



# 2010 Minerals Yearbook

---

LAOS

---

# THE MINERAL INDUSTRY OF LAOS

By Yolanda Fong-Sam

In 2010, Laos produced a variety of mineral commodities. These included tin, copper concentrate, silver, and gold, of which production increased by 46%, 26%, 7.2%, and 0.6% respectively, compared with that of 2009 (table 1).

In April, the country began operating the Nam Theun 2 dam, which is the largest hydroelectric dam in the country. The project was a joint venture of the Government of Laos, the Electricity Generating Public Co. of Thailand, and the French energy company Électricité de France. The dam is located in central Laos in the Nam Theun River and was built at a cost of \$1.3 billion, which was funded in part by the Asian Development Bank and the World Bank. The majority (95%) of the generated power was exported to neighboring Thailand, and the remaining 5% was consumed locally, which met 20% of the country's annual energy demand (Voanews.com, 2010).

In December, the Government of the Republic of Korea announced that it had signed various agreements with the Government of Laos to develop mineral resources, such as copper, iron ore, and rare-earth elements in Laos. The agreements also involved cooperation for the development of Laos's energy and power generation sectors (Thomson Reuters, 2010).

## Government Policies and Programs

The mining sector in Laos is governed by the Mining Law of 2008, which was implemented in 2009. The mining law establishes the requirements for obtaining a mining license and developing mineral projects. The Department of Geology and the Department of Mines are the two Government agencies that oversee Laos's Mining Law, which includes inspecting and monitoring mineral development activities in the country. Together, the agencies also assist in the negotiation of mining contracts and in mineral exploration and mining licensing activities, promote investment in the mining sector, maintain geologic databases, and provide mineral exploration support and data analysis studies (Department of Geology and Mines of Laos PDR, 2010a, b).

## Structure of the Mineral Industry

Laos has a variety of undeveloped mineral resources. The Government recognized mining as a critical sector of the economy and continued to support development of the sector by promoting domestic and foreign investment. In 2010, the significant producers of copper, gold, and silver in Laos were the Australian companies Minerals and Metals Group Lane Xang Minerals Ltd. (MMG LXML) and PanAust Ltd. The country's major mineral industry facilities are listed in table 2.

## Commodity Review

### Metals

**Bauxite and Alumina.**—The Laos Bolaven Plateau bauxite project, which is located in the southern part of the country, was being developed by Sino Australian Resources (Laos) Co., Ltd. (SARCO), which was a joint venture between China Nonferrous Metals Industry's Foreign Engineering and Construction Co., Ltd. of China (51%) and ORD River Resources Ltd. of Australia (49%). SARCO had two tenements in the property; they were the LSI tenement, which covers a 66-square-kilometer (km<sup>2</sup>) area, and the Yuqida tenement, which covers a 42-km<sup>2</sup> area (ORD River Resources Ltd., 2010a, p. 5).

In October 2009, SARCO signed a joint-venture agreement with local partner Lao LSI to acquire a 51% interest in the LSI tenement and to complete a feasibility study. Upon the successful completion of the feasibility study, the company expected to secure a mining license for the LSI tenement. In the long run, the joint venture planned to build an alumina refinery with a capacity of 600,000 metric tons per year (t/yr) near the tenement. In December 2009, SARCO acquired a 35% interest in the Yuqida tenement (ORD River Resources Ltd., 2010a, p. 5).

In March 2010, SARCO announced that Sinomine Resources Exploration Co., Ltd. had been selected to conduct a feasibility study in the LSI and Yuqida tenements; the study was projected to cost \$5.3 million and was scheduled to be completed in 2011. Meanwhile, SARCO and Sinomine Resources drilled holes for core sampling, analyzed samples, and completed geologic reconnaissance and mapping in the LSI tenement. In December, the company announced that field work was in progress at the Yuqida tenement and consisted of a topographic survey of the area, collection of samples, identifying drilling locations for further analysis, and performing exploration drilling (ORD River Resources Ltd., 2010a, p. 5; 2010b, c).

