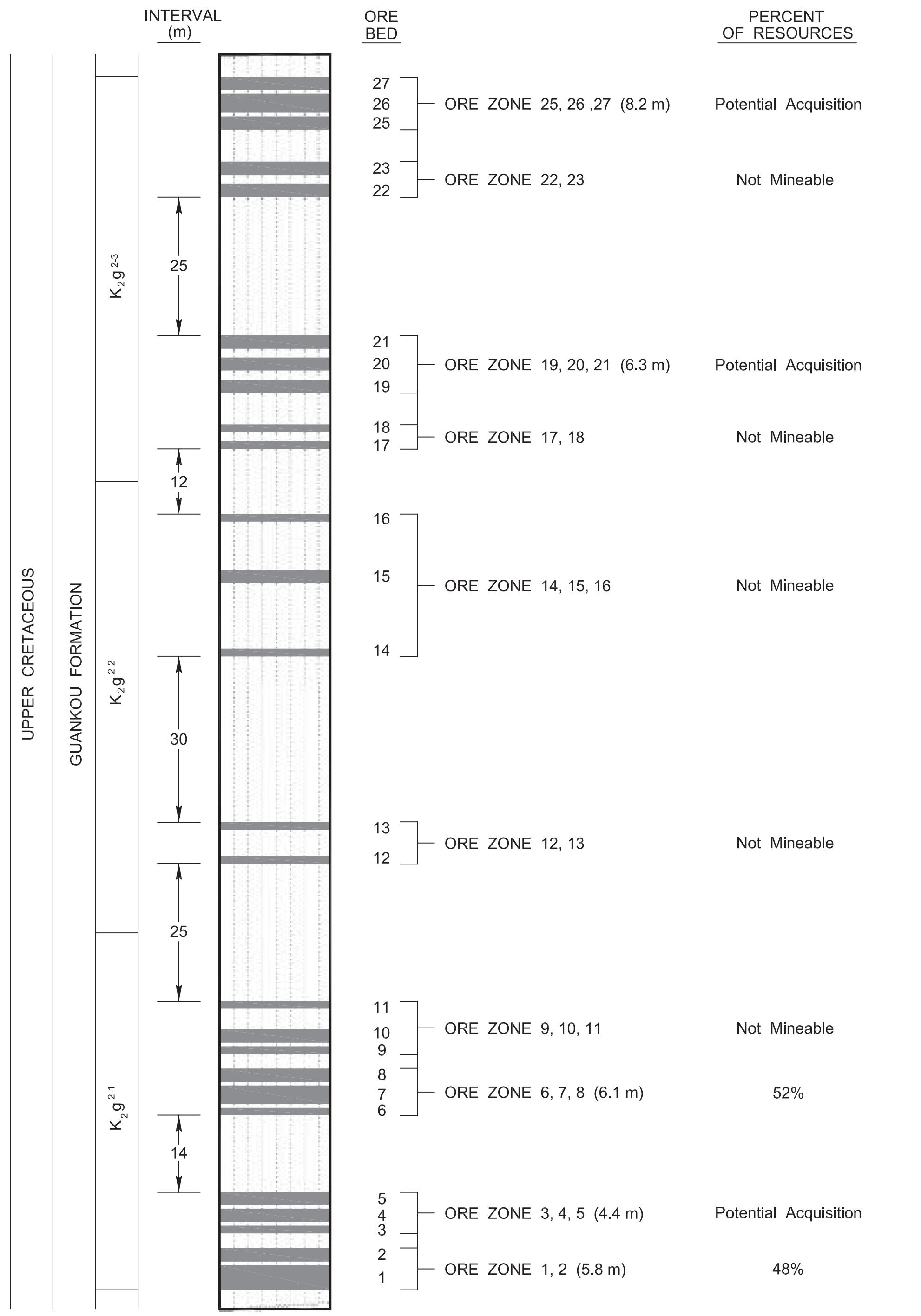


FIGURE 2.1

GENERALIZED STRATIGRAPHIC SECTION
DAHONGSHAN AREA
Sichuan Province, People's Republic of China

Prepared For
LUMENA RESOURCES CORP.

John T. Boyd Company | May 2009 No Scale

DRAFT

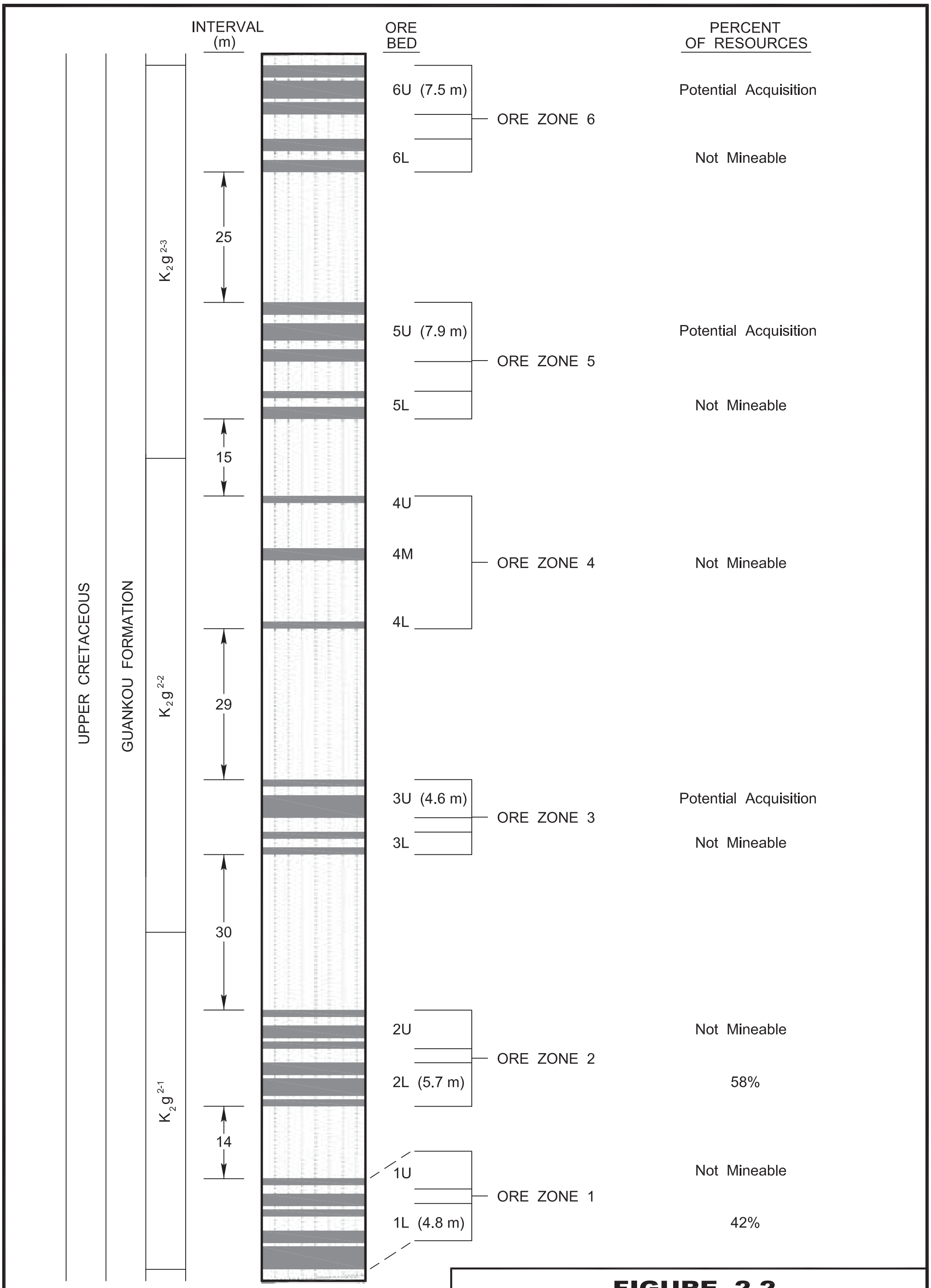


FIGURE 2.2

GENERALIZED STRATIGRAPHIC SECTION
GUANGJI AREA
Sichuan Province, People's Republic of China

Prepared For
LUMENA RESOURCES CORP.

John T. Boyd Company | May 2009 No Scale

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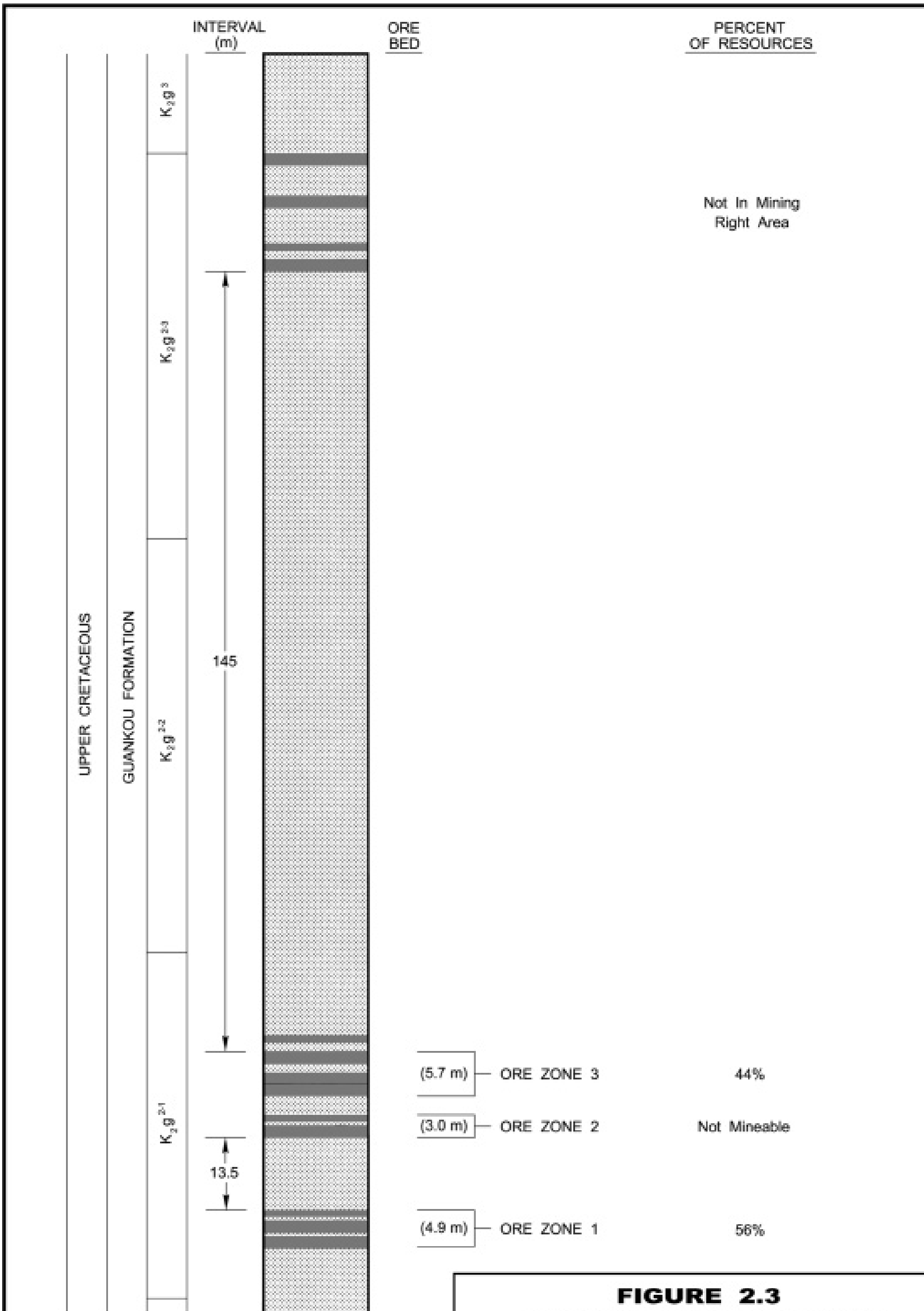


FIGURE 2.3

GENERALIZED STRATIGRAPHIC SECTION
MUMA AREA
Sichuan Province, People's Republic of China

Prepared For
LUMENA RESOURCES CORP.

John T. Boyd Company | May 2009 | No Scale

DRAFT

TABLE 2.1

RESERVE ESTIMATE
SICHUAN CHUANMEI MIRABILITE COMPANY LTD.
SICHUAN CHUANMEI SPECIAL GLAUBER SALT COMPANY LTD.
Sichuan Province, China
Prepared For
LUMENA RESOURCES CORP.
By
John T. Boyd Company
Mining and Geological Consultants
May 2009

	JORC Code — January 1, 2009 — Thenardite (Mt)							
	In-Place Resource				Marketable Reserves			
Ore Zone	Measured	Indicated	Inferred	Total	Proved	Probable	Total	% of Reserves
Dahongshan Mine								
6,7,8,	13.80	2.69	—	16.49	8.28	1.62	9.90	51
1,2	11.68	4.14	—	15.82	7.01	2.49	9.50	49
Total	25.48	6.83	—	32.31	15.29	4.11	19.40	100
Guangji Mine								
2L	11.85	8.05	0.96	20.86	7.10	4.83	11.93	58
1L	8.80	5.71	0.65	15.16	5.27	3.43	8.70	42
Total	20.65	13.76	1.61	36.02	12.37	8.26	20.63	100
Muma Mine								
3	9.70	3.10	—	12.80	5.82	1.57	7.39	43
1	—	16.26	—	16.26	—	9.75	9.75	57
Total	9.70	19.36	—	29.06	5.82	11.32	17.14	100
Total								
Total	55.83	39.95	1.61	97.39	33.48	23.69	57.17	100

3.0 PRESENT OPERATIONS OF DAHONGSHAN

3.1 Introduction

Chuanmei Mirabilite operates the Dahongshan Mine (Dahongshan) approximately 20 km northwest of Meishan City, Sichuan Province. The authorized output level is 1.2 Mtpa. Actual output of Thenardite in 2008 was 0.6 Mt, and Lumena intends to maintain this output level in the next two years. Initial production of Mirabilite from the current mining area used shallow wells (40 to 60 m deep) for solution recovery of the Mirabilite material. In 1972, the central government provided funding to commence development of an underground mine. Construction was suspended later in 1972 due to insufficient funds. In 1985 work was resumed and the mine opened in 1987. Drill and blast techniques are used to develop the underground roadways. Chuanmei Mirabilite has been granted a new mining right certificate in September 2009, which covers 3.6917 km^2 area and the Nos. 1, 2, 6, 7, and 8 Glauberite beds.

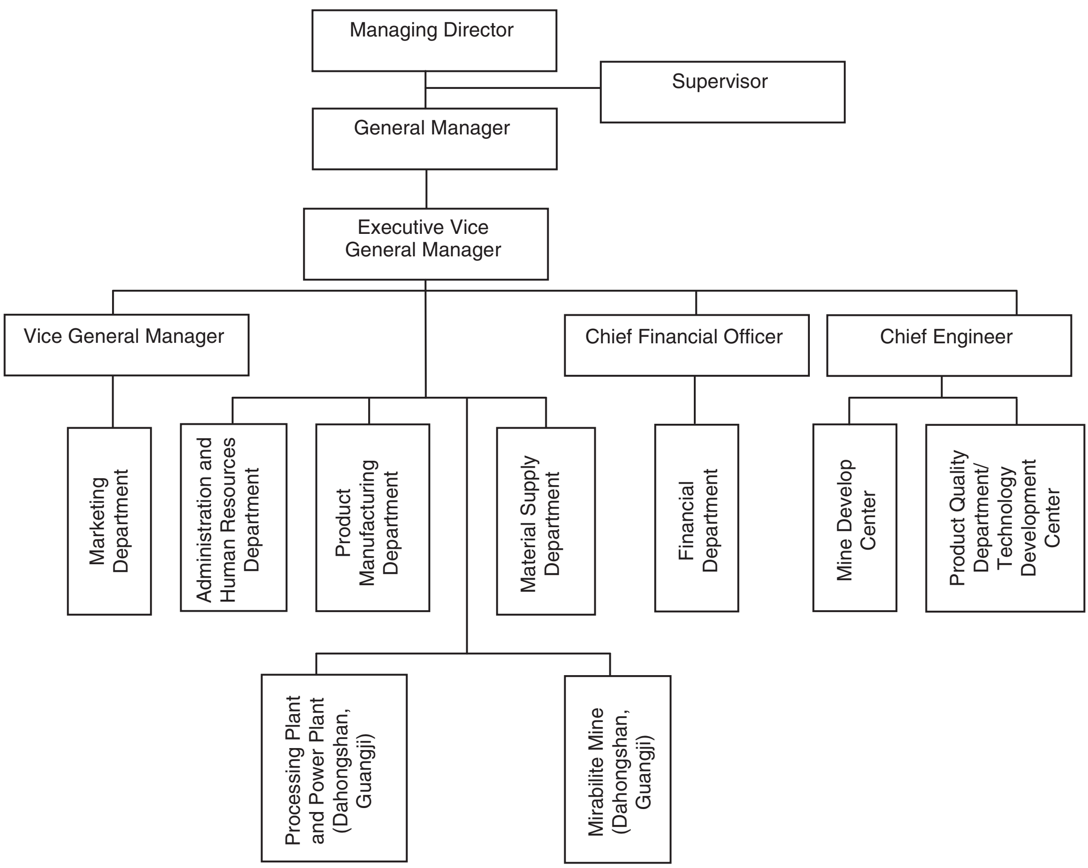
Transportation infrastructure in the Dahongshan area is well-developed. The Chengdu-Kunming railway passes the east side of this area and the Meishan Railway Station is about 10 km away by road. The distance from Dahongshan to Chengdu, the capital of Sichuan Province, is approximately 75 km, and to Chengdu Shuangliu Airport, is approximately 60 km.

