

Explanatory notes for the geological and mineral resources map of Lao People's Democratic Republic 1:1,000,000.

EXPLANATORY NOTES FOR THE GEOLOGICAL AND MINERAL RESOURCES MAP OF LAO PEOPLE'S DEMOCRATIC REPUBLIC

1:1,000,000

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THE GEOLOGICAL MAPPING AND MINERAL INFORMATION SERVICE PROJECT
FOR PROMOTION OF MINING INDUSTRY IN THE LAO P.D.R. (2006 - 2008)

Department of Geology (DGEO)
Ministry of Energy and Mines
Vientiane, Lao PDR

Department of Mines (DOM)
Ministry of Energy and Mines
Vientiane, Lao PDR

Japan International Cooperation Agency
Tokyo, Japan

2008

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GEOLOGICAL AND MINERAL
RESOURCES MAP
OF LAO PEOPLE'S DEMOCRATIC
REPUBLIC**

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EXPLANATORY NOTES FOR THE GEOLOGICAL AND MINERAL RESOURCES MAP OF LAO PEOPLE'S DEMOCRATIC REPUBLIC, 1:1,000,000

1. INTRODUCTION

The revising of 1:1,000,000 geological and mineral resources map compiled by British Geological Survey (BGS) in 1991 was carried out in the project of "The Geological Mapping and Mineral Information Service Project for Promotion of Mining Industry in the Lao People's Democratic Republic" conducted from 2006 to 2008 by Japan International Cooperation Agency, and Department of Geology and Department of Mines, Lao People's Democratic Republic. Many geological survey and mineral exploration were conducted since 1991 and abundant data were accumulated. Furthermore, the geological mapping projects of 1:200,000 in scale are in progress in many areas. By 2008, approximately 65% of Lao PDR will be covered by 1:200,000 geological maps. The revising was carried out based on the above geological information.

1.1 Revising of 1:1,000,000 Geological Map

Revision work was applied to the 1:1,000,000 geological map compiled by BGS, referring to the 1:1,000,000 geological map of Cambodia, Laos and Vietnam prepared by Geological Survey of Vietnam in 1991, and also taking the result of 2 sheets of 1:200,000 regional geological map made by this Project as well as sheets over Lao PDR made by Department of Geology and Mines of Vietnam (DGMV) after publication of the 1:1,000,000 geological map by BGS. The areas covered by 1:200,000 sheet used in the revision are shown in the Figure 1.