**Copper, Gold, and Silver.**—In 2010, the Sepon copper-gold project produced a total of 64,241 metric tons (t) of copper cathodes and 3,252 kilograms (kg) of gold, which represented a decrease of about 5% and 0.5%, respectively, compared with production in 2009. The Sepon project reported that the decrease in copper production was mainly the result of an intense rainy season and difficulties encountered in the mine after a scheduled shutdown, which delayed the resumption of operations. In December 2010, an expansion project in the Sepon copper mine was completed and commissioned, and it increased the mine's capacity to 80,000 t/yr of copper cathode from 65,000 t/yr. MMG LXML held a 90% interest in the Sepon project, and the Laotian Government held the remaining 10% interest. The project is located 40 kilometers (km) north of the town of Sepon in Savannakhet Province in the south-central region of the country (Minerals and Metals Group, 2010, p. 7–8).

PanAust, through its wholly-owned subsidiary Pan Mekong Exploration Pty. Ltd., owned a 90% interest in the Lao-registered company Phu Bia Mining Ltd. (PBM) (which manages the Phu Kham copper-gold operation), and the Government of Laos owned the remaining 10%. The Government of Laos and PBM had a mineral exploration and production agreement that regulated exploration and mining within the company's contracted area of 2,636 km<sup>2</sup>. In 2010, the Phu Kham copper-gold operation, which is located approximately 120 km north of the capital city of Vientiane, had copper concentrate production with total output of 67,806 t, which was an increase of 25.5% compared with that of 2009 (table 1). The mine also produced 1,809 kg of gold, which was an increase of about 35% compared with the 1,341 kg produced in 2009; and 15,788 kg of silver, which was an increase of about 7.2% compared with the 14,726 kg produced in 2009 (PanAust Ltd., 2010, p. 6).

In 2010, PanAust's interests in Laos also included the Ban Houayxai gold-silver project, the Phonsavan copper-gold project, and the Phu Kham heap-leach operation. At the beginning of 2010, the Government of Laos issued the company a permit to start construction work at the Ban Houayxai gold-silver project, which is located approximately 25 km west of the Phu Kham copper-gold operation. By March 2010, the board of directors for the project approved the development at Ban Houayxai after receiving encouraging results from the feasibility study completed in the area. The study recommended open pit mining and a carbon-in-leach processing plant with the capacity to process 4 million metric tons per year (Mt/yr) of ore to produce potentially more than 3,100 kilograms per year (kg/yr) of gold (reported as 100,000 troy ounces), and more than 21,700 kg/yr of silver (reported as 700,000 troy ounces). By the end of 2010, the construction phase in the Ban Houayxai project was in progress; the plant was expected to be commissioned by the end of 2011 and to reach full production capacity by the first half of 2012 (PanAust Ltd., 2010, p. 7).

In April, PanAust announced that operations at its Phu Kham heap-leach operation had ceased owing to gold depletion. The company decided to concentrate efforts in its other operations in Laos. The Phonsavan copper-gold project consisted of two copper deposits named KTL and Tharkhek, which are located within 5 km of each other. During 2011, the company would be defining the resources of the project to determine the viability for development. The study would be carried out under a 2-year resource drilling program (PanAust Ltd., 2010, p. 7).

**Iron and Steel.**—In April, Lao Iron and Steel Co. Ltd. announced the start of the construction of an iron and steel facility with a capacity of 500,000 t/yr. The project, which was being built in Hai Village in the Xaythany District, was expected to be completed by the first half of 2011 at an estimated total cost of \$180 million. Lao Iron and Steel Co.'s project was a joint venture between CK Import-Export Co. Ltd of Laos (30%) and Kungang Iron Co. (70%) of China (Pansivongsay, 2010).