BOYD personnel visited the mine and processing facilities on January 25, 2008 and subsequently on June 4-7, 2008. The underground pump station, explosive storage room, roadways, development heads, and other underground facilities were toured, as well as the surface power station, processing plants, and portal facilities.

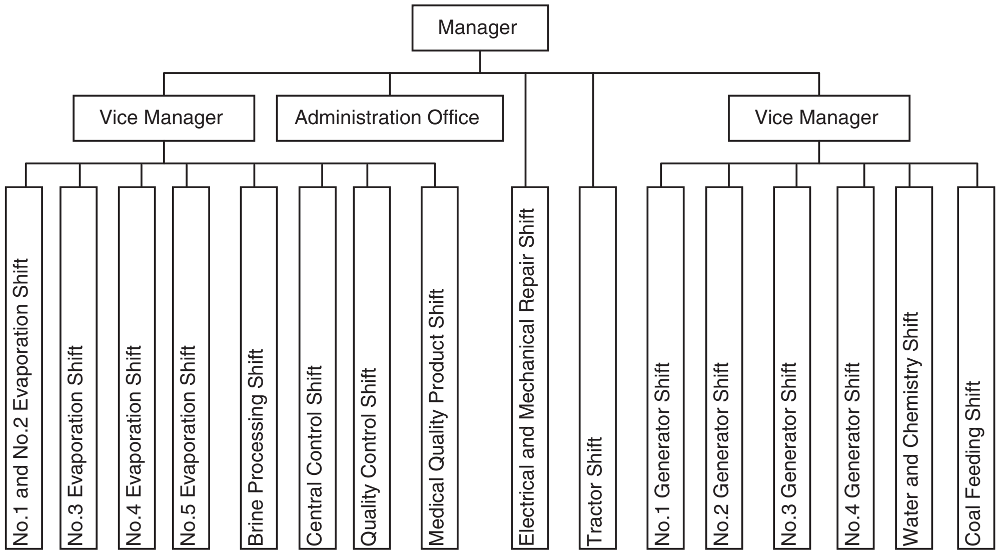
3.2 Management Structure

Chuanmei Mirabilite, which operates Dahongshan Mine and processing plant, and Chuanmei Glauber Salt, which operates both the Guangji and Muma underground mines and processing plants, share the same general management, while each mine has its own on-site mine/plant management staff.

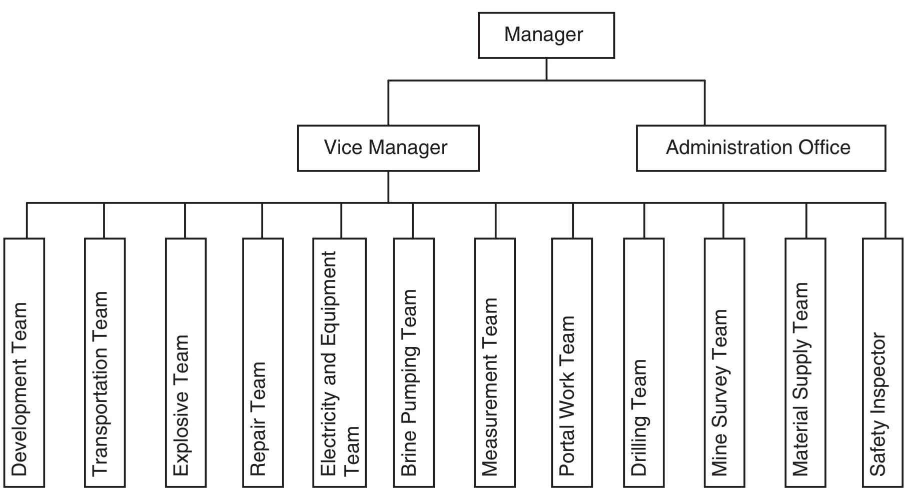
Current management of Chuanmei Mirabilite and Chuanmei Glauber Salt is illustrated below:



The management of Dahongshan processing plant and power plant is illustrated below:



The management of Dahongshan Mine is illustrated below:



3.3 Site Operating Statistics/Costs

The site operating schedule is based on three 8-hour shifts per day, 7 days per week, and an average of 330 work days per year. Underground roadway drivage is scheduled at two shifts daily. As of December 31, 2008, Dahongshan employed 928 employees.

Work Area	Number of Employees
Management	119
Mine	245
Processing Plant	351
Power Plant	213
Total	928

The mine personnel are distributed by general work area as follows:

Department	Number of Employees
Development Crews	150
Transportation System	29
Maintenance	5
Electrician & Mechanic	16
Brine Pumping	21
Safety Inspection	4
Portal	4
Detonator & Explosive Storage	9
Drilling	2
Supervision (Managers)	5
Total	245

Development of underground workings is the primary and most labor-intensive work which requires approximately 10 personnel, including workers performing drilling, blasting, loading of the shot ore, etc.

A summary of historic Thenardite production (output) at Dahongshan follows:

Year	Production Thenardite Product (tonnes-000)
2002	411
2003	441
2004	465
2005	521
2006	504
2007	603
2008	586

3.4 Dahongshan Underground Mine

3.4.1 Physical Mining Conditions

Historic mining has been in the combined No. 1 and No. 2 beds (1/2 Zone), which are the thickest and stratigraphically the lowest of the Glauberite zones. The combined No. 1 and No. 2 beds average 5.8 m in ore thickness within the active mining areas and are separated by a rock parting that averages 0.7 m.

In areas of shallow overburden depth, caution must be exercised to avoid encroaching on the water-bearing alluvial material which varies from 30 m to 70 m in depth and overlies the bedrock. While the underground mine workings are generally dry, 2,000 m^3/day of ground water enters the mine from the main incline, which is driven from the surface through the alluvial material (source of the ground water inflow) and into the underlying Glauberite-bearing bedrock.

Average dip of the Glauberite beds is 10 degrees to the southeast. Depth of mining to the 1/2 Zone ranges from suboutcrop (nominal 75 m) to 250 m within the original mining right area and up to 375 m in the adjacent Dahongshan Expansion area.

The mine floor and immediate roof strata are typically sandy clay, which are stable and do not require support at most locations.

The insoluble (non-ore) material has a coefficient of expansion of 1.3 to 1.4 when exposed to water. This swelling or bulking fills the void left in the production cells after recovery of the Mirabilite (dissolved sodium sulfate solution, $Na_2SO_4 \cdot 10\ H_2O$) and serves to minimize or prevent subsidence of the overlying strata. No surface subsidence was observed during BOYD's site visit.

Gases produced during blasting are diluted and removed by the mine's ventilation system.

3.4.2 Access

Access to the underground mine is provided by three inclines, the two original mine openings and the current main incline (Taojiawan) driven in 1995.

Incline	Length, Incline Angle	Current Use
Original Main	353 m at 23º25'	Intake fresh air, travel way for mine personnel.
Original Service	364 m at 23º30'	Return air (exhaust ventilation fan), pipelines and cables.
Taojiawan Main	330 m at 23º	Intake fresh air; hoist for removal of mined ore, operating supplies (materials), and equipment; pipeline to return Mirabilite (recovered from mined ore) to the underground Mirabilite handling system.

The original inclines are 40 m apart and located in the north-central portion of the original mining right area. Processing and other mine surface facilities are located near the original mine openings. The Taojiawan Main Incline is 1.65 km west of the original inclines and located to provide more direct access to the southwestern portion of the original mining right area (final phase of mining in the 1/2 Zone within the original mining right area). Underground mined Glauberite from roadway drivage is transported to the Taojiawan Main Incline and hoisted to the surface. Glauberite is deposited on the surface and leached with water, and the Mirabilite solution is returned by pipeline to the underground Mirabilite solution circulation system.

3.4.3 Mine Layout and Mining Practices

Dahongshan Mine employs a room solution mining technique that includes a combination of room-and-pillar underground mining practices with solution recovery of the soluble ore within designed 260 m x 200 m production cell or block areas. The basic sequence of mining includes:

- Development of transport roadway on strike (i.e., horizontal) at selected levels: 389 m (Level No. 1), 331 m (Level No. 2) with intermediate roadways driven at 359 m and 300 m. All roadways are developed using drill and shoot practices. Main roadways are designed 4 m wide x 2.8 m high in cross section and driven on the bottom of the No. 1 bed. Double narrow gage rail is laid in the transport roadways for movement of 1 tonne capacity ore cars via electric 7 tonnes locomotive-trolley wire system to and from the incline hoist system serving the Taojiawan Main Incline.

- A connecting entry is driven between levels on approximate 260 m intervals (past mining has the connecting entry spaced 175 to 450 m apart) to form the individual cell or production block area boundary.

- A series of service roadways are driven downdip and connected by a series of horizontal roadways (on strike) or crosscuts are driven on nominal 18 m centers, resulting in a series of 16 m x 16 m solid pillars remaining. (See Figure 3.1, following this text.) These interior cell roadways are 3 m wide x 2.6 m high and are driven at the bottom of the No. 1 bed. A fully developed cell has a series of 15 horizontal roadways and 9 to 10 connecting inclined roadways. Ancillary hoisting roadways are driven downdip on 54-m intervals along the length of the cell (to removal shot ore to the wheel roadway located updip via a hoist and rail-mounted, 1 tonne ore car system). A 25–30 m wide barrier pillar (measured at the bottom of No. 1 Bed) is left on the updip side of the cell adjacent to the wheel roadway with nominal 10 m wide pillars (barriers) maintained on the three remaining sides of the cell. Including the adjacent wheel roadway, approximately 4,860 m of roadway must be driven for each 260 m square cell. This equates to 10,270 tonnes of mined material (ore and rock). Pipelines for future water injection at the top of the cell and extraction of the mirabilite solution from downdip corner of the cell are installed.

- High density angle drilling is completed along both sides of the horizon cross-cut entries. Holes are spaced 2.0 to 2.5 m apart, with rows in 1.6 to 1.8 m spacing, and extend 10 m into the pillar and up to 8 m into the roof (as illustrated on Figure 3.1, following this text). The depth of individual drill holes is varied depending on thickness of the ore layers and the angle of drilling. Upon completion of drilling, holes are loaded with explosives and the cell area shot. Up to 40 tonnes to 50 tonnes of explosives and 8,000 detonators are used to rubblize each cell area with 300,000 to 400,000 tonnes of ore blasted. Average powder factor (explosive usage) is 0.20 kg of explosives per tonne of ore. See Figure 3.2, following this text, for an illustration of roadway drilling practices.

- Fresh water (at 25º C to 26º C temperature) is injected into the cell area to dissolve the ore. When the concentration level reaches 27º Baumé, the mirabilite solution is removed and enters the mine's Mirabilite pipeline system for transport to the surface. The cells can be recharged with fresh water and the process repeated. The operating life of individual cells is three to five years. Over time the recoverable ore is depleted. When the concentration drops to 7º to 8º Baumé, the solution is circulated to a newer mining block.

Figure 3.3, following this text, includes selected photographs of the Dahongshan underground mine operation during BOYD's visits.

3.4.4 Mine Services

Electricity is sourced from the on-site Dahongshan power plant (3 x 1,500 kW). Lumena reported that the capacity of Dahongshan power plant is not sufficient for the mine and processing plant, and additional power has to be purchased from the public grid. The power source from the public grid is a 750 kW coal-fired power plant, which distributes electricity at 127 kV to the Doguan Substation. From the substation, power is reduced to 35 kV and transmitted to the mine site's 5,000 kVA substation. Power is further reduced to 10 kV and distributed to various transformer substations for further reduction to 36 V for underground use and 220/380 V for surface use. As a backup to the power stations, there are two 700 kW diesel-powered generator sets.

Water for industrial and residential use is sourced from the nearby Huangliangeng reservoir. This water must be treated for human consumption and residential uses. Ground water flowing into the mine via the inclines is collected and stored in a series of sumps and used underground for roadway development (drilling) and to fill production cells for dissolving the soluble Mirabilite.

The underground mine's central ventilation system is an exhaust system using the two main inclines as fresh air intakes and the service incline as the return air facility. Approximately 2,038 m^3/min of return air exits the mine via the fan drift connection to the service incline. A 15 m high chimney is constructed on top of the fan drift to facilitate the discharge of gases in the return air flow. Brattice cloth is used underground to direct air flow into cell areas following blasting to dispel gases. Smaller axial flow ventilation fans are also used in the blowing mode to improve ventilation underground.

Underground transportation systems are in place for movement of man, materials, mined ore, and Mirabilite solution. Personnel enter the mine using an overhead staff-riding system (overhead tram) installed in the service incline. Once underground, personnel walk to their assigned work area. The main incline has a double roller hoisting system capable of raising five 0.5 m^3 capacity "V" type mine cars at a time. On the level roadways, 7 tonne, electrical powered locomotives are used to shuttle five 1 tonne capacity ore cars from the mouth of the working faces to the connection to the underground winch system. Manual loading is used to remove the shot ore from the development headings and place it into the 1 tonne railcars. Mirabilite solution enters the underground pipeline system directly from the production cells and is pumped to the Glauber's salt sump located at the bottom of the original main incline. The solution is then pumped up the original mine main incline to the Mirabilite processing plant located on the surface.

3.4.5 Mine Safety

The Dahongshan Mine operates in a safe manner with only one reported accident between 2003 and 2008, as shown below:

Year	Accident	Number of Workers Hurt	Number of Accidents
2002	Mine car collision	1	1
2003	Mine car collision	1	1
2004	—	—	—
2005	—	—	—
2006	—	—	—
2007	—	—	—
2008	—	—	—

Following the 2003 accident, Chuanmei Mirabilite took proactive steps (measures) to address the cause of the accident, including:

- Installed railcar stops.
- Installed automatic safety gate.
- Strengthened safety management practices.

3.5 Mirabilite Processing

3.5.1 History

The original processing plant was constructed in 1952 and replaced with the current facility in 1975. A new boiler and associated steam delivery system was installed in 1991. The processing facility is currently served by three 1500 kW and one 750 kW coal-fired boilers which generate electricity and steam for plant and facility consumption. Current plant capacity is 0.6 Mtpa of Thenardite product (anhydrous sodium sulfate, Na_2SO_4). In 2006, 2007, and 2008, reported production was 0.50 Mt, 0.6 Mt, and 0.59 Mt, respectively, of anhydrous sodium sulfate. The product is commonly packaged and sold in 50 kg, 25 kg, and 1,000 kg bags.

3.5.2 General Comment

Processing employed at the Dahongshan plant is typical for Mirabilite operations. Process vessels, evaporators, centrifuges, cyclones, and auxiliary equipment (pumps) were observed to be well maintained and observed leakage was minimal. Housekeeping practices in the plant are good and the facility is free of noticeable debris. The installed process system incorporates five independent circuits enabling the plant to continue to operate in the event of a mechanical failure or maintenance-related issue to one or more of the circuits. The production output of the plant is reduced in this case, however, the plant could continue to operate. The plant uses a closed loop circulation system eliminating untreated process water being discharged to the environment. The plant age (31 years), the corrosive nature of the process, and visible external corrosion mandate a detailed plant integrity inspection program to facilitate the regular refurbishment or replacement of equipment as required. Special attention/maintenance is required for the evaporation circuitry of the plant.

3.5.3 Process

Brine (Mirabilite solution) from the mine is treated to remove impurities, principally calcium sulfate ($CaSO_4$), evaporated to precipitate sodium sulfate (Na_2SO_4), and centrifuged and dried (at 45º C) to remove water before the Thenardite product is transferred to the bagging plant (see flowsheet, Figure 3.4, following this text).