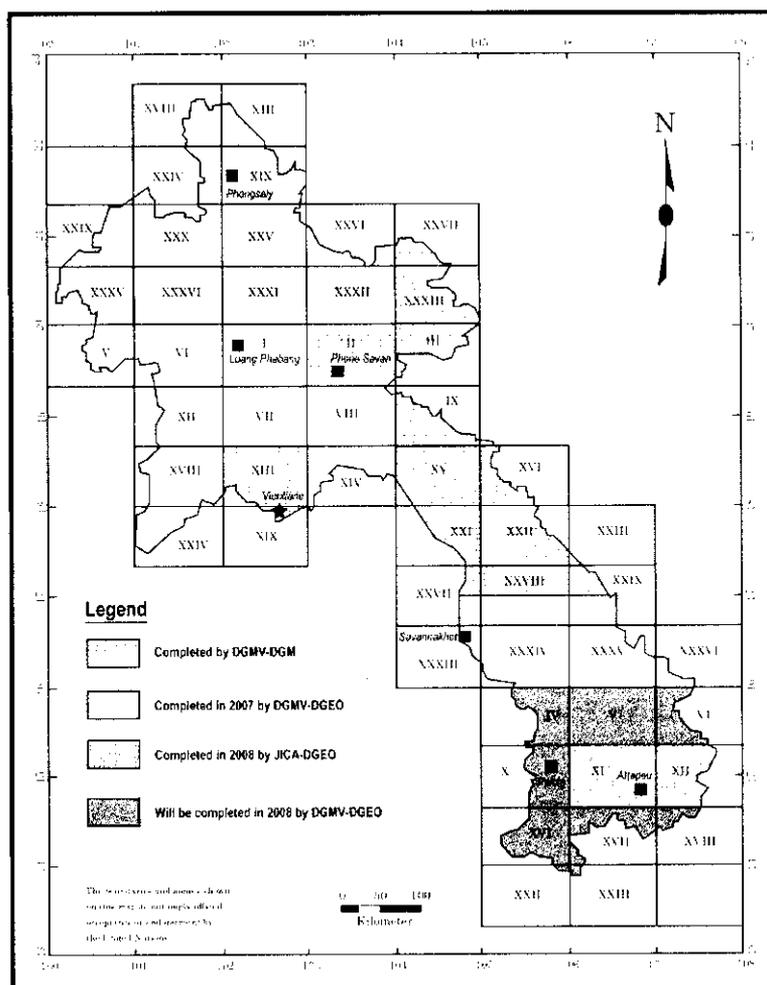


Figure 1 Index map of 1:200,000 geological and mineral resources map

1.2 Revising of 1:1,000,000 Mineral Resources Map

A total of 479 mineral occurrences is documented in a digital form and shown in a sheet of 1:1,000,000 geological and mineral resources map (BGS, 1991). After BGS's compilation DGMV surveyed over central area and 151 localities were described as "Record Book of Mineral Deposits and Ore Occurrences" In Attapeau district a new copper occurrence was discovered by the Project and in the northern part newly discovered mineral occurrences have been reported by DGMV survey team. Although these information was added on the list following a format arranged by BGS, there were uncertainty with information of locality of old records and separate files were generated depend on projects.

2. GENERAL GEOLOGY

Geologically the Lao PDR is the least known of the Southeast Asian countries, but the stratigraphy is quite similar to the neighbouring countries. Metamorphic rocks are believed to be Proterozoic outcrop in northwest and in eastern Lao PDR, Paleozoic and Mesozoic rocks consisting of continental fluvial and shallow to deep marine sediments dominate throughout the country. These rocks have been intruded by numerous granitoid plutons comprising granodiorites, monzonites and quartz porphyries during the Devonian to Triassic. Permo-Triassic acidic extrusive rocks comprising rhyolites and dacites are frequently seen especially in the southern part of Lao PDR. Extensive covers of red beds of Mesozoic age are seen mainly in the southern part of the country. Intense folding took place during the Early Paleozoic, Mid-to Late Paleozoic and Triassic periods.

2.1 Precambrian (PR)

The oldest rocks in Lao PDR are Proterozoic migmatitic and granitoid gneisses exposed in the south-eastern part of the country in the Komtum basement massif which extends eastwards to the coast of Vietnam. Medium to high grade mica schists with garnet, cordierite, sillimanite, kyanite or graphite occur within this massif and are associated with pyroxenites, amphibolites and marbles. In the Song Ma massif in the north-eastern part, the Proterozoic rocks are low-grade schists, arenites and marbles forming a sequence whose upper part may be of Lower Palaeozoic age. Altered ultramafic rocks occur as part of an ophiolite belt near Sam Neua where they mark a major suture oriented parallel to the NW-SE striking Song Ma system. Plutons of potassic granite were intruded into the basement during the Proterozoic and it became a positive cratonic element.

2.2 Palaeozoic (Pz1, Pz2, Pz3)

Pz1 (Pz1-1; Early Cambrian to Early Ordovician, Pz1-2; Early Ordovician to Early Silurian, Pz1-3; Early Silurian to Early Devonian) : The Precambrian is overlain by a sequence of lightly metamorphosed Early Cambrian to Ordovician marine volcanosedimentary rocks. These rocks accumulated in a NW-SE striking deep-water basin (the TruongSon belt of Annamitic zone) bordered by a volcanic arc along the eastern edge of the Indosinian continental mass, and consist mostly of mudrocks interbedded with sandstone, wackes, mafic to intermediate and acidic lava flows, and black limestone.

Pz2 (Pz2-1; Early Devonian to Late Devonian, Pz2-2; Late Devonian to Early Carboniferous): During the Silurian period, a further sedimentary basin and volcanic arc (the Louanphabang belt) developed, extending NNE from Paklay and further north towards Phongsaly. Deep-water deposition of muds occurred in this belt and continued in the TruongSon belt, with the eruption of intermediate and acidic lavas and tuffs in the newer (Louangphabang) trough, and the intrusion of granodiorite and diorite bodies accompanied by low-grade regional metamorphism. As the water shallowed, muddy shelf limestones were deposited in Devonian to Early Carboniferous times, and local emergence to continental conditions occurred over the stable cratonic block beneath the present Vientiane area.