**Zinc.**—In 2010, Padaeng Industry Public Co. Ltd. of Thailand, through its wholly owned subsidiary Padaeng Industry (Laos) Co. Ltd., continued its second year of zinc exploration in Laos. Since 2008, the company had held a 30-month exploration license granted by the Government of Laos for a 400-km<sup>2</sup> area

in Vientiane Province. The company focused on two prospects where zinc resources had been identified: the Pha Vang Sam and the Tham Noi Zinc. In October, the company estimated resources to be 700,000 t at a grade of 9.25% zinc and 1.9% lead. Additional drilling to increase resources was planned for 2011 (Padaeng Industry Public Co. Ltd., 2010).

### *Industrial Minerals*

**Potash.**—In January 2009, SinoAgri Mineral Resources Exploration Ltd., which was a joint venture between Beijing Jiang Zhi Yuan Investment Ltd. and the Chinese company China National Agricultural Means of Production Group Corp., signed a 30-year agreement with the Government of Laos for a potash mining license in a 35-km<sup>2</sup> area. The joint-venture company also owned a prospecting license for potash deposits in an area of about 237 km<sup>2</sup>. In 2010, SinoAgri Mineral Resources finalized the construction of a \$37 million pilot plant, which had a production capacity of 100,000 t/yr of potash and was located in northeastern Sakhon Nakon basin in Khammouan Province. In March, the plant produced its first batch of potash (Fertilizer.org, 2010).

In November 2010, the construction of a potassium chloride plant by the Laotian Potash Mining Industry Ltd. was completed. The 50,000-t/yr plant was built with the technical support of the Chinese Academy of Qinghai Salt Lake. The project was a bilateral cooperation project between the Chinese and the Laotian Governments to reduce the shortage of potash fertilizer in the region (Qinghai Institute of Salt Lakes Chinese Academy of Sciences, 2010).

### *Mineral Fuels*

**Petroleum and Natural Gas.**—In August, Salamander Energy plc of the United Kingdom announced that it was abandoning the Bang Nouan-1 well located in a block within the Savannakhet production-sharing contract (PSC) because the company was unable to find significant hydrocarbons to develop the well commercially. Salamander was the operator of the well and held a 30% interest in the project, which covered 19,520 km<sup>2</sup> (Rigzone.com, 2010; Salamander Energy plc, 2010a, p. 19).

Salamander also had a 20% interest in the Champasak & Saravan PSC, which covered 41,140 km<sup>2</sup> and is located south of the Savannakhet PSC. In 2010, Salamander began a two-dimensional seismic survey in the Champasak & Saravan block to identify drilling prospects. The survey was expected to be completed in 2011, and depending on the results, the company was planning to start drilling by 2012 (Salamander Energy plc, 2010a, p. 19–20; 2010b).

### **Outlook**

As Laos continues to develop its infrastructure and to create business ties with neighboring countries, its demand for construction materials, fertilizers, metals, and fuel minerals is expected to increase to meet local demand and growing demand from the regional and global markets. During 2010,

Laos increased its partnerships with other Asian countries such as China, for the exploration of bauxite and potash; the Republic of Korea, for the exploration of various mineral and energy resources; and Thailand, in the operation of the biggest hydroelectric dam in the country (from which power is exported to neighboring Thailand). Laos's participation in such projects enhances its economic development and economic cooperation with other Southeast Asian countries.

In 2011, copper cathode production at the Sepon project is expected to increase to about 80,000 t/yr after an expansion in the project was commissioned at the end of 2010. Gold production in Sepon is expected to stay at about 3,500 kg/yr. Production of copper concentrates in the Phu Kham project is expected to remain at 70,000 t/yr during 2011. PanAust expects its gold and silver production to increase in 2012 following the commissioning of the Ban Houayxai project by the end of 2011. Increases in the production of potash are also expected within the next few years as mines and plants that were in construction during 2010 will be completed in the near future.