The brine from the production cells is pumped to the surface from a 10,000 m³ capacity underground surge tank and initially flows through a steam and/or hot water heat exchanger before entering the reactor for calcium treatment. A reagent, e.g., soda ash (sodium carbonate, $Na_2\ CO_3$) and caustic soda (sodium hydroxide, NaOH) is added at a metered rate for calcium removal. The process stream is then gravity directed to a settling tank where solids are removed. The stream is then pumped through a sand filter for removal of suspended solids before passing into a solution tank for process control. After leaving the solution tank, the solution is deoxidized using a vacuum system.

Five steam evaporators in series are used for water removal and concentration of the sodium sulfate. The steam evaporators use secondary heat recovery from the coal-fired generating station's steam turbine. Modernization of the evaporation system to utilize more efficient heat recovery would reduce energy costs. After passing through the evaporators, the product stream is pumped to cyclones for further concentration and dewatering, then centrifuged and desiccation dried for final removal of moisture. Two Thenardite products, one coarse (medical grade) and one powder, are produced.

3.5.4 Packaging

The Thenardite product is conveyed from the desiccator after drying and stored in an overhead bin for bagging. Discharge rate from the bin is valve-controlled to fill poly-woven bags (with plastic liners). After filling, the bags of products are belt-conveyed to a heat shrink station which seals the plastic liners and then to an automated sewing station which stitches shut the poly-woven bags. The bags of products are then manually either immediately loaded onto trucks or warehoused for interim storage. The bags of products are dispatched from the processing facility to individual customers or distribution centers by truck. Approximately 8 to 10 people per shift are involved in the packaging operation.

3.6 Environmental Protection

3.6.1 Regulatory Guidelines

The following governing environmental protection requirements are adopted for the Dahongshan operations:

- Guideline for Environmental Protection Design of Construction Project, (87) China Environment No. 002.
- Guideline for Metallurgical Industry Environmental Design (YB9066-95).
- Sichuan Province Atmosphere Pollution and Drainage Standard.

- Sichuan Province Pollution Material Drainage Standard, DB51/190-93.
- Technique Enterprise Plant Boundary Noise Environment Standard (Industrial Area), BG12348-90.

3.6.2 Environmental Quality Status

The general mine site by its inherent nature has affected the environment in terms of surface facility construction (land use) and disposal and processing of mined ore on the surface near the entrance to the Taojiawan Main Incline. Chuanmei Mirabilite has taken proactive measures to protect the environment and to minimize any potential negative impact on the environment.

3.6.3 Areas of Potential Environmental Impact

The potential impacts on the environment and the steps taken by Chuanmei Mirabilite to avoid or minimize such impacts are discussed below.

3.6.3.1 Surface Subsidence

The high extraction of Glauberite ore during the room-and-pillar development, bulk blasting, and solution recovery operations in the underground mine create the possibility of mine roof collapse and resulting subsidence of the overlying surface. Chuanmei Mirabilite conducts mining process strictly in accordance with the Non-coal Mining Safety Regulations and leaves sufficient underground pillars to support the surface. Chuanmei Mirabilite believes the potential for subsidence is mitigated by the inherent swelling characteristics of the non-soluble strata occurring within and between the Glauberite beds (i.e., non-soluble materials have a swell or bulking index of 1.3 to 1.4 when exposed to water). In addition, the mine workings located outside the immediate production cell areas are only mined to low level (percentage) of extraction. Large barrier and other support pillars are left intact to protect the integrity of the key roadway openings. The mine has also left the Glauberite resource areas underlying the mine's surface facilities and the Pan'ao River in place (unmined). Chuanmei Mirabilite and Dahongshan Mine management report there has not been any evidence of significant ground fissures or other manifestations of surface subsidence within the surface areas overlying the existing mine workings.

3.6.3.2 Solid Waste

Run-of-mine (ROM) ore from the roadway drivages is hoisted to the surface at the Taojiawan Main Incline, where it is placed in stockpiles and subjected to leaching with water to recover the Mirabilite solution. The ROM ore material includes the mined Glauberite bed(s) and rock contamination, including rock between the beds and floor rock (to the extent that excavating a horizontal mine floor results in cutting into the rock strata under No. 1 bed). Approximately 10% to 15% of the ROM tonnage hoisted to the surface is rock contamination. Leaching will result in recovery of the Mirabilite from the stockpiled Glauberite ore. After processing, approximately 65% of the total tonnage of ROM material remains as residue to be disposed of on the surface. Thenardite recovered from the mined ore accounts for 5% or less of total product when the mine is in normal operating mode (i.e., mining is limited to extension of level roadways and production cell development in one ore zone). A small amount of slag is also generated from Mirabilite refining process. At an annual production level of 550,000 tonnes of Thenardite, the corresponding annual quantity of refuse disposal at the Taojiawan site is an estimated 260,000 tonnes. Part of the refuse from underground development is gypsum ore which is then dried and compressed into sulfate remover, and Lumena plans to recover and use the gypsum ore from all its three mines (Dahongshan, Guangji, and Muma) as a resource. RMB5.0 million has been budgeted as a research and development fund for this purpose. The rest is transferred into underground ore-depleted cells.

The Taojiawan ore refuse disposal area has over 50 years of operating life capacity. Ore and slag material is disposed of on a large hill, which will be covered by loess (surface alluvial material), then planted with grass and trees.

3.6.3.3 Dust and Gas Generation

Airborne dust and waste gas are produced during underground operations: rock drilling, blasting of the ore in active roadway headings, and during handling and transport of the ROM ore. Limiting the generation and control (removal) of airborne dust are achieved by use of wet drilling, installation of water sprays at ROM ore handling stations, and dispersal by the mine's ventilation system. Workers loading shot ore from the active roadway headings are provided face masks to minimize dust inhalation. The processing facility is generally well kept and maintained. During our site inspections, we observed that very little mine and process waste is landfilled and that scrap and waste materials were properly recycled in accordance with current environmental requirements. Ash from the coal-fired power and steam plant is temporarily stockpiled in a designated area and subsequently sold to local cement producers for use in their manufacturing process. The above ground production plants adopt electrostatic precipitators and filter bag techniques to remove airborne dust. Lumena plans to upgrade the ash residue removal system for the boilers at Dahongshan power plant to reduce the sulfur content in the smoke discharges and improve the efficiency of fuel usage. RMB5.0 million is budgeted for this project over the next three years. BOYD is of the opinion that these measures are effective and the mine and processing plant operate in compliance with relevant dust/gas emission and control requirements.

3.6.3.4 Wastewater

Availability and use of clean water is critical to the underground mining operation since Mirabilite is primarily recovered via solution action in the production cells. Water requirements are met from the inflow of groundwater into the underground workings. It is our understanding the entire operation does not discharge any untreated wastewater to the environment using a waste water recycling system. All waste water generated from the production process is recycled underground to be used in Glauberite ore dissolution. It is BOYD's opinion that there is not any material issue with wastewater disposal.

3.6.3.5 Noise

Noise is generated during the operation of equipment and machinery, and during underground blasting operations. The Mirabilite processing facility incorporates pressure vessels, pumps, conveyors and steam operated equipment. Reasonable measures taken by Chuanmei Mirabilite regarding noise control include the use of low noise equipment (mufflers), process snubbers, and sound-deadening insulation and the provision of earplugs to all employees working in areas exposed to higher noise levels. BOYD is of the opinion that those measures are in line with general industrial practices and are effective in reducing noise levels.

Following this page are:

Figures

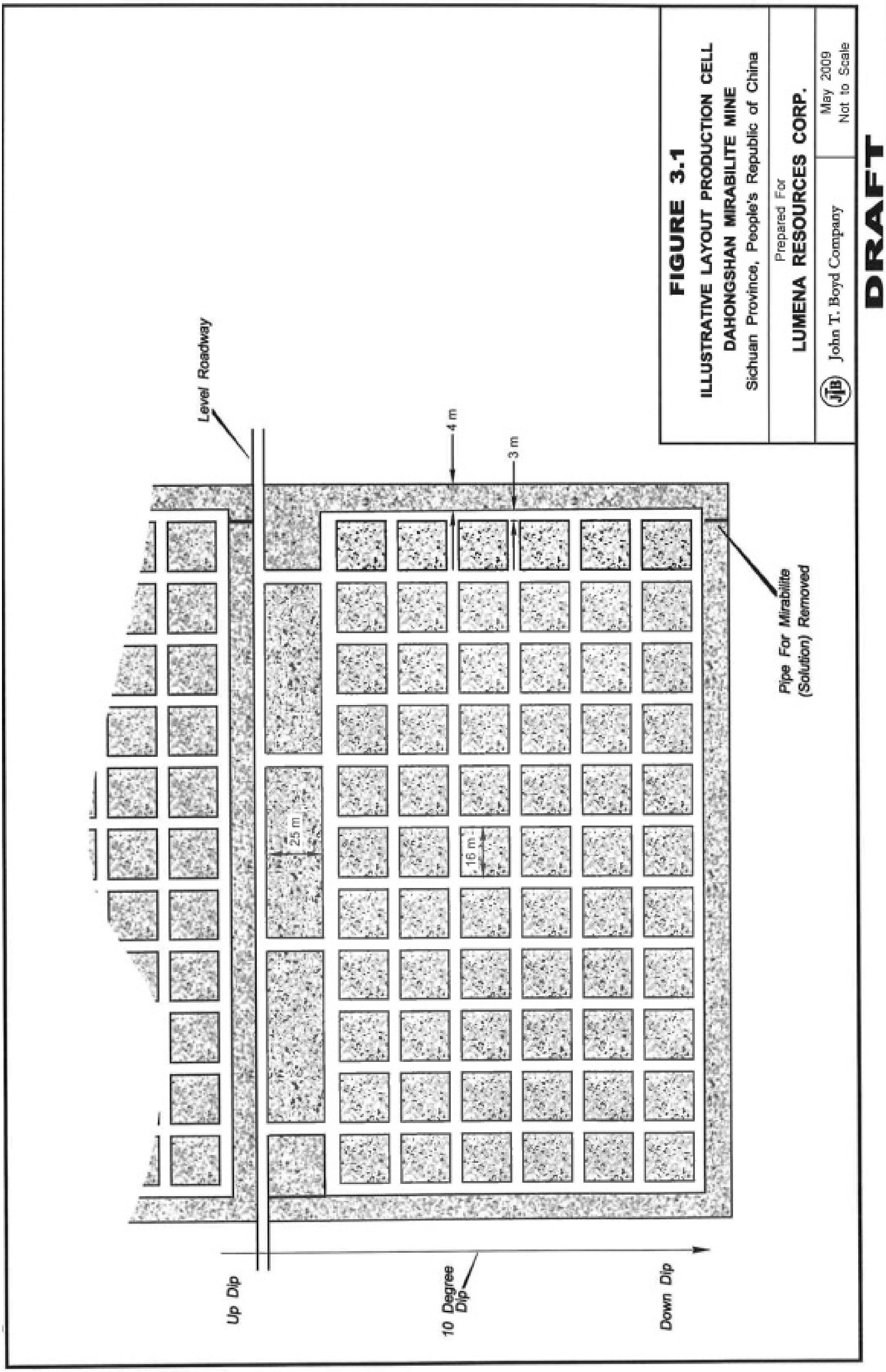


FIGURE 3.1
ILLUSTRATIVE LAYOUT PRODUCTION CELL
DAHONGSHAN MIRABILITE MINE
Sichuan Province, People's Republic of China
Prepared For
LUMENA RESOURCES CORP.
John T. Boyd Company
May 2009
Not to Scale
DRAFT
Level Roadway
4 m
3 m
25 m
16 m
Pipe For Mirabilite (Solution) Removed
Up Dip
10 Degree Dip
Down Dip

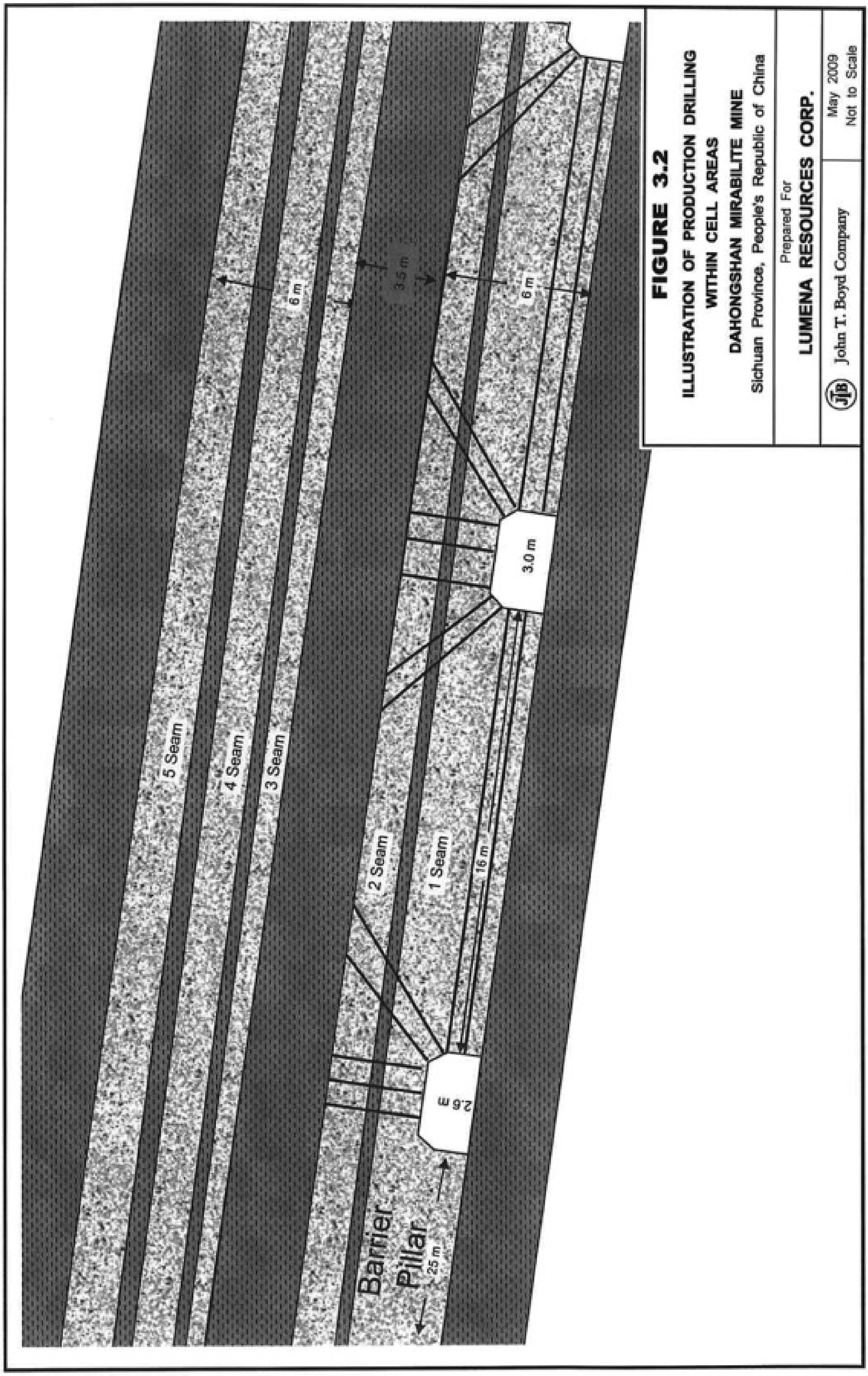


FIGURE 3.2
ILLUSTRATION OF PRODUCTION DRILLING WITHIN CELL AREAS
DAHONGSHAN MIRABILITE MINE
Sichuan Province, People's Republic of China
Prepared For
LUMENA RESOURCES CORP.
John T. Boyd Company
May 2009
Not to Scale
DRAFT
5 Seam
4 Seam
3 Seam
2 Seam
1 Seam
6 m
3.5 m
6 m
3.0 m
2.6 m
16 m
Barrier Pillar
25 m

Dahongshan Processing Plant

FIGURE 3.3

SELECTED PHOTOGRAPHS
DAHONGSHAN UNDERGROUND MINE
OPERATION

Prepared For
LUMENA RESOURCES CORP.