Pz3 (Pz3-1; Early Carboniferous to Late Carboniferous, Pz3-2; Late Carboniferous to Early Permian, Pz3-3; Early Permian to Early Triassic): Local early Indosinian extension caused rifting to form a NW-SE striking continental trough in Houaphanh. Bedded to massive limestones were deposited in this trough and the other two troughs, which were next driven against the central

Indosinian continental crustal massif by movement of the Houeixai (Shan) continental crustal massif from the northwest and of the Song Ma massif (or western edge of the Yangtze/South China platform) from the northeast. Silts, mud and some coal seams were deposited in the TruongSon trough, and also in the west and south of the Lao PDR area. Intrusion of granodioritic plutons accompanied these convergent movements during Late Carboniferous times and, during Mid-Permian to Early Triassic times, acidic, intermediate and mafic volcanic rocks were extruded from volcano-plutonic centres situated in the continental block margins. In late Permian times the eastern border of the Louangphabang belt was probably defined by fractures related to the northern prolongation of the NE-striking Nan-Utradit suture, a possible Indosinian subduction zone.

2.3 MESOZOIC (Mz1, Mz2)

Mz1 (Mz1-1; Early Triassic to Late Triassic, Mz1-2; Early Jurassic to Middle Jurassic): During the Mid-Triassic time, shallow shelf sea conditions prevailed in the south, in the TruongSon belt and in the Muang Xai belt, with the deposition of the limestones and a gradual increase in the proportion of clay and sand as emergence took place over most areas up to mid-Jurassic time. Red continental clays and sands (The Indosinias inferieures, Moyennes and the basal Indosinias Superieures) were deposited during this interval, with some marine limestone intercalations of Liassic age being laid down in the south. Conglomerates and coal seams developed locally within paralic environments, and megacrystic granitoid plutons were intruded between late Triassic and late Jurassic time. Recent work by Russian and Laotian geologists suggests that in parts of the TruongSon belt and in the Louangphabang zone, collision events which took place by mid-Triassic time may have caused Permo-Carboniferous limestones units to slide across Triassic and older rocks with the formation of complex recumbent fold and nappe structures. These structures appear to have been buried by Upper Triassic to Lower Jurassic sedimentary units.

Mz2 (Mz2-1; late Jurassic to early Cretaceous, Mz2-2; late Cretaceous): Deposition of continental red sands (Indosinias Superieres) continued from mid-Jurassic to Cretaceous times over the stable continental area and to a lesser extent in the north, with clay-rich sediments dominating the upper part to the sequence. Mudstones and evaporitic sequences developed in shallow lagoonal basins limited to the orogenic area during the Late Cretaceous and these are seen in the Vientiane and Savannakhet basin areas.

2.4 Tertiary (vPg, vNg)

The Palaeogene and early Neogene periods were characterised by emergence and non-deposition over the entire area of Lao PDR during the Himalayan orogeny. Alkali basaltic lava flows were extruded, and small intrusions of gabbro, monzonite and acidic rocks emplaced. Extensional movements of Late Neogene age produced small intermontane “pull-apart” basins which became filled by fresh-water sequences with occasional limestones and lignite beds. Some basaltic lava flows were also extruded at this time.

2.5 Quaternary (N2-Q)

Sedimentation continued within the Tertiary basins and is represented by alluvium in the present river system and regional loess cover. Lateritised intra-formational erosion surfaces exist within the Quaternary sequence.

3. MINERAL RESOURCES

Lao PDR is well-endowed with mineral resources such as gold, copper, lead-zinc, iron, coal, potash and tin, which are important for Lao economy. The rather limited geological survey works carried out to-date have identified several potential mineral deposits which are being and could be developed.