## References Cited

- Department of Geology and Mines of Laos PDR, 2010a, Department's functions: Department of Geology and Mines of Laos PDR. (Accessed January 27, 2010, at <http://www.dgm.gov.la/>.)
- Department of Geology and Mines of Laos PDR, 2010b, Policy and legislation: Department of Geology and Mines of Laos PDR. (Accessed January 27, 2010, at <http://www.dgm.gov.la/>.)
- Fertilizer.org, 2010, SINO-AGRI potash project in Laos: China National Agricultural Means of Production Group Corp. and SINO-AGRI Mineral Resources Co. Ltd.: Vietnam, November, 2010, presentation, [unpaginated]. (Accessed December 6, 2010, at [www.fertilizer.org/ifacontent/download/46697/677426/version/1/file/2010\\_crossroads\\_wang\\_slides.pdf](http://www.fertilizer.org/ifacontent/download/46697/677426/version/1/file/2010_crossroads_wang_slides.pdf).)
- Minerals and Metals Group, 2010, Quarterly report for the three months ending 31 December 2010: Minerals and Metals Group, 15 p. (Accessed June 20, 2011, at <http://www.mmg.com/en/Investors-and-Media/Reports-and-Presentations/~media/Reports and Presentations/Quarterly Reports/2010/110128MMGSepandDecQuarterlyReport2010fn11.ashx>.)
- ORD River Resources Ltd., 2010a, Annual report: Sydney, New South Wales, Australia, ORD River Resources Ltd., 76 p. (Accessed November 30, 2011, at [http://www.ord.com.au/ASX Announcements/2010/ORD\\_ANNUAL\\_REPORT\\_2010.pdf](http://www.ord.com.au/ASX Announcements/2010/ORD_ANNUAL_REPORT_2010.pdf).)
- ORD River Resources Ltd., 2010b, Laos bauxite feasibility study—Yuqida field work continues to make progress: Sydney, New South Wales, Australia, ORD River Resources Ltd., November 30, 1 p. (Accessed August 6, 2011, at [http://www.ord.com.au/ASX Announcements/2010/2010\\_12\\_30\\_Laos\\_Bauxite\\_Project\\_Feasibility\\_Study.pdf](http://www.ord.com.au/ASX Announcements/2010/2010_12_30_Laos_Bauxite_Project_Feasibility_Study.pdf).)
- ORD River Resources Ltd., 2010c, Laos bauxite project feasibility study commenced: Sydney, New South Wales, Australia, ORD River Resources Ltd., March 3, 2 p. (Accessed August 6, 2011, at <http://www.ord.com.au/ASX Announcements/2010/Commencement of Laos Bauxite Project Feasibility Study.pdf>.)
- Padaeng Industry Public Co. Ltd., 2010, Annual report 2010: Bangkok, Thailand, Padaeng Industry Public Co. Ltd., 94 p. (Accessed August 30, 2011, at [http://www.padaeng.com/pdf/Annual/2010\\_AnnualReport.pdf](http://www.padaeng.com/pdf/Annual/2010_AnnualReport.pdf).)
- PanAust Ltd., 2010, Annual report 2010: PanAust Ltd., 104 p. (Accessed June 20, 2011, at [http://www.panaust.com.au/sites/default/files/reports/20110325\\_PanAust Annual Report Final Web Version\\_V1.pdf](http://www.panaust.com.au/sites/default/files/reports/20110325_PanAust Annual Report Final Web Version_V1.pdf).)
- Pansivongsay, Manichanh, 2010, Domestic steel supply set to surge: Bangkok, Thailand, Asia News Network, April 24. (Accessed April 28, 2010, at <http://www.asianewsnet.net/home/news.php?id=11574&sec=2>.)
- Qinghai Institute of Salt Lakes Chinese Academy of Sciences, 2010, A 50,000 tons of potassium chloride potash plant completed in Laos: Quhai Institute of Salt Lakes Chinese Academy of Sciences, November 22. (Accessed January 27, 2011, at [http://english.isl.cas.cn/ns/es/201011/t20101123\\_61803.html](http://english.isl.cas.cn/ns/es/201011/t20101123_61803.html).)
- Rigzone.com, 2010, Salamander hits dry well in Laos: Rigzone.com, August 4. (Accessed August 4, 2010, at [https://rigzone.com/news/article.asp?a\\_id=96970](https://rigzone.com/news/article.asp?a_id=96970).)
- Salamander Energy plc, 2010a, Annual report 2010: Salamander Energy plc: London, United Kingdom, 100 p. (Accessed June 2, 2011, at <http://www.salamander-energy.com/~media/Files/S/Salamander-Energy/PresentationsReportsPDFs/AR-2010.pdf>.)
- Salamander Energy plc, 2010b, Champasak & Saravan: London, United Kingdom, Salamander Energy plc. (Accessed June 2, 2011, at <http://www.salamander-energy.com/operations-map/where-we-operate/lao-pdr/champasak.aspx>.)
- Thomson Reuters, 2010, S. Korea signs deal with Laos to develop iron, copper: Thomson Reuters, December 23. (Accessed December 24, 2010, at <http://af.reuters.com/article/metalsNews/idAFTOE6BM00S20101223>.)
- Voanews.com, 2010, Laos inaugurates dam, hopes for major economic boost: VOA News, December 9. (Accessed December 11, 2010, at <http://www.voanews.com/english/news/asia/southeast/Laos-Inaugurates-Dam-Hopes-for-Major-Economic-Boost-111634639.html>.)