John T. Boyd Company

May 2009

Dahongshan Processing Plant
Bagging Area

Dahongshan Processing Plant Storage Area

FIGURE 3.3 - Continued

Dahongshan Power Plant Turbine Room

Access/Hoisting Downdip Roadway Into
Production Cell Under Development

FIGURE 3.3 - Continued

Manual Loading of Shot Ore
Roadway Drivage Face Operation

Underground Mirabilite Pipeline System
Note Dual Pipeline Discharge Pipes from Production Cell

FIGURE 3.3 - Continued

Dahongshan UG Mine Main Roadway

FIGURE 3.3 - Continued

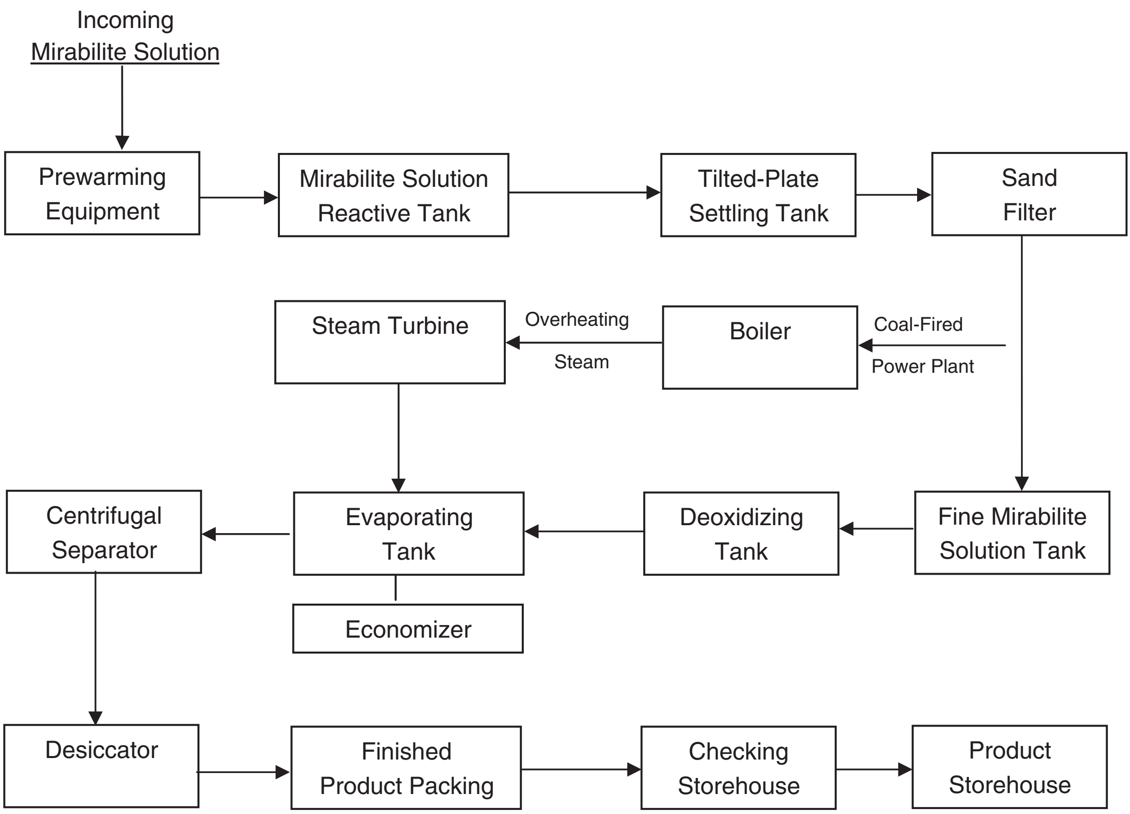


FIGURE 3.4

DAHONGSHAN PROCESSING PLANT SCHEMATIC DIAGRAM

Prepared For
LUMENA RESOURCES CORP.

John T. Boyd Company May 2009

4.0 PRESENT OPERATIONS OF GUANGJI

4.1 Introduction

Chuanmei Glauber Salt operates the Guangji Mirabilite Mine (Guangji) located approximately 22 km west of Meishan City, Sichuan Province, adjacent to Guangji Township. Mine preparation and construction work at Guangji commenced at the end of 2006. Beginning in November 2007, the mine began to supply Mirabilite solution to the processing plant. A more advanced mine development method is used at Guangji, which employs a roadheader (to replace traditional drill and blast operation in main roadway construction). This mechanized approach, compared with drill and blast techniques, improves the rate of advancement in the main roadway development significantly. A combination of underground and solution mining methods is used to produce the Mirabilite. Solution mining is employed after the solution cells are developed by drill and blast method.

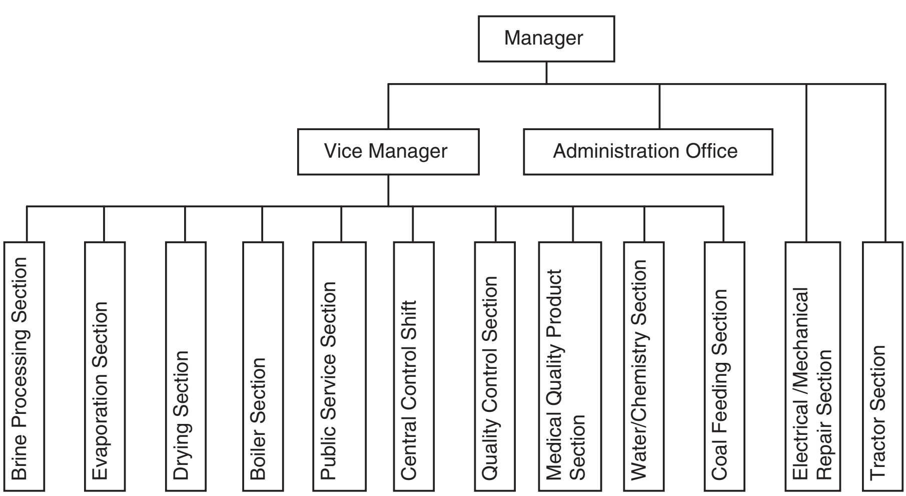
Off-site transportation infrastructure at Guangji area is well developed. The Chengdu-Kunming Railway passes the east side of this area and the Meishan Railway Station is approximately 11 km away by road. The Meishan-Hongya Highway runs through the mine area. The distance from Guangji to Chengdu is approximately 81 km, and to Chengdu Shuangliu Airport, approximately 66 km.

BOYD personnel visited the mine site and processing facilities on January 25, 2008 to review the progress of construction work, including the incline accesses and completed an underground mine tour on March 3, 2008. BOYD subsequently visited the Guangji facilities during the period June 4–7, 2008.

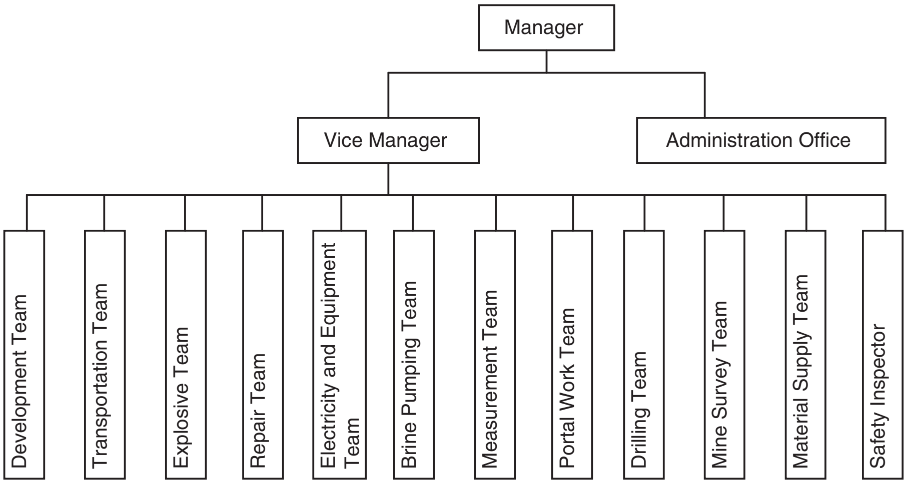
4.2 Management Structure

Chuanmei Glauber Salt, which operates Guangji Mine and processing plant, and Chuanmei Mirabilite, which operates Dahongshan Mine and processing plant, share the same general management. Guangji operation has its own mine/plant management staff on-site.

The management of Guangji processing plant and power plant is illustrated below:



Management of Guangji Mine is illustrated below:



4.3 Site Operating Statistics

The site operating schedule is based on three 8-hour shifts per day, 7 days per week, and an average of 330 work days per year. Underground roadway drivage is scheduled at two shifts daily. The daily ore hoisting time is designed to be 16 hours. As of December 31, 2008, Lumena reported employment at 874 personnel for both Guangji and Muma operations.

Work Area	Number of Employees
Management	46
Mine	476
Processing Plant	225
Power Plant	127
Total	874

The mine personnel are distributed by general work areas as follows:

Work Area	Number of Employees
Development Crews	247
Transportation System	105
Maintenance	12
Electrician & Mechanic	40
Brine Pumping	13
Safety Inspection	5
Portal	3
Detonator & Explosive Storage	6
Drilling	25
Survey	7
Material	4
Other Labor	2
Supervision (Managers)	5
Total	414

Two roadheaders are employed in the development of part of the service incline and main roadways. Conventional drill and blast are practiced in solution cell development (entry excavation), which is labor-intensive. Individual crews completing solution cell development total approximately eight personnel, including workers performing drilling, blasting, loading of the shot ore, etc.

In 2008, Guangji produced 930 Kt of Thenardite products.

4.4 Guangji Underground Mine

4.4.1 Physical Mining Conditions

The mining and Mirabilite production is designed in the Nos. 2 and 1 beds zone, which is the thickest and technically the most favorable of the available Glauberite zones. The combined Nos. 2 and 1 beds average 10.4 m in ore thickness within the active mining areas and are separated by a rock parting that averages 20 m. The composite grade of Mirabilite for the areas being mined is about 35% to 40% of Na_2SO_4.

The mine water inflow rates of the Dahongshan Mine, 14,400 m^3/day maximum and 9,600 m^3/day on average, were used in selecting pumping equipment. The current monitored underground water inflow rate is about 4,800 m^3/day. The ground water is collected and enters into the underground water circulation system which is used for ore dissolving.

Guangji Mine is located on the southwest flank of the Xiongpo anticline. The Glauberite beds dip to the southwest with the dip gradually decreasing from 25 degrees to 9 degrees along the dip direction. Depth of mining to the current active mining area ranges from 250 to 290 m.

In geologic terms, the site's geology is categorized as simple. The floor and immediate roof strata are typically sandy clay or clayey siltstone with little fracture and are stable without roof support. Based on BOYD's underground observations and exploration data, roof support in Guangji Mine is unlikely to be needed in most areas which are developed. In certain essential locations, some props and beams are used as a precautionary measure to support the roof. The main transportation roadways and main air return roadways are supported by reinforced shotcrete. No roof deformation and entry stability issues were observed during BOYD's site visits.

The insoluble non-ore material has a coefficient of expansion of 1.3 to 1.4 when exposed to water. This swelling or bulking factor fills the void left in the production cells after recovery of the mirabilite (dissolved sodium sulfate solution, $Na_2SO_4 \cdot 10\ H_2O$) and minimizes or prevents subsidence of the overlying strata. In addition, there are no major surface features or developments (e.g., water bodies, villages, railways, etc.) above the mine area and the mining depth is generally more than 150 m. Therefore, the mining activity is projected to have little effect on the surface.

Gases produced from the blasting operation are diluted and removed by the mine's ventilation system. The projected ventilation air volume at the early stage of mining is 62 m^3/s and will be increased to 75 m^3/s as the mining area expands. The beds are not reported to have gas emissions during development.

4.4.2 Access

Access to the underground mine is provided by three inclines, as shown below.

Incline	Length, Incline Angle	Designed Use
Main	837 m at 23.5º	Intake fresh air, solution pipelines and cables, ore hoisting by belt conveyor, travel way for mine personnel.
Service	764 m at 23.5º	Intake fresh air, equipment and material transportation, travel way for mine personnel.
Air Return	619 m at 25º	Air return, pipeline for clean water.

The inclines are located in the northwestern part of the mining right area. Processing and other mine surface facilities are located near these mine openings. Underground mined Glauberite from roadway drivage and solution room development is transported to the Main Incline and hoisted to the surface. Glauberite is deposited on the surface, leached with water and the Mirabilite solution returned by pipeline to the underground Mirabilite handling system.

During BOYD's underground visit on March 3, 2008, the incline construction had been completed, although the service and ventilation inclines were under minor repairs and final finishing. The floor of the service and air-return inclines had not been paved. Rails weighing 22 kg/m at 600 mm gauge were installed in all three inclines. Temporary auxiliary fans are used for ventilation prior to completion of the ventilation system.

A 2JTP-1.6 model winch was installed in the main incline; a 2JK-2 model winch and a winch monitoring system were installed in the service incline. Installation of pipelines and cables in the ventilation incline were completed.

A roof fall occurred in the air-return incline on March 2, 2008. There were no injuries reported for this roof fall. The roof fall occurred before the permanent opening support was installed. A detailed plan for cleanup and support at this area was developed after the roof fall occurrence. BOYD reviewed this plan, and in our opinion, it is prudent in terms of safety and practicability. BOYD suggests that support should be installed as soon as practical once the incline is excavated to reduce exposure time of the unsupported area. BOYD is of the opinion that roof falls during incline development are not unusual and do not affect the future long-term operation of the mine. Once the area of the fall is cleaned up and repaired and permanent support is properly installed, we expect the area will remain stable.

4.4.3 Mine Layout and Mining Practices

Guangji Mine employs a room solution mining technique which includes a combination of room-and-pillar underground mining practices with solution recovery of the soluble ore within designed 300 m x 145 m production cell or block areas. The solution cells are in the No. 2 bed. The basic sequence of mining includes:

- Beginning from the incline bottom, the initial main air-return roadway and main transport roadway are developed on strike (i.e., horizontal) at selected 280 m and 240 m levels using two roadheaders. Main roadways are a nominal 3.0 m wide x 2.7 m high in cross section and driven on the bottom of the No. 2 ore bed. Two roadheaders are used in developing the main roadways. The advance rate of a roadheader section is 15 to 20 m/day, or 450 to 500 m/month. Single narrow gage rail (600 mm, 33 kg/m) is laid in the transport roadway for movement of 1 tonne capacity ore cars and 2 tonne side-dump ore cars pulled by trolley locomotive. The mine is equipped with three trolley locomotives, two active and one standby.

- At the designated solution cell location, a dip entry at the No. 1 ore bed, 95 m in length and 25 degrees in dip angle, is driven first to connect the lower (240 m level) main transport roadway and the upper (280 m level) main air-return roadway. Single narrow gage rail is laid in this dip entry, which serves as the transportation entry to remove shot ore during the development of the openings within the cell. A series of dip roadways parallel to the dip entry, on nominal 25 m centers and 2.7 m wide x 2.0 m high, and horizontal crosscuts, on nominal 22 m centers and 4.0 m wide x 2.4 m high, are driven, resulting in a series of solid pillars remaining (12 pillars per row x 5 rows = 60 pillars per cell). See Figure 4.1, following this text. The planned advancing rate for development is 80 m/month for dip roadways and 150 m/month for horizontal crosscuts. Once fully developed a typical cell will have a series of six horizontal roadways and 11 dip entries. Barrier pillars, 15 m wide between the cell and the upper main air-return roadway and 20 m wide between the cell and the lower main transport roadway are left, with nominal 30 m wide pillars (barriers) left on the two remaining sides of the cell. Including the main roadways and the railed dip entry, approximately 3,400 m of roadway must be driven for each 300 m x 145 m solution cell. This equates to 75,000 tonnes of mined material (ore and rock). Pipelines for future water injection (top of cell) and extraction of the Mirabilite solution (downdip corner of cell) are installed.

- After the roadways and crosscuts are developed, high density angle drilling is completed along both sides of the horizon cross cut entries. Holes are spaced 1.0 m apart, with rows in 1.0 m spacing, and extend 6 to 10 m into the ore body. The depth of individual drill holes varies depending on thickness of the ore layers and the angle of drilling. Five deep-hole drills are equipped for each cell development. Upon completion of drilling, holes are loaded with explosives and the cell area shot. Average powder factor (explosive usage) is 0.294 kg of explosives per tonne of ore.

- After the ore body within a solution cell is rubblized, clean water is injected into the cell area to dissolve the ore. When the concentration level reaches 25º Baumé, the Mirabilite solution is removed and enters the mine's Mirabilite pipeline system for transport to the surface. The cells can be recharged with freshwater and the process is repeated. The operating life of individual cells is three to five years. Over time, the recoverable ore is depleted. If the concentration is too low, pumping will be paused to allow more retention time so the Mirabilite dissolves until the concentration climbs back. When the concentration drops to 10º Baumé and fails to reach a higher level, the solution is circulated to a newer mining block. The concentration of the solution is routinely monitored underground.