3.1 Gold

From a geological structural point of view, Lao PDR consists of four units; the Sukhothai fold belt (mainly composed of Middle to Upper Paleozoic system and granitic rocks of the Late Paleozoic era), the Loei fold belt (mainly composed of Middle to Upper Paleozoic system, Lower Mesozoic system and granitic rocks of the Late Paleozoic era), the Indosinia fold belt (mainly composed of Middle to Upper Paleozoic system and granitic rocks of the Late Paleozoic era) and Khorat plateau (mainly Mesozoic group to Paleogene system).

Gold deposits and occurrences in Lao PDR are widely distributed in three fold belts, with the exception of the Khorat plateau. In these areas, there are numerous epithermal gold deposits and prospects, and placer gold deposits along rivers.

Gold deposits are distributed throughout the country. Gold alluvial deposits are found in the Khorat plateau near Vientiane city, but place deposits originated in gold deposits in the Loei fold belt.

At the location of gold potential zones, gold deposits and occurrences are distributed around granitic rocks of the Late Paleozoic era and near and along the large-scale tectonic lines trending NNE-SSW and NW-SE. The Sepon gold deposit, which is a Carline type gold deposit, and the Phu Bia gold deposit, which is oxide gold cap after a primary porphyry copper deposit, are distributed near fracture zones along tectonic lines. They are thought to be formed by Late Paleozoic granitic rock activity.

Ore reserve of the Sepon mine amounts to 142 million tons with 3.43g/t Au and 5.68g/t

The Phu Bia Gold Project comprises three deposits: the Phu Kham deposit; Long Cheng deposit; and Ban Houayxai deposit. The Phu Kham deposit contains two million ounces of gold.

In Lao PDR, exploration activity for gold has not been sufficiently implemented. Lao PDR has a high potential for gold. At present, gold reserves in Lao PDR accounted to 72 tons. Judging from the distribution of gold deposits, mineralization, and numerous discoveries in the Sepon region, gold potential in Lao PDR could possibly range from 500t to 600t.

3.2 Copper

Copper deposits and occurrences in Lao PDR are widely distributed in three fold belts, in addition to the Khorat plateau. Numerous deposits are especially distributed in the Indosinian fold belt.

Copper deposits and occurrences in the Indosinian fold belt are concentrated around granitic rocks of the Late Paleozoic era in Xiang Khoang province where the Phu Kham copper deposit was formed, and around granitic rocks of the Late Paleozoic era in Champasak province. Other copper deposits in the Sukhothai fold belt are concentrated in the north of Oudomxay province.

The Khanong copper deposit (skarn type) in the Sepon mine and the Phu Kham copper deposit (porphyry copper type) are related to granitic rocks, such as diorite and tonalite, of the Late Paleozoic era. Fracture zones have developed near those copper deposits. The granitic rocks intrude calcareous sedimentary rocks, and skarn-type copper deposits lie replacing calcareous rocks.

Copper mineralization is divided into two types: one is porphyry copper-gold deposits forming quartz stockwork in granitic rocks, and the other is skarn-type copper deposits which are formed in and around country rocks. These types of copper deposits are important in Laos. However exploration for copper has not been sufficiently implemented. Lao PDR has high potential for copper. At present, copper metal reserves in Lao PDR account for 1.7 million tons

3.3 Lead and Zinc

Many lead and zinc deposits and occurrences are distributed in the Loei fold belt and the north of the Indosinian fold belt. Lead and zinc deposits and occurrences in the Loei fold belt are found near the Mekong River in Vientiane and Luang Prabang provinces. Other deposits and occurrences are distributed in Xiang Khoang and Houaphan provinces in the Indosinian fold belt, and in Champasak province.

Lead and zinc deposits are divided into skarn type, Mississippi Valley Type (MVT), and stratabound type surrounding ore deposits underlie calcareous rock of the Upper Paleozoic system, and those strata are favourable for country rocks of skarn type deposits and MVT.

At present, the only zinc deposit developed in Lao PDR is the Kaiso deposit in Vientiane province. Annual zinc production ranges from 3,000 to 40,000 tons with 40% Zn. In the Kaiso deposit, zinc

silicate in the part of the ore body is mined, and zinc concentrates are sent to the Tak refinery plant near the Padaeng mine in western Thailand.