TABLE 1  
LAOS: ESTIMATED PRODUCTION OF MINERAL COMMODITIES<sup>1,2</sup>

(Metric tons unless otherwise specified)

Commodity <sup>3</sup>	2006	2007	2008	2009	2010
Barite	29,000	29,000	29,000	29,000	29,000
Cement	400,000	400,000	400,000	400,000	400,000
Clay	5,200	5,500	5,500	5,500	5,500
Coal, lignite	233,000	620,000	600,000	600,000	600,000
Copper:					
Concentrate	--	--	24,929 <sup>4</sup>	54,019 <sup>4</sup>	67,806 <sup>4</sup>
Metal, refined <sup>4</sup>	60,803	62,541	64,075	67,561	64,241
Gemstones, sapphire	carats	1,200,000	1,200,000	1,200,000	1,200,000
Gold <sup>4</sup>	kilograms	6,068	5,137	4,333	5,033
Gravel		100,000	120,000	120,000	120,000
Gypsum		775,000	775,000	775,000	775,000
Limestone		750,000	750,000	750,000	750,000
Salt, rock		35,000	35,000	35,000	35,000
Sand, construction materials		90,000	100,000	100,000	100,000
Silver <sup>4</sup>	kilograms	6,331	4,500	6,700	14,726
Tin, mine output, Sn content <sup>5</sup>		420	370	450	240
Zinc, mine output, Zn content		1,100	3,000	2,200	3,400

<sup>1</sup>Revised. -- Zero.

<sup>2</sup>Estimated data are rounded to no more than three significant digits.

<sup>3</sup>Table includes data available through January 30, 2012.

<sup>4</sup>In addition to the commodities listed, crude construction materials, such as sand and gravel, and varieties of stone were produced irregularly.

<sup>5</sup>Reported figure.

<sup>6</sup>Estimated figures based on Laos inferred exports of titanium ores to China, Thailand, and Vietnam.

Sources: U.S. Geological Survey Minerals Questionnaire for Laos (2006–7); Oxiana Ltd. Annual Reports 2006–8 and Quarterly Reports 2006–7; Pan Australian Resources Ltd., Annual Report 2009–10 and Quarterly Reports 2006–7; Minerals and Metals Group Lane Xang Minerals Ltd. (MMG LXML) Quarterly Reports 2009–10; World Metal Statistics, December 2010.