- A closed loop circulation is used for Mirabilite removal. On the surface and located beside the processing plant there is a 400 m^3 recycling water pool. Water is pumped from here through pipelines laid in the main incline and ventilation incline to underground solution cells. The Mirabilite solution from production cells is collected in the central underground solution sump where two 800 kW pumps (one active and one standby) are used to pump the mirabilite solution to surface and processing plant. Water released during processing is routed to the recycling water pool and reused for ore dissolving. Based on the designed 1.0 Mtpa Thenardite producing capacity, about 4.0 million m^3 Mirabilite solution at 25º Baumé concentration is needed each year, or 12,122 m^3 water is needed daily for ore dissolving.

- The planning sequence of mining extracts Mirabilite from the No. 2 bed first, followed by the No. 1 bed. The designed Thenardite output could be reached by running two producing cells in the No.2 bed and three producing cells in the No. 1 bed.

4.4.4 Mine Services

Electricity used at Guangji Mine is sourced from a dual-circuit power supply system installed in April 2008 from a public power supply from the nearby Guangji Town 35/10 kV transformer station 2 km away, which distributes power at 10 kV to the mine's substation. At the mine's main substation, power from Guangji Town transformer station is distributed to various transformer substations. The underground power has four utilization voltages, i.e., 10 kV, 1,140 V, 660 V, and 127 V. Voltages for surface use are 10 kV and 220/380 V.

Water for industrial and residential use is sourced from the nearby Yangshuinian Reservoir. This water must be treated for residential uses. Ground water flowing into the mine via the inclines is collected and stored in a series of sumps (capacity of 4,200 m^3). The diameter of the steel pipes used for water supply is 160 mm in the service incline, 100 mm in the main roadways, and 50 mm in the production cells under development. Three 710 kW pumps are used to pump the mine inflow water from the underground sumps to the 400 m^3 capacity surface tank. This water is used for surface leaching and underground spray (dust suppression) purposes.

The underground mine's central ventilation system is an exhaust system using the main and service inclines as fresh air intakes and the ventilation incline as the return air facility. During the early phases of operation, approximately 3,540 m^3/min of return air exits the mine via the fan drift connection to the ventilation incline. Air volume will increase to 4,260 m^3/min later. Brattice cloth is used underground to direct air flow into cell areas following blasting to dispel gases. Smaller axial flow ventilation fans (120 kW and 22 kW) are also used underground to dilute the smoke and dust after each blasting shot. Based on the mine layout, BOYD suggests a second return air incline may be required as the mine advances into the deeper areas of the mine to reduce airflow resistance caused by excessive distance.

Underground transportation systems are designed for movement of man, materials, mined ore and Mirabilite solution. According to the mine design, an overhead staff-riding system (overhead tram) is to be installed in the service incline. Once underground, personnel walk to their assigned work area. The main incline is equipped with a 800 mm wide conveyer belt system for ore transport to the surface and a winch system (110 kW with a 1.6 m diameter hoisting drum) for pulling mine cars up the incline.

A small mechanized (electrical powered) loading machine is used to remove the shot ore from the development headings and place it into the 1 tonne railcars. Mirabilite solution enters the underground pipeline system directly from the production cells and is pumped to the Glauber's salt sump located at the bottom of the main incline. The solution is then pumped up the mine main incline to the Mirabilite processing plant located on the surface.

The authorized underground explosives magazine is located 25 m from the service incline bottom. It was designed to store 400 kg of explosives, which is about the amount used in one day.

4.4.5 Mine Safety

New workers are trained at the mine before starting any work either underground or on the surface. Safety regulations and proactive measures are in place covering major working procedures. Special workers like shot lighters and equipment operators hold the relevant qualification certificates by the administration department after passing the relevant qualification exams. The roadheader operators are trained on-site by the equipment manufacturer for one month. The safety and professional health measures stated in the Preliminary Design Report of Guangji Mirabilite Mine are prudent and follow Chinese and international general underground mining practices. Lumena reported only one minor injury case at Guangji Mine in 2008.

4.5 Mirabilite Processing

4.5.1 History

The Guangji processing plant was completed in November 2007.

The processing facility is currently served by one 7,000 kW, coal-fired boiler which generates electricity and steam for plant and facility consumption. Lumena reported that power generation from the generator is sufficient for the processing plant usage and the remaining power is used by Guangji Mine. The Guangji facility has the option to purchase power from the local high voltage grid at 117,000 kW. The Guangji plant was fully functional and operational with a minimum of start-up and debugging problems according to our discussions with plant management. Utilizing current quality control processes and programmable logic controller (PLC) automation, the product(s) is packaged and transported to the shipping bays in one of four automated, technologically advanced packing and shipping lines and can be pre-packaged in a number of sizes by weight to suit individual customer requirements for the specific product.

The designed plant capacity is 1.0 Mtpa of Thenardite product (anhydrous sodium sulfate, Na_2SO_4). The Guangji plant has a designed capacity over 60% greater than the second largest facility of its type, the Quimica del Rey plant of Grupo Penoles, which is located in Laguna del Rey, Coahiula State, Mexico, which has a reported capacity of 620,000 tpa of sodium sulfate and reportedly produced 618,000 tonnes of anhydrous sodium sulfate in 2008.

4.5.2 Process

Lumena has been able to combine the technology of its equipment suppliers into its production facility in the Guangji Mining Area. The process at Guangji is similar to the process employed at Dahongshan except for the reverse recirculating and balance circuits. Brine (Mirabilite solution) from the mine is pre-treated prior to introduction to the heat exchangers to remove impurities, principally calcium sulfate ($CaSO_4$), evaporated to precipitate sodium sulfate (Na_2SO_4), and centrifuged and dried (at 45º C) to remove water before the Thenardite product is transferred to the packaging plant (see flowsheet of Dahongshan Plant, Figure 3.4, following last section).

The brine from the underground production cells is pumped to the surface from a 10,000 m^3 capacity underground surge tank to a series of pretreatment tanks and initially flows through a steam heat exchanger before entering the reactor for calcium treatment. A reagent, e.g., soda ash (sodium carbonate, $Na_2 CO_3$) and caustic soda (sodium hydroxide, NaOH) is added at a metered rate for calcium removal. The treated brine is then pumped to a settling tank where solids are removed. The brine is then pumped through a series of sand filters for removal of suspended particles before passing into a solution tank for process control. At this step, a metered quantity of concentrated pre-heated and pre-treated brine solution is first introduced into the system. After mixing, the solution is deoxidized using a vacuum system. Following vacuum deoxidizing, the solution is introduced to the evaporation circuit.

Five steam evaporators in series are used for water removal and increased concentration of the sodium sulfate. The steam evaporators use secondary heat recovery from the coal-fired generating station's steam turbine. The evaporation system facilitates more efficient heat utilization, thereby reducing energy consumption and decreasing costs. At various stages in the evaporator circuit, additional injections of concentrated and treated brine are introduced to the solution. After passing through the evaporators, the concentrated product stream is pumped to cyclones for initial dewatering and further concentration. The product is then centrifuged and desiccation dried in hooded fluidized bed recirculating steam dryers for final removal of moisture. Specialty Thenardite is produced in Guangji with different customers' specifications.

Lumena upgraded the hoisting system at Guangji Mine in 2008. During the upgrading (June to December 2008), part of the brine needed at the Guangji processing plant was supplied by Dahongshan Mine. BOYD was informed that since January 2009, Guangji Mine has been capable of supplying all the brine needed by Guangji plant.

4.5.3 Packaging

The Thenardite product(s) is conveyed from the desiccators after drying and stored in designated overhead bins based on quality and size prior to the packaging operation. A specific quality and/or size can be packed independently of the other product(s). The process is automated, with a metered discharge rate from a load cell valve-controlled to fill poly-woven bags (with plastic liners). After filling, the bags are belt-conveyed to a heat shrink station which seals the plastic liners and then to an automated sewing station which stitches shut the poly-woven bags. The bags are then mechanically directed to one of four product discharge conveyor lines for immediate shipment or to a designated warehouse location based on product size and quality for interim storage. Shipments are dispatched from the covered warehouse to customers or distribution centers by conveyor to truck. Bulk shipments of anhydrous sodium sulfate can be accommodated using one of two bulk loading stations located in the interior of the warehouse. Approximately 8 to 12 people per shift are involved in the packaging and warehousing operation.

4.5.4 General Comments

The process circuitry at Guangji employs "reverse circulation consistent concentration balance." This technology was developed in-house under the technical and commercial guidance of Chuanmei Glauber Salt's technical advisor. In this process, a constant amount of a pre-set concentration of the pre-heated and reagent-treated brine ($Na_2SO_4 \cdot 10\ H_2O$) is continuously recycled back into the system. According to Chuanmei Glauber Salt's management, this process circuitry has several distinct advantages over more conventional brine extraction processes, such as the system employed at Dahongshan.

The key design features and process technology improvements have the following features and benefits:

- The stability of the crystalline compound is increased, as is the ability to control the structure and size of the crystal which is essential for commercial production of specialty Thenardite. This results in improved marketability of this product to specific industrial consumers, in particular the medical market.

- The process design employed at Guangji provides for greater energy efficiency. According to management, the typical energy savings per tonne of anhydrous sodium sulfate produced at Guangji is approximately 20 kWh as compared to Dahongshan, or about 33% per tonne of product.

- The process circuitry provides a higher recovery of sodium sulfate by maintaining consistent concentrated levels of the recirculated treated brine interacting and mixing with the pre-treated inflow.

- There are operational advantages in greater process control by utilizing this particular circuitry.

Process vessels and tanks, evaporators, centrifuges, cyclones, and desiccation dryers were designed and constructed of superior anti-corrosion materials to combat the corrosive nature of the product. Titanium was used throughout the process circuitry (heat-exchangers, evaporators, process piping, and desiccation dryers) to minimize heat loss and provide superior energy efficiency. Auxiliary equipment such as pumps, process control valves, instrumentation, solution tanks, mixers, the reagent system, electrical, and piping runs are well designed and efficiently laid-out. Wash-down channels and spill protection runways are designed effectively to prevent accidental spills and discharges into the environment. BOYD opines that observed housekeeping practices in the plant are excellent and the facility is free of litter, debris, and waste materials.

Process steam and plant electricity are produced on-site by a 7,000 kW coal-fired boiler and generating plant. Coal handling and ash disposal are facilitated by modern materials handling equipment and were designed and constructed in an environmentally sound manner.

The installed process system incorporates five independent circuits similar to Dahongshan, two of which are the recirculating and balance circuits that provide the basis for the high energy efficiency, process control, and crystal formation time. The plant uses a closed loop circulation system, thereby eliminating untreated process water being discharged to the environment. All process water is both pre-treated prior to introduction to the system and post-process treated. There is no discharge of untreated process water to the environment.

The processing facility has operated safely and shown higher efficiency than older processing facilities. It is of BOYD's opinion that the Guangji production facility will be capable of producing 1.0 Mt of Thenardite in 2009 and 2010. Approximately 0.93 Mt Thenardite products were produced at Guangji in 2008.

4.6 Environmental Protection

4.6.1 Regulatory Guidelines

The following governing environmental protection requirements are adopted for the Guangji site operations:

- Guideline for Environmental Protection Design of Construction Project, (87) China Environment No. 002.
- Guideline for Metallurgical Industry Environmental Design (YB9066-95).
- Sichuan Province Atmosphere Pollution and Drainage Standard.
- Sichuan Province Pollution Material Drainage Standard, DB51/190-93.
- Technique Enterprise Plant Boundary Noise Environment Standard (Industrial Area), BG12348-90.

4.6.2 Environmental Quality Status

The general mine site by its inherent nature has affected the environment in terms of surface facility construction (land use) and disposal and processing of mined ore on the surface near the entrance to the Guangji Main Incline. Chuanmei Glauber Salt has taken proactive measures to protect the environment and to minimize any potentially negative impact on the environment. Environmental Impact Assessment Reports for Guangji plant and mine projects were filed with the provincial environment administration in 2007, and the approval notices were issued in February and April 2008, respectively.

4.6.3 Areas of Potential Environmental Impact

The potential impacts on the environment and the steps taken by Chuanmei Glauber Salt to avoid or minimize such impacts are discussed below.

4.6.3.1 Surface Subsidence

The high extraction of Glauberite ore during the room-and-pillar development, bulk blasting, and solution recovery operations in the underground mine create the possibility of mine roof collapse and resulting subsidence of the overlying surface. Chuanmei Glauber Salt conducts mining process strictly in accordance with the Non-coal Mining Safety Regulations and leaves sufficient underground pillars to support the surface. Guangji management believes the potential for subsidence is mitigated by the inherent swelling characteristics of the nonsoluble strata occurring within and between the Glauberite beds (i.e., nonsoluble materials have a swell or bulking index of 1.3 to 1.4 when exposed to water). In addition, the mine workings located outside the immediate production cell areas are only mined to low level (percentage) of extraction. Large barrier and other support pillars are left intact to protect the integrity of the key roadway openings. The mine has also left the Glauberite resource areas underlying the mine's surface facilities and the villages of Guangji Township in place (unmined). Chuanmei Glauber Salt and Guangji Mine management report there has not been any evidence of ground fissures or other manifestations of surface subsidence within the surface areas overlying existing mine workings.

4.6.3.2 Solid Waste

ROM ore from the roadway drivages is hoisted to the surface at the Guangji Main Incline where it is placed in stockpiles and subjected to leaching with water to recover the mirabilite solution. The ROM ore material includes the mined Glauberite bed(s) and rock contamination, including rock between the beds and floor rock (to the extent that excavating a horizontal mine floor results in cutting into the rock strata under No. 1 bed). Approximately 10% to 15% of the ROM tonnage hoisted to the surface is rock contamination. Leaching will result in recovery of the Mirabilite from the stockpiled Glauberite ore. After processing, approximately 65% of the total tonnage of ROM material remains as residue to be disposed of on the surface. Thenardite recovered from the mined ore accounts for 5% or less of total product when the mine is in normal operating mode (i.e., mining is limited to extension of level roadways and production cell development in one ore zone). A small amount of slag is also generated from mirabilite refining process. At an annual production level of 1.0 Mt of Thenardite, the corresponding annual quantity of refuse disposal at the Guangji site is an estimated 520,000 tonnes.

The Guangji ore refuse disposal area reportedly has sufficient capacity to meet the requirement of mine operating life. Ore and slag material is disposed of on a large hill, which will be covered by loess (surface alluvial material), then planted with grass and trees.

4.6.3.3 Dust and Gas Generation

Airborne dust and waste gas are produced during underground operations: rock drilling, blasting of the ore in active roadway headings, and during handling and transport of the ROM ore. Limiting the generation and control of airborne dust are achieved by use of wet drilling, installation of water sprays at ROM ore handling stations, and dispersal by the mine's ventilation system. Workers loading shot ore from the active roadway headings are provided face masks to minimize dust inhalation. The processing facility is generally well kept and maintained. During our site inspections, we observed that very little mine and process waste is landfilled and that scrap and waste materials were properly recycled in accordance with current environmental requirements. Solid fuel (coal) and ash handling in the power plant is stockpiled and handled in accordance with current industry practices. Ash from the coal-fired power and steam plant is temporarily stockpiled in a designated area and subsequently sold to local cement producers for use in their manufacturing process. The above ground production plants adopt electrostatic precipitators and filter bag techniques to remove airborne dust. Lumena reported that a real-time monitoring system for the chimney at Guangji power plant was installed in 2008. BOYD is of the opinion that these measures are effective and the mine and processing plant operate in compliance with the relevant dust/gas emission and control requirements.

4.6.3.4 Waste water

Availability and use of clean water is critical to both the underground mining operation since Mirabilite is primarily recovered via solution action in the production cells and to the Mirabilite processing system. Water requirements are met from the inflow of ground water into the underground workings. It is our understanding that the entire operation does not discharge untreated waste water to the environment and the process water is pre-treated to remove undesirable contaminants and to supply a uniform product to the process system. Post-process treatment of the water used during the Mirabilite recovery is utilized. All water used in the processing system both in-circuit and for washdown and cleanup purposes is collected and treated for reuse. There are no process effluents discharged into the environment using a waste water recycling system. All waste water generated from the production process is recycled underground to be used in Glauberite ore dissolution. It is BOYD's opinion, there are no material issues with waste water disposal.