At the Pha Luang lead-zinc prospect in Vientiane province, high-grade lead and zinc ore were discovered by drilling exploration and with grades varying from 8 to 26% of Pb and Zn. It was announced that the lead and zinc ore had characteristics of MVT ore. There is a high potential for the existence of MVT in Laos, and more exploration focusing on MVT is needed. At present, the zinc metal reserves are small and amount to 13 thousand tons. However, judging from the existence of lead and zinc deposits in Thailand and Vietnam, zinc potential in Laos could possibly range from 2 to 3 million tons.

3.4 Tin

Tin deposits and occurrences are distributed in the north and south of the Indosinian fold belt. Tin deposits and prospects are concentrated in Vientiane, Xieng Khouang, Houaphan, Khammouane provinces and Champasak province in the south. Tin deposits are related to granitic rocks of the Late Paleozoic era. Cassiterite-bearing quartz veins and quartz networks exist. Though tin ore reserves amount to 45 million tons at present, those reserves could increase with exploration activity.

Tin exploration and exploitation at Boneng-Phontiou tin mines (Hin Boun District, Khammouane Province) has been undertaken since many decades time. Nowadays, two companies are carrying out exploration and mining activities: the Lao-Korean Company mine produces 500 to 600 ton per year with a grade of 70% cassiterite and the Russian Bo Baikal mine 550 tons of concentrate with a grade of 50% cassiterite per year. Tin is exclusively mined from weathered rock.

3.5 Aluminium

Bauxite is the major aluminium ore found in Lao PDR. It is mostly concentrated in the southern part of the country (Champassack, Sekong and Attapeu provinces). Hypothetical resources total approximately 700 million tons and provable reserves 125 million tons.

3.6 Coal

Coal deposits occur mainly in the northern half of the country. There are two types of coal in Lao PDR: anthracite of Palaeozoic to Mesozoic age and lignite of Tertiary age.

Anthracite deposits mostly occurs throughout the country. The calorific value is 5,500 to 8,500 Kcal/kg. The ash content varies from 20 to 40%. Sulphur contents are up to 1.5%. The coal seams vary in width from a few centimetres to more than 20metres; however, most of the seams are 0.6 to 12 metres thick. Up to 23 seams have been reported from several coal deposit.

The coal seams are interlayered in argillites and sandstones. The coal seams have often been folded and faulted which makes them somewhat difficult to mine.

3.7 Gypsum

Gypsum occurs in thick evaporite of the Upper Cretaceous over and its reserve amounts to 8 million tons. The thick evaporite of the Upper Cretaceous is distributed over Vientiane, Bolildlamxay and Khammouan provinces in central part. Gypsum resources and reserves total 172 million tons. At present, gypsum is produced in Khammouan and Savannakhet provinces.

3.8 Potash

Potash has very good potential for development of a large potash mine. Potash is found in two sub-basins with evaporites and detrital sediments in the Vientiane and Khammouane area. These sedimentary basins continue across the border to Thailand.

The Vientiane potash deposit near Vientiane Capital has an estimated reserve of 50 million tons with grades up to 15 % K₂O at depths between 25 and 200 meters and with a thickness of up to 100 meters.

The Nonglom potash deposit near Thakhek City is the second deposit under development. The variation coefficient of thickness of sylvinite - carnallite bodies is 46 meters. Its dip is gentle (5 - 10 degrees). The quality of major compositions of sylvinite, carnallite and halite is rather good. In sylvinite -carnallite, the average content of KCl in this area varies from 14.78 to 29.15% with the

variation coefficient of KCl content = 26%, MgCl = 56%. Total estimated reserves and inferred resources in the area of 13,440 km² is 450,000 million tons of sylvinite-carnallite.

References

- British Geological Survey (1990): Lao PDR geological and mineral occurrences map on scale 1:1,000,000.
- Department of Geology and Mines of Vietnam (1975-1990): Geological map of Xam Neua(northeast Lao PDR), Khang Khay(north of Xiengkhouang) and Vientiane area at 1:200,000
- Department of Geology and Mines of Vietnam (1988): Geological map of whole Indochina at 1:1,000,000. Second edition was published in 1991.
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- Tran van Ban (2000): Report on geology and minerals of mid-central Lao region, Scale 1:200,000, Intergeo Vietnam, Department of Geology and Mines of Vietnam.
- Tran van Ban (2007): Report on geology and minerals of north Lao region, Scale 1:200,000, Intergeo Vietnam, Department of Geology and Mines of Vietnam.