TABLE 2  
LAOS: STRUCTURE OF THE MINERAL INDUSTRY IN 2010

(Metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity <sup>e</sup>
Barite		Barite Mining Co., Inthavong Mining Co., Lao Development Construction Co., Phethongkham Co., Oravan Barite Co., and Singphououfar Co.	Muongfuong and Sanakham, Vientiane Province	30,000 <sup>1</sup>
Cement		Lao Cement Co. Ltd., a joint venture between China Yunnan Corp. for International Techno-Economic Cooperation and Lao State Agricultural Industry Development Enterprise Imp-Exp & General Service	Vangvieng Cement Plant No. II	250,000
Do.		Wanrong Cement I	Vangvieng, Vientiane Province	78,000
Do.		Wanrong Cement II (Yuannan Industrial Economic Co., 60%, and Agricultural and Forestry Development and Service Co. of Laos, 40%)	do.	200,000
Do.		Wanrong Cement III	Savannakhet Province	200,000
Coal:				
Anthracite		Agriculture Industry Development Enterprises	do.	60,000
Lignite		Viengphoukha Coal Mine Co. Ltd.	Viengphoukha, Luangnamtha Province	300,000
Copper:				
Mined ore output, Cu content		Minerals and Metals Group Lane Xang Minerals Ltd. (MMG LXML), 90%, and Government, 10%	Sepon, Vilabouly District, Savannakhet Province	80,000
Refined		do.	do.	65,000
Do.		Phu Bia Mining Ltd. (wholly owned subsidiary of PanAust Ltd.), 90%, and Government, 10%	Xaisomboun special zone, 120 kilometers north of Vientiane, Vientiane Province	65,000
Gemstone (sapphire)	carats	Bokeo Mining Co. Ltd.	Bokeo Province	300,000
Do.	do.	Buhae Industrial Corp.	Houaxay District, Bokeo Province	500,000
Do.	do.	Lao International Trade and Service	do.	400,000
Gold, mine output, Au content	kilograms	Minerals and Metals Group Lane Xang Minerals Ltd. (MMG LXML), 90%, and Government, 10%	Sepon, Vilabouly District, Savannakhet Province	7,500
Do.	do.	Phu Bia Mining Ltd. (wholly owned subsidiary of PanAust Ltd.), 90%, and Government, 10%	Xaisomboun special zone, 120 kilometers northeast of Vientiane, Vientiane Province	1,700
Gypsum		Lao State Gypsum Mining Co. Ltd.	Champhon District, Savannakhet Province	200,000
Do.		Mining Development Economy Cooperation (OECD)	Tha Kect District, Khammouane Province	150,000
Do.		Savan Gypsum Mining Co. Ltd.	Champhon District, Savannakhet Province	70,000
Do.		LAVICO Co. Ltd. (a Laos-Vietnam joint venture)	Xebangfay District, Khammouane Province	100,000
Limestone		Laos Cement Co. Ltd. (a Laos-China joint venture)	Vangvieng, Vientiane Province	250,000
Do.		Agriculture Industry Development Enterprises	do.	150,000
Do.		V.S.K. Co. Ltd.	Tha Kect District, Khammouane Province	150,000
Do.		Phanangnon Co. Ltd.	do.	100,000
Potash		SinoAgri Mineral Resources Exploration Ltd. (a joint venture between Beijing Jiang Zhi Yuan Investment Ltd. and China National Agricultural Means of Production Group Corp.)	Plant in Sakhon Nakon basin in the Khammouan Province	100,000
Do.		Laotian Potash Mining Industry Ltd. Co.	Potassium chloride plant	50,000
Silver	kilograms	Phu Bia Mining Ltd. (wholly owned subsidiary of PanAust Ltd.), 90%, and Government, 10%	Xaisomboun special zone, 120 kilometers northeast of Vientiane, Vientiane Province	14,000

See footnotes at end of table.

TABLE 2—Continued  
 LAOS: STRUCTURE OF THE MINERAL INDUSTRY IN 2010

(Metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity <sup>e</sup>
Tin, mine output, Sn content	Lao-North Korea Tin Mines	Hinboune District, Khammouane Province	120
Do.	S V Mining Co. Ltd.	do.	300
Zinc, mine output, Zn content	Padeang Industry Public (Laos) Co. Ltd. [Majority interest owned by Padeang Industry (Public) Co. Ltd., and minority interest owned by the Government]	Kaiso, Vangvieng, Vientiane Province	1,100

<sup>e</sup>Estimated. Do., do. Ditto.

<sup>1</sup>Estimated combined capacity of the six local barite mining companies.