4.6.3.5 Noise

Noise is generated during the operation of equipment and machinery and during underground blasting operations. The Mirabilite processing facility incorporates pressure vessels, pumps, conveyors, and steam-operated equipment. Reasonable measures are taken by Guangji regarding noise control, including the use of low noise equipment (mufflers), process snubbers, and sound-deadening insulation and provision of earplugs to all employees working in areas exposed to higher noise levels. In BOYD's opinion these measures are in line with general industrial practices and are effective in reducing noise levels.

Following this page are:

Figures

4.1: Illustrative Layout Production Cell

4.2: Selected Photographs, Guangji Operation

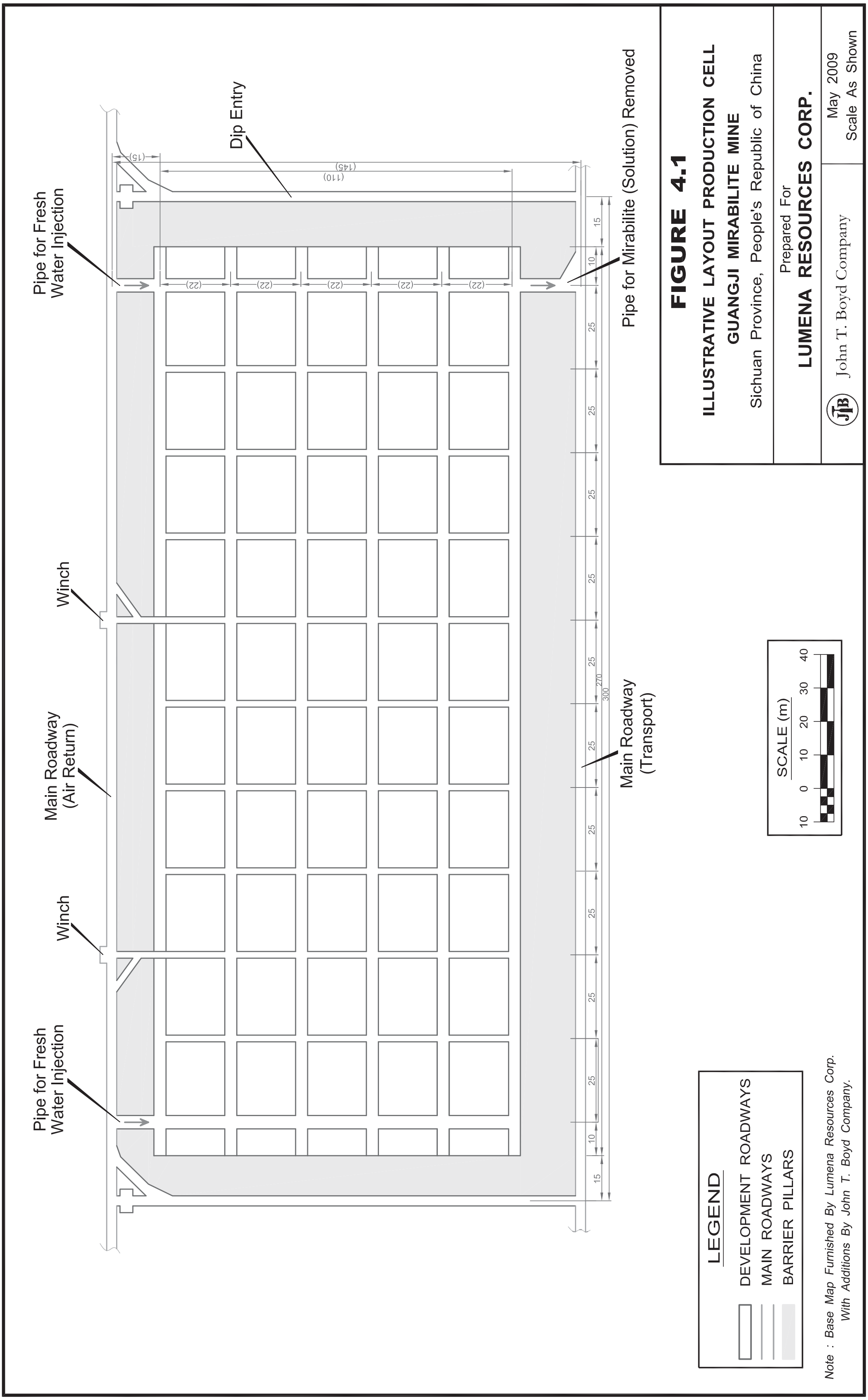


FIGURE 4.1
ILLUSTRATIVE LAYOUT PRODUCTION CELL
GUANGJI MIRABILITE MINE
Sichuan Province, People's Republic of China
Prepared For
LUMENA RESOURCES CORP.
John T. Boyd Company
May 2009
Scale As Shown
DRAFT
Pipe for Fresh Water Injection
Winch
Main Roadway (Air Return)
Winch
Pipe for Fresh Water Injection
Dip Entry
Pipe for Mirabilite (Solution) Removed
Main Roadway (Transport)
SCALE (m)
LEGEND
DEVELOPMENT ROADWAYS
MAIN ROADWAYS
BARRIER PILLARS
Note : Base Map Furnished By Lumena Resources Corp.
With Additions By John T. Boyd Company.

FIGURE 4.2

SELECTED PHOTOGRAPHS
GUANGJI OPERATION

Prepared For
LUMENA RESOURCES CORP.

John T. Boyd Company

May 2009

Processing Plant

Power Plant/Water Treatment Facilities

Control Room of Power Plant

FIGURE 4.2 - Continued

Processing Plant Bagging Area

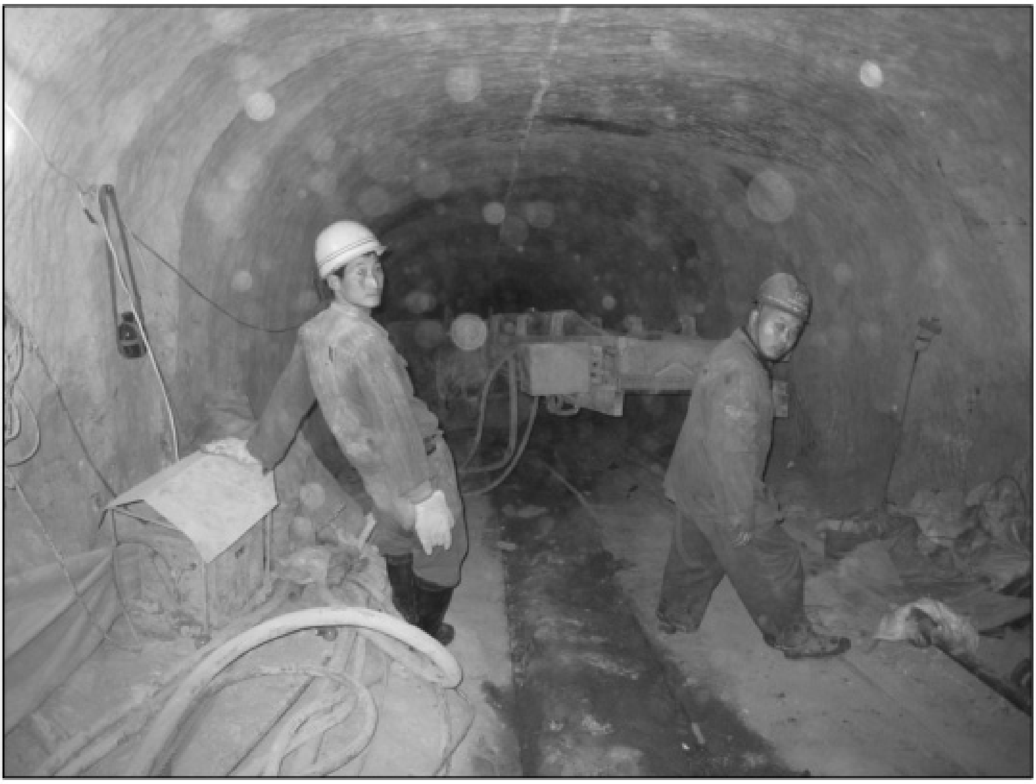
Bagged Product Storage Area

FIGURE 4.2- Continued

Main Incline

No. 3 Incline (developed by Roadheader)

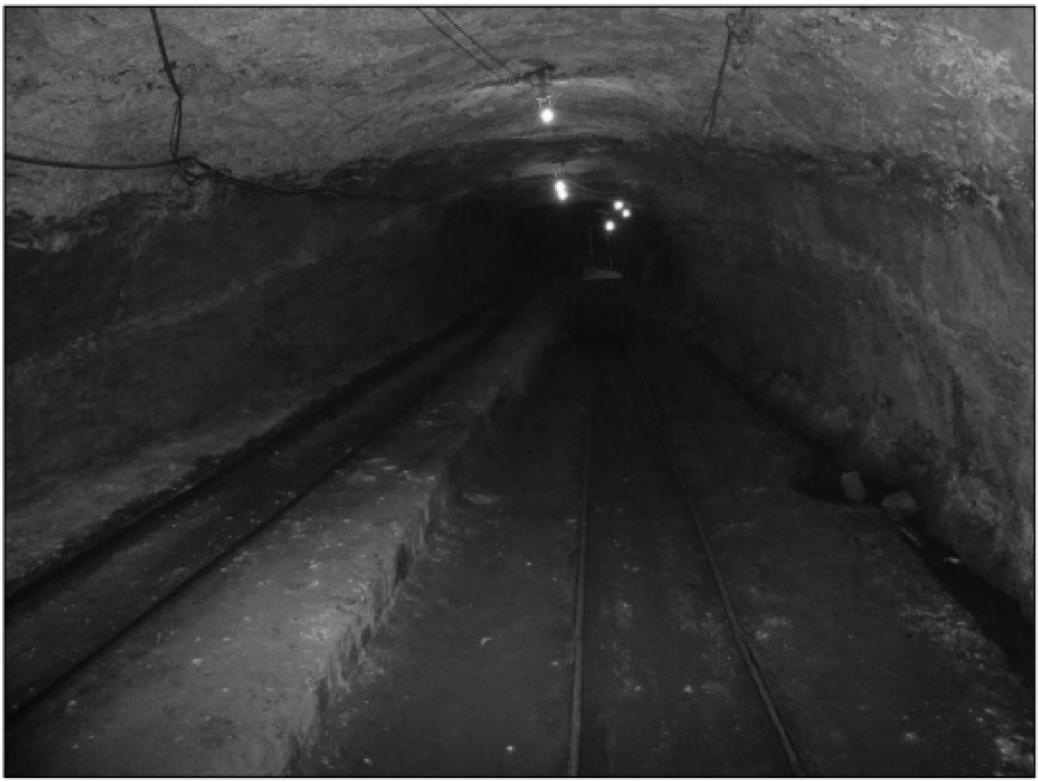
FIGURE 4.2- Continued



Roadheader

Main Roadway

FIGURE 4.2- Continued



Pit Bottom

FIGURE 4.2- Continued

5.0 PRESENT OPERATIONS OF MUMA

5.1 History

Muma Mirabilite Mine (Muma) located approximately 11 km northeast of Pengshan County, Sichuan Province, is currently operated by Chuanmei Glauber Salt. The Chengdu-Kunming Railway, Chengdu-Leshan Express Way, and the Min River pass by the west side of the mine area. The distance from Muma to Chengdu is approximately 60 km and to Chengdu Shuangliu Airport, approximately 45 km.

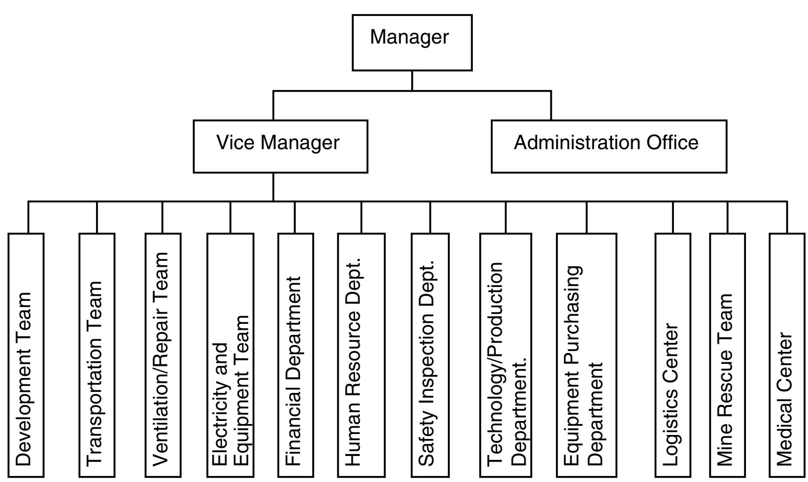
The mine was first constructed and put into production in 1997. At the time of acquisition by Chuanmei Glauber Salt in September 2007, the production capacity was 0.3 Mtpa. Under the current mining right certificate, Muma is authorized to mine the No. 2 (too thin to mine) and Nos. 1 and 3 Glauberite beds.

Chuanmei Glauber Salt has successfully expanded the mining right area to 3.6971 km^2 and plans to increase the Thenardite output to 1.2 Mtpa in 2010. The old processing facilities were demolished and the new 0.2 Mtpa and 1.0 Mtpa processing plants will be constructed in 2009 and 2010, respectively.

Production of Mirabilite employs a combination of underground mining for roadway and other entry development with solution mining employed after the solution cells are developed by drill and blast method. Because Muma's 0.2 Mtpa processing plant will not be finished until the end of 2009, only solution cell development work is currently being conducted underground. BOYD personnel visited the mine on January 26, 2008.

5.2 Management Structure

According to the FSR of Muma Mine and the processing plant, proposed management of Muma is illustrated below:



It is proposed that after the construction of the new processing plant and other surface facilities are completed at Muma, the current manager will oversee the operations.

The Muma workforce is currently based at Guangji, which shares staff with Muma.

5.3 Site Operating Statistics

Only limited historical data are available. Prior mining was conducted in the No.3 Glauberite bed and above the 294 m elevation. Five cells in No.3 bed had been mined at Muma. The solution cells measured 80 m x 120 m with 10 m barrier pillars between cells.

An FSR and a PDR, both finished by Chuanmei Mirabilite, were provided to BOYD. Based on our experience and understanding, a qualified design institute is required to officially issue such reports for such documents to be submitted to the government to support a mining right application. BOYD team was advised that Lumena would hire a qualified design institute to review the design and to issue a PDR.

5.4 Muma Underground Mine

5.4.1 Physical Mining Conditions

Prior to 2008, the mine operated in the No. 3 bed zone, which is the authorized Glauberite bed to be mined. The No. 3 bed averages about 5.9 m in ore thickness within the active mining areas. The mining right certificate granted to Chuanmei Glauber Salt covers the Nos.1, 2, and 3 beds and expands the area to 3.6971 km^2.

Production cells in No.3 bed within the elevation range of 305 to 285 m at Muma are being developed. The mine currently does not perform any mirabilite solution pumping. The original two inclines accessing the mine will be used in the new mine design. BOYD representatives entered the underground mine during the site visit using the existing service incline for observation of the mining conditions and operations.

While the underground mine workings are generally dry, about 274 m^3/day of ground water enters the mine from the existing main and service inclines, which are driven from the surface, through the alluvial material (source of the ground water inflow) and into the underlying Glauberite-bearing bedrock. The ground water is collected and pumped to the surface and discharged. BOYD projects that higher ground water inflow is expected when the new main incline is developed.

Average dip of the Glauberite beds is approximately 3 degrees to the southwest. Depth of mining to the current active mining area is (No. 3 bed) is approximately 180 m.

The mine floor and immediate roof strata typically fall into the Category "Va" type (medium strong). During the BOYD team site visit, we observed that the roof was stable and no support was required in most areas. In some critical locations such as where equipment was installed, timber props and beams were used to support the roof. Indications of pillar stress were not observed by BOYD during our underground tour of the mine.

The insoluble non-ore material has a coefficient of expansion of 1.3 to 1.4 when exposed to water. This swell or bulking factor reportedly fills the void left in the production cells after recovery of the mirabilite (dissolved sodium sulfate solution, $Na_2SO_4 \cdot 10\ H_2O$) and serves to minimize or prevent subsidence of the overlying strata. No formal survey of subsidence survey has been completed, but no indication of surface subsidence was reported by site management.

No harmful gases are emitted from the Glauberite strata during underground roadway development. Gases produced from blasting operations are diluted and removed by the mine's ventilation system. The projected ventilation air requirements for underground operation are approximately 59 m^3/s in the initial period and 74 m^3/s when additional underground areas are mined.

5.4.2 Access

Access to the underground mine is provided by two existing inclines and one new main incline is to be constructed. The original main incline will be used for air return purposes, as shown below.

Inclines	Length, Incline Angle	Planned Use
Main (to be constructed)	600 m at 23º	Intake fresh air, ore and material hoisting by conveyor belt, Mirabilite pipelines and cables
Service (existing, main incline)	320 m at 27º	Intake fresh air, travel way for mine personnel, track laid for material transportation
Ventilation (existing, service incline)	292 m at 28º	Air return, clean water supplying pipelines

The service and ventilation inclines are spaced about 140 m apart and located in the southern part of the mining right area. The new main incline will be located in the northern part of the mining right area. Muma plans to commence construction of the main incline in January 2010, with completion projected in July 2010. The cross section is 5 m in width by 3 m in height for a 15 m^2 area. The incline will be supported by concrete lining. Underground mined Glauberite from roadway drivage and solution room development is transported to the main Incline and hoisted to the surface. Glauberite is deposited on the surface and leached with water and the Mirabilite (solution) is returned by pipeline to the underground Mirabilite handling system. According to the mine design, the surface ore pile will be located in the valley beside the service incline. BOYD personnel observed that some concrete ducts were being installed along the valley bottom, which, according to Muma management, is for dewatering during raining seasons.

5.4.3 Mine Layout and Mining Practices

Muma Mine employs the same mining technique used at Dahongshan and Guangji, i.e., a room solution mining technique that includes a combination of room-and-pillar underground mining practices with solution recovery of the soluble ore within production cell or block areas. Nominal dimension of 240 m x 120 m is typical for Muma's production cell. At the time BOYD visited the mine, the cell development work was along the 294 m elevation section. One solution cell had been fully developed, while two cells were under development. All development was in the No. 3 Bed. According to the mine design, the ore bed is divided into 10 mining levels with roadways in each level driven parallel to the strike with subsequent levels developed downdip at a typical elevation interval of 5 to 7 m. The basic sequence of mining includes the following procedures:

- Beginning from the incline bottom, the initial main air-return roadway and main transport roadway are developed on strike (i.e., horizontal) at selected 320 m and 328 m levels using two roadheaders. Main roadways are a nominal 3.0 m wide x 2.7 m high in cross section and driven on the bottom of the No. 3 ore bed. Single narrow gage rail (600 mm, 15 kg/m) is laid in the transport roadway for movement of 1 m^3 capacity ore cars pulled by trolley locomotive. The mine is equipped by three 10 tonne trolley locomotives, two being active and one standby.

- At the designated solution cell location, a dip entry along the No. 3 ore bed, 120 m in length and 3 degrees in dip angle, is driven first to connect the lower (320 m level) main transport roadway and the upper (328 m level) main air-return roadway. Single narrow gage rail is laid in this dip entry, which serves as the transportation entry to remove shot ore during the development of the openings within the cell. A series of dip roadways parallel to the dip entry and horizontal crosscuts, on nominal 20-m centers and 3.5 m wide x 2.8 m high, are driven, resulting in a series of solid pillars (12 x 6 = 72) remaining. (See Figure 5.1, following this text.) The advancing rate for development is estimated by Lumena at 80 m/month for dip roadways and 150 m/month for horizontal crosscuts. Compared with Guangji, the dip of ore beds is much gentler, and it is BOYD's opinion that the driving speed of dip roadways should be about the same as that of horizontal crosscuts (150 m/month). Once fully developed, a typical cell will have a series of six horizontal roadways and 12 dip entries. Barrier pillars, 10 m wide between the cell and the upper main air-return roadway and 15 m wide between the cell and the lower main transport roadway, are left, and nominal 25-m-wide pillars (barriers) are maintained on the two remaining sides of the cell. Including the main roadways and the railed dip entry, approximately 2,700 m of roadway must be driven for each 240 m x 120 m solution cell. This equates to about 70,000 tonnes of mined material (ore and rock). Pipelines for future water injection (top of cell) and extraction of the Mirabilite solution (downdip corner of cell) are installed.

- After the roadways and crosscuts are developed, high density angle drilling is completed along both sides of the horizon crosscut entries. Holes are spaced 1.0 m apart, with rows in 1.0-m spacing, and extend 6 to 10 m into the ore body. The depth of individual drill holes varies depending on thickness of the ore layers and the angle of drilling. Five deep-hole drills are equipped for each cell development. Upon completion of drilling, holes are loaded with explosives and the cell area shot. Average powder factor (explosive usage) is 0.294 kg of explosives per tonne of ore.

- After the ore body within a solution cell is rubblized, clean water is injected into the cell area to dissolve the ore. When the concentration level reaches 25º Baumé, the Mirabilite solution is removed and enters the mine's Mirabilite pipeline system for transport to the surface. The cells can be recharged with freshwater and the process repeated. The operating life of individual cells is three to five years. Over time, the recoverable ore is depleted. If the concentration is too lower, pumping will be paused to allow more retention time so the Mirabilite dissolves until the concentration climbs back. When the concentration drops to 10º Baumé and fails to reach a higher level, the solution is circulated to a newer mining block. The concentration of the solution is routinely monitored underground. The final Na_2SO_4 recovery from solution cell is estimated at 75%.

- A closed loop circulation is used for Mirabilite removal. On the surface and beside the processing plant there is a 400 m^3 recycling water pool. Water is pumped from here through pipelines laid in the main incline and ventilation incline to underground solution cells. The Mirabilite solution from production cells is collected in the central underground solution sump where two 800 kW pumps (one active and one standby) are used to pump the Mirabilite solution to the surface and the processing plant. Water released during processing is routed to the recycling water pool and reused for ore dissolving. Based on the designed 1.0 Mtpa Thenardite-producing capacity, about 4.0 million m^3 Mirabilite solution at 25º Baumé concentration is needed each year, or 12,122 m^3 water is needed daily for ore dissolving.

- The planning sequence of mining extracts Mirabilite from the No. 3 bed first, followed by the No.1 bed. The designed Thenardite output could be reached by running 10 to 11 producing cells in the No.3 bed.

5.4.4 Mine Services

Electricity used at Muma is sourced from the Qinglong transformer station located 3 km away and will also be sourced from a proposed on-site 15 MW coal-fired power generating station. Public power (Qinglong transformer station) is distributed at 10 kV to the mine site's substation. At the mine's main substation, power is reduced to 380 V and 220 V for surface use. At the underground substation, incoming power is reduced from 10 kV to 1,140 V, 660 V, and 127 V for various uses underground. The construction period for the proposed power plant at Muma is projected to be five to six months.

Ground water flowing into the mine via the inclines is collected and stored in a series of sumps (1,968 m^3) and pumped to surface by a 55 kW pump. The diameter of the steel pipes used for water supply is 160 mm in the service incline and 100 mm in the main roadways, and 50 mm in the production cells under development.

The underground mine's central ventilation system is an exhaust system using the main and service inclines as the fresh air intakes and the ventilation incline as the return air facility. The ventilation demand for underground operation is about 59 m^3/s in the initial period and 74 m^3/s later when more underground areas are mined.

The mine is equipped with two 45 kW fans to meet the ventilation requirement in the initial period which will be replaced with two 90 kW fans as mining operations expand and extend to greater depths. Brattice cloth is used underground to direct air flow into cell areas following blasting to dispel gases. Smaller axial flow ventilation fans are also used underground to dilute the smoke and dust after each blasting shot.

Underground transportation systems are designed for movement of man, materials, mined ore, and Mirabilite solution. Personnel will enter the mine by an overhead staff-riding system (to be installed later) through the service incline. Once underground, personnel walk to their assigned work area. The proposed new main incline will be equipped with an 800 mm conveyor belt system to transport shot ore from the underground workings to the surface.

Similar to Guangji operation, small loading machines will be used to remove the shot ore from the development headings and place it into the railcars. Mirabilite solution enters the underground pipeline system directly from the production cells and is pumped to the salt solution sump located at the bottom of the main incline. The solution is then pumped up the main incline to the Mirabilite processing plant located on the surface.

The authorized explosives magazine is located underground near the intersection of the 328 m main transport entry and the air-return connection. It was designed to store 400 kg of explosives and detonators for development usage.

5.4.5 Mine Safety

New workers will be trained at the mine before starting any work either underground or on surface. Safety regulations and proactive measures will be in place covering major working procedures. Special workers like shot firers and equipment operators are issued qualification certificates by the administration department after passing qualification exams. The safety and professional health measures stated in Muma Mine PDR are prudent and follow PRC and international general practices.

5.5 Mirabilite Processing

5.5.1 History

The Muma site was occupied by an old Mirabilite mine and processing facility reportedly dating from the 1930s. The entire facility, including existing processing equipment, process piping, conveyors, and infrastructure, was demolished. There was little evidence of the former plant during BOYD's site visit.

5.5.2 General Comments

A 0.2 Mtpa medical Thenardite facility is planned to be constructed at Muma in 2009. In addition, a processing system with 1.0 Mtpa capacity identical to the Guangji plant will be constructed in 2010. Management reported that the new Muma plant will have a capacity of 1.2 Mtpa of anhydrous sodium sulfate after completion of construction by the third quarter of 2010.

The key design features and process technology to be designed and implemented at Muma have the following features and benefits:

- The process design will provide for greater energy efficiency. According to management, the typical energy savings per tonne of anhydrous sodium sulfate produced will be approximately 20 kWh as compared to Dahongshan, or about 33% per tonne of product.

- The newly developed process will provide a higher recovery of sodium sulfate by maintaining consistent concentrated levels of the recirculated treated brine interacting and mixing with the pre-treated inflow.

- There will be operational advantages in greater process control by utilizing this particular circuitry.

- The stability of the crystalline compound will be increased, as will the ability to control the structure and size of the crystal, resulting in improved marketability of this product to specific industrial consumers, in particular the medical market.

Process circuitry design and equipment will follow that of Guangji plant and will provide economies of scale savings (as compared to Dahongshan and other smaller operations).

The Muma location is currently under construction and the preliminary scheduled completion date for the 0.2 Mtpa medical Thenardite facility is the end of 2009 and that for the 1.0 Mtpa facility is the end of the third quarter of 2010, with initial production commencing in the fourth quarter of 2010.

During our January 2008 visit, site preparation activities included installation of erosion, sedimentation and drainage control structures and the installation of a 2.0-m-diameter interlocked concrete diversion tunnel to re-route a natural surface drainage away from the planned facility area.

Major rehabilitation had begun on the two existing inclines. Each incline is approximately 300 m in length and driven at an angle of 27 degrees from the horizontal. Rehabilitation work observed during our site visit included the construction of a new service trackage and tippling area, installation of two new hoisting and drive mechanisms, and construction of a new maintenance and tool shop. The main inclines were inspected and found to be in good condition and well maintained. Incline construction consisted of a drilled and shot entry with poured concrete liner, access steps, and water control channels along its entire length and at appropriate points along the decline. The service rail had been worked on and several sections replaced. In some areas, the service steps needed additional repair and/or replacement. A new service incline is planned for future development, but work had not commenced at the time of our site visit.

5.5.3 Process

The Mirabilite recovery process at Muma will incorporate design features and modifications from the Guangji plant.

5.6 Environmental Protection

5.6.1 Regulatory Guidelines

Management reportedly has filed the Environmental Impact Assessment Report for the 0.2 Mtpa medical Thenardite project with the provincial environment administration and the approval notice was issued in April 2009. We expect Chuanmei Glauber Salt will adopt similar guidelines as those used at Dahongshan and Guangji.

5.6.2 Environmental Quality Status

The general mine site by its inherent nature and prior use has affected the environment in terms of surface facility construction (land use) and disposal and processing of mined ore on the surface near the entrance to the Muma Main Inclines. Chuanmei Glauber Salt has taken proactive measures to protect the environment, has cleared the debris from the area, and has acted to minimize any potential negative impacts on the environment.

5.6.3 Areas of Potential Environmental Impact

Areas of potential environmental impact and steps taken by Chuanmei Glauber Salt to avoid or minimize such environmental impacts are discussed below.

5.6.3.1 Surface Subsidence

The high extraction of Glauberite ore during the room-and-pillar development, bulk blasting, and solution recovery operations in the underground mine create the possibility of mine roof collapse and resulting subsidence of the overlying surface. Muma management believes the potential for subsidence is mitigated by the inherent swelling characteristics of the nonsoluble strata occurring within and between the Glauberite beds (i.e., nonsoluble materials have a swell or bulking index of 1.3 to 1.4 when exposed to water). In addition, the mine workings located outside the immediate production cell areas, are only mined to low level (percentage) of extraction. Large barrier and other support pillars are left intact to protect the integrity of the key roadway openings. The mine will leave the Glauberite resource areas underlying the mine's surface facilities and the village of Muma in place (unmined). Chuanmei Glauber Salt and Muma Mine management report there has not been any evidence of ground fissures or other manifestations of surface subsidence within the surface areas overlying existing and previously mined workings.

5.6.3.2 Solid Waste

ROM ore from past operations was restricted to the general area of the leach pad according to our observations. Following conventional methods employed elsewhere, the roadway drivage ore is hoisted to the surface and deposited on a prepared site for leaching. The Muma site had been cleared of this leach pad at the time of our inspection. It is assumed that a new leach pad area will be constructed for this purpose, as is the case at Guangji and Dahongshan. At an annual production level of 1.2 Mt of Thenardite, the corresponding annual quantity of refuse disposal at the Muma site is an estimated 630,000 tonnes.

The Muma ore refuse disposal area is located in a valley and is reportedly sufficient to accommodate all disposal material generated during the mine operating life. Ore and slag material is disposed of to fill the valley, which will be covered by loess (surface alluvial material), then planted with grass and trees.

5.6.3.3 Dust and Gas Generation

The Muma facility is not in operation and is currently in an early stage of development. For the purpose of this report, it is our knowledge and understanding that the appropriate precautions and measures in compliance with dust/gas emission and control requirements in the PRC taken at Dahongshan and Guangji operations will be implemented at Muma.

5.6.3.4 Waste water

Availability and use of clean water is critical to both the underground mining operation since mirabilite is primarily recovered via solution action in the production cells and to the mirabilite processing system. Water requirements are met from the inflow of ground water into the underground workings. It is our understanding from discussions with Chuanmei Glauber Salt management that the planned operations and facilities to be constructed at Muma will follow the Guangji operation. Based on that discussion point, we assume that the Muma operation will not discharge any untreated waste water to the environment. In addition, like Guangji, all process water at Muma will be pre-treated to remove undesirable contaminants and to supply a uniform product to the process system. Post-process treatment of the water used during the Mirabilite recovery will be utilized. Water used in the processing system both in-circuit and for washdown and clean-up purposes will be collected and treated for reuse. According to the mine management, there will be no process effluents discharged into the environment. With the use of this closed water circuit, it is BOYD's opinion, there will be no material issues with wastewater disposal.

5.6.3.5 Noise

Noise is generated during the operation of equipment and machinery and during underground blasting operations. The Mirabilite processing facility will incorporate pressure vessels, pumps, conveyors, and steam operated equipment. For the purpose of this report, we assume all reasonable measures will be taken by Muma management regarding noise control, including the use of low noise equipment (mufflers installed), process snubbers, and sound-deadening insulation and the provision of earplugs to all employees working in areas exposed to higher noise levels in accordance with corporate governance.

5.7 Capital Expenditure

According to the budget provided to BOYD, RMB406 million are projected for the 0.2 Mtpa medical Thenardite production facility at Muma with the following breakdown:

Category	Capital Projected (RMB millions)
Property, plant and equipment	241
Construction of buildings and mining structures	165
Total	406

In addition, RMB646 million are projected for Muma 1.0 Mtpa project.

Based on Lumena's experience at Guangji, it's BOYD's opinion that the projected capital budget is reasonable.

Following this page are:

Figures

5.1: Illustrative Layout Production Cell

5.2: Selected Photographs, Muma Operation

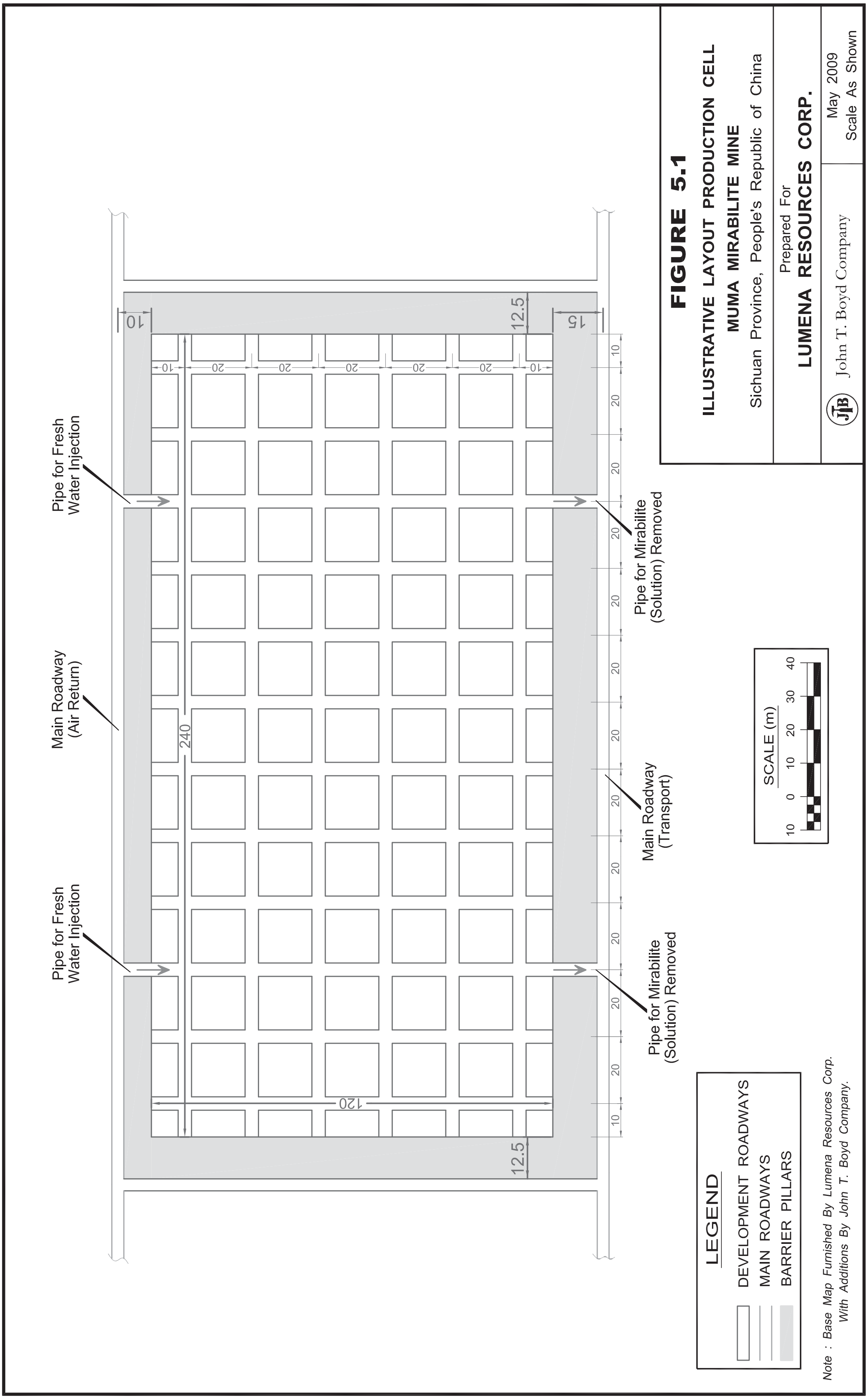


FIGURE 5.1
ILLUSTRATIVE LAYOUT PRODUCTION CELL
MUMA MIRABILITE MINE
Sichuan Province, People's Republic of China
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Scale As Shown
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Pipe for Fresh Water Injection
Main Roadway (Air Return)
Pipe for Fresh Water Injection
Pipe for Mirabilite (Solution) Removed
Main Roadway (Transport)
Pipe for Mirabilite (Solution) Removed
SCALE (m)
10 0 10 20 30 40
240
120
12.5
12.5
10
15
LEGEND
DEVELOPMENT ROADWAYS
MAIN ROADWAYS
BARRIER PILLARS
Note : Base Map Furnished By Lumena Resources Corp. With Additions By John T. Boyd Company.

Surface Facilities Area
(Prior Plants and Buildings Demolished)

FIGURE 5.2

SELECTED PHOTOGRAPHS
MUMA OPERATION

Prepared For
LUMENA RESOURCES CORP.

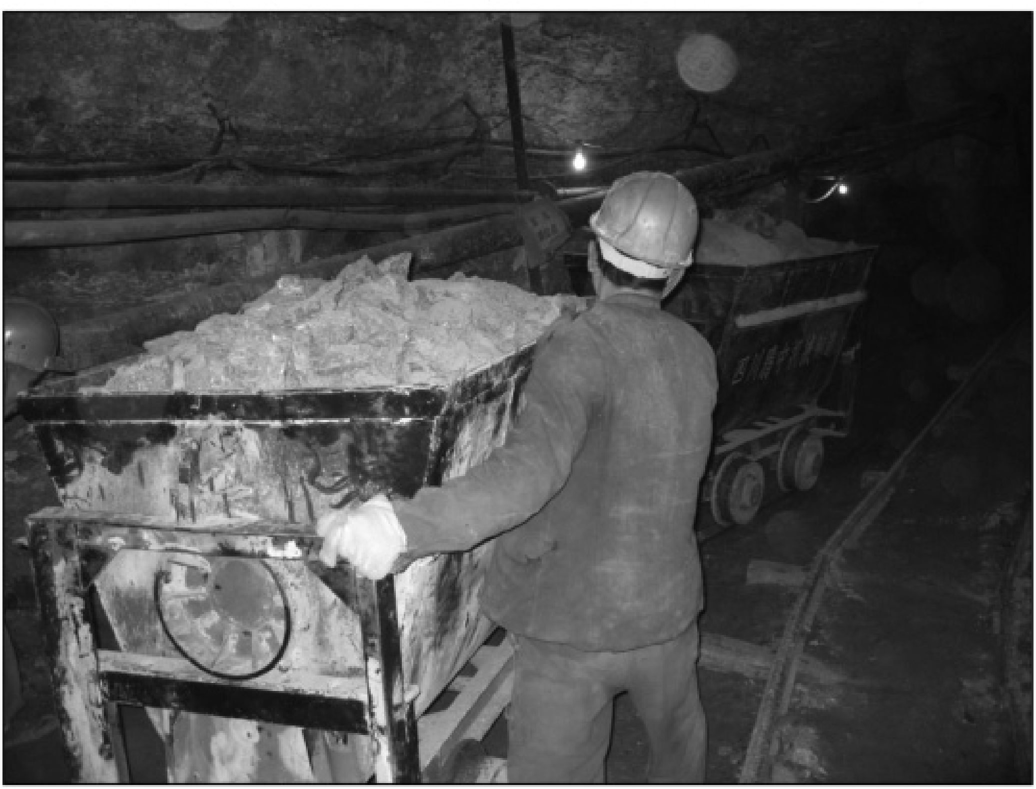
John T. Boyd Company | May 2009

Site Preparation Area
Valley Diversion Pipeline Construction

Entrance to Ore Hoisting Incline

FIGURE 5.2 - Continued

Existing Main Incline



Underground Ore Railcars

FIGURE 5.2- Continued

Solution Discharge Point for Abandoned Cell

FIGURE 5.2- Continued

6.0 BACKGROUND AND QUALIFICATIONS

6.1 BOYD Qualifications

BOYD is one of the largest independent consulting firms in the world exclusively serving the mining, financial, utility, power, and related industries. Our consultancy services have been provided on a continuous basis since 1943 in over 50 countries. Our full-time staff includes specialists in the analysis of geology, reserves, mine planning and costs, material handling, markets, business planning, transport, and environmental issues. Our full range of professional services includes:

- Due diligence of mining operations
- Fuel and energy supply planning
- Permitting and environmental analysis
- Contract negotiations
- Market and transport analyses
- Economic feasibility studies and valuations
- Assessment of existing operations
- Strategic business planning
- Transport issues
- Asset appraisals
- Minerals industry restructuring
- Privatization studies
- Geologic, reserve and mine plan modeling
- Exploration design and supervision
- Reserve and geotechnical studies
- Technical assistance in legal matters
- Monitoring of operating companies
- Financial analysis

BOYD also possesses extensive computer and software systems to estimate reserves and complete mine plans. These include Vulcan, MINCOM, SurvCADD, and others.

Our headquarters office is located in the Pittsburgh, Pennsylvania, region in the United States. Branch offices are established in Denver, Colorado (US); Brisbane, Australia; and Beijing, PRC.

Please visit our website, www.jtboyd.com, for additional details.

BOYD has extensive experience in preparing Competent Persons and Independent Financial and Technical Review Reports for international financing purposes for stock exchange filings. We are knowledgeable of the listing requirements of The Stock Exchange of Hong Kong, London Stock Exchange, and NI43-101 (Canadian requirements), JORC Code, U.S. Securities and Exchange (SEC) Rules, etc. We are familiar with the level of effort required by international investors and financial institutions.

We represented Shenhua Group Corporation as their technical advisor for their successful IPO on the Hong Kong Stock Exchange. Our work included an analysis of reserves (JORC, SEC, and UN Reporting Standards), mineral quality, mine operations, processing, material handling, rail and ocean transport facilities, and economics.

BOYD is a recognized consultancy having worldwide stature. We were retained by Her Majesty's Government, Department of Trade and Industry, regarding the privatization of British Coal Corporation (British Coal) and were actively involved with N M Rothschild, the lead financial advisor, during the course of this project. Our work assisted in the restructuring of the industry, and the coal mining operations of British Coal were successfully privatized.

We have completed over 2,000 resource and reserve audits. BOYD's reserve statements have been used by client companies, including some of the largest US coal producers. We have worked with and for virtually all of the major international banks. Numerous financial agencies have used our services to opine on property/mine operations. We have the proven ability to prepare a bankable document that is accepted and used with confidence by major financial institutions and other investors around the world.

6.2 Statement of Interests

BOYD is a privately owned consultancy firm with headquarters in the United States. Our company was selected for this assignment on the basis of our internationally recognized expertise in exploration, resource/reserve studies, mine development, and valuation. BOYD has no ownership or shareholder interest in the Dahongshan, Guangji, and/or Muma operations; Lumena; Chuanmei Mirabilite; Chuanmei Glauber Salt; or related assets. There have been no transactions between BOYD and its employees, either in the past or presently, and Lumena, Chuanmei Mirabilite, Chuanmei Glauber Salt, or related assets. BOYD does not have any claims outstanding with Lumena, Chuanmei Mirabilite, Chuanmei Glauber Salt, or related assets. Payment for our services is not contingent upon our opinions regarding the merits of the project or approval of our work by Lumena. BOYD has completed its work in accordance with US and international ethical standards for professional engineering.

6.3 Forward-Looking Statements

Estimates of resources and reserves, as well as projections of mine and processing plant output and financial results, are inherently forward-looking statements. Actual performance may differ from projections of future performance due to various reasons beyond the control of BOYD, including, but not limited to: inherent uncertainties in geologic data interpretation, occurrence of unforeseen geological conditions, change or lack of development in key domestic and international markets, material changes in market prices, variances in the execution of construction and mine plans, and significant changes in projected materials, supplies, parts and equipment, operating costs, and expenditures. Imposition of different central, regional, and/or local government policies could affect future coal production. For example, increased environmental compliance and changes in regulatory oversight for health and safety could result in reduced output and increased costs. Possible variations of future performance from the projections presented in this report are addressed in more detail in specific sections of this report.

BOYD did not perform a risk assessment on the Dahongshan, Guangji, and Muma mining areas and the associated processing facilities, although we did review the mines and facilities to determine long-term viability. We do not believe that the mines and facilities are inherently dangerous or have a high risk of accidents that would compromise the ability of the mines and plants to function. BOYD is aware of the operational risks and that Lumena's management of safety and production process are important elements to reduce the operational risks involved. Lumena's output plans do not contain provisions for any unforeseeable decreases in production because the mines and production facilities operate at designed production capacity. In the event that any unforeseeable events result in decreased production, there is no assurance that additional capacity and scheduling will be available to make up for any loss of production volumes. Comments on the risks inherent in the various operations are discussed in the appropriate sections.

6.4 Source Data

The principal sources of information for this project are:

1. Feasibility Study Report of Guangji Mirabilite Mine, Sichuan Chuanmei Special Glauber Salt Co. Ltd., by Sichuan Coal Design & Research Institute, August 2007.

2. Preliminary Design Report of Guangji Mirabilite Mine, Sichuan Chuanmei Special Glauber Salt Co. Ltd., by Sichuan Coal Design & Research Institute, January 2008.

3. Feasibility Study Report of the 1.0 Mtpa Thenardite Project (Guangji) of Sichuan Chuanmei Special Glauber Salt Co. Ltd., by Zigong City Light Industry Design & Research Institute Co. Ltd., June 2007.

4. Review Report of the Resources/Reserves of Guangji Mirabilite Mine, Sichuan Chuanmei Special Glauber Salt Co. Ltd., Sichuan Chemical Industry Geology Exploration Institute, September 2007.

5. Review Report of the Resources/Reserves of No. I Section, Guangji Mirabilite Mine, Sichuan Chuanmei Special Glauber Salt Co. Ltd., Sichuan Chemical Industry Geology Exploration Institute, December 2007.

6. Official Reply to the Water and Soil Preservation Report for the 1.0 Mtpa Thenardite Project of Sichuan Chuanmei Special Glauber Salt Co. Ltd., by Bureau of Water Resources of Meishan City, circular (2007) No.149.

7. Review Opinions on the Environmental Impact Review Outline for the 1.0 Mtpa Thenardite Project of Sichuan Chuanmei Special Glauber Salt Co. Ltd., by Environmental Engineering Review Center of Sichuan Province, circular (2007) No.063.

8. Feasibility Study Report of Muma Mirabilite Mine, Sichuan Chuanmei Special Glauber Salt Co. Ltd., by Sichuan Province Chuanmei Mirabilite Co. Ltd, December 2007.

9. Preliminary Design Report of Muma Mirabilite Mine, Sichuan Chuanmei Special Glauber Salt Co. Ltd., by Sichuan Province Chuanmei Mirabilite Co. Ltd, January 2008.

10. Preliminary Plan of Mine Expansion and Development for Muma Mirabilite Mine, Sichuan Chuanmei Special Glauber Salt Co. Ltd., by Sichuan Province Chuanmei Mirabilite Co. Ltd, December 2007.

11. Exploration Geological Report of Muma Mirabilite Mine, Pengshan County, Sichuan Province, by Sichuan Chemical Industry Geology Exploration Team, August 1996.

12. Review Report of the Resources/Reserves of Muma Mirabilite Mine, Sichuan Chuanmei Special Glauber Salt Co. Ltd., Sichuan Chemical Industry Geology Exploration Institute, January 2008.

13. 2008 Thenardite Market Research and Analysis Report, by Marketing and Sales Department, Sichuan Province Chuanmei Mirabilite Co. Ltd, February 2008.

While the primary source of information relied upon by BOYD in preparing this ITR was provided by Lumena, we independently evaluated the reasonableness of the data provided within the context of our professional and technical expertise and our broad Chinese and international mining experience. To facilitate our interpretation of the data, discussions were conducted with mine site management during our visits. Additional information was requested and collected as necessary.

6.5 Closing

In preparing this ITR report, we have relied on reserve, operating, and other data as provided by Lumena. We have exercised reasonable care in reviewing the information provided, but assumed all historic data have been accurately reported and all forward projections are prepared and/or approved by competent professionals and Lumena management. We have no reason to believe that any material facts have been withheld, or that a more detailed analysis may reveal additional material information. Our ITR has been completed in accordance with generally accepted standards and practices employed in the international mining industry. Although we have compared key information provided by Lumena with expected values, the accuracy of the results and conclusions of this report are reliant on the accuracy of the information provided. We are not responsible for any material errors or omissions in the information provided.

The findings and conclusions presented in this ITR report represent the independent professional opinion of BOYD based on our review of available project information. We have made no attempt to verify the technical and geological information presented in the reference material documents and assume it has been prepared by competent engineers and geologists. Our expertise is in technical and financial mining issues, and we are not qualified, nor do we represent that any of our findings include, matters of a legal or accounting nature. BOYD's independent analyses of the available data have been developed in a manner consistent with industry standards and engineering practices. We believe our conclusions are reasonable assessments of the information provided.

The ability of Lumena to achieve the projections contained in this ITR report is dependent on numerous factors that are beyond the control of, and cannot be anticipated by, BOYD. These factors include mining and geologic conditions, the capabilities of management and employees, the securing of required approvals and permits in a timely manner, etc. Unforeseen changes in regulations could also impact performance. We believe all findings and conclusions to be reasonable but we do not warrant this report in any manner, express or implied.

This ITR report only addresses technical (e.g., reserve, mining, etc.) issues. Forward production and financial plans are developed by Lumena. By assignment, BOYD's review is limited to mines and processing plants and does not consider corporate or other downstream costs.