Main Metallic and Non-metallic Mineral Occurrences in Lao PDR (excluding fuel minerals and construction materials) (1/8)

ID Code	Commodity	Map sheet No.	Province	Locality	Longitude	Latitude	Type	Notes	Reference
2413	Au		Sekong	Muong samxay	107.15	15.22	weathering-residual		Xe004
2102	Au		Bolikhamsai	Nam Pheo	105.13	18.20	contact-metasomatic?		UN, 1990
2104	Au		Vientiane	Sanakham-1	101.67	17.93	hydrothermal	presently worked	Bo009
2104	Au		Khammouane	Phou Vang	105.58	17.80	hydrothermal?		UN, 1990
2101	Au		Vientiane	Nam Sang	102.06	18.37	alluvial		K001
2101	Au		Xiangkhong	Ban Namone	103.21	19.56	alluvial	Quaternary	V005
2101	Au		Phongsali	Nam Phak	102.47	21.07	alluvial	Quaternary; previously worked	Xk004
2101	Au		Louangphabang	Muang Moi	103.07	20.28	alluvial		P001
2101	Au		Bolikhamsai	Kham Keut	104.72	18.25	alluvial	Quaternary; previously worked	UN, 1990
2101	Au		Louangphabang	Phou Loi	103.20	20.27	alluvial	Quaternary	Bo007
2101	Au		Xiangkhong	Ban Kao	103.34	19.12	alluvial	Quaternary; previously worked	Lp004
2101	Au		Louangphabang	Sop Sap	103.10	20.15	alluvial		Xk005
2101	Au		Vientiane	Ban Thalat	102.51	18.52	alluvial	Quaternary; previously worked	Lp005
2101	Au		Xiangkhong	Nam Khamnoi (That Kham)	103.60	19.00	alluvial	Quaternary, 0.35g/m ³ , estimated reserve 2Kg	V002
2101	Au		Vientiane	Houaykangxang	102.20	18.63	alluvial	Quaternary	Xk008
2101	Au		Vientiane	Houay La	102.10	18.58	alluvial	Quaternary	UN, 1990
2101	Au		Xiangkhong	Ban Longmon	102.97	19.04	alluvial		V003
2106	Au		Savannakhet	Moung Angkham	106.03	16.97	placer	presently worked	Xk006
2101	Au		Louangphabang	Ban Nam Nga	102.28	20.34	alluvial	previously worked	Sv003
2101	Au		Attapeu	Se Sou	107.08	14.83	alluvial	Quaternary	Lp002
2101	Au		Attapeu	Attapu	106.88	14.80	alluvial	Quaternary	A003
2101	Au		Vientiane	Houay King	101.48	17.92	alluvial	Quaternary	UN, 1990
2101	Au		Bokeo	Ban Houayxai	100.38	20.35	alluvial	Quaternary, 0.5g/m ³ , estimated 60 kg reserve (Barithay)	V007
2101	Au		Bolikhamsai	Houaysangy	104.80	18.45	alluvial	Quaternary	Repetoire
2101	Au		Oudomxai	Hat Sa	100.57	19.91	alluvial	Quaternary	Bo004
2101	Au		Xiangkhong	Muang Ngon	103.70	19.22	alluvial	Quaternary, 3 - 8.5 g/m ³	Oi002
2104	Au		Oudomxai	Pak Beng	101.15	19.91	hydrothermal	previously worked	Xk007
2101	Au		Vientiane	Nam Khouan	101.63	18.20	alluvial	Quaternary	Oi004
2101	Au		Vientiane	Nam Met	101.98	18.90	alluvial	Quaternary	V008
2101	Au		Savannakhet	Sathamouak	105.90	16.72	alluvial	Quaternary	V001
2101	Au		Bolikhamsai	Ban Phoukham	103.67	18.47	alluvial	Quaternary	Bo004
2101	Au		Vientiane	Sanakham-2	101.67	17.92	alluvial	Quaternary; presently worked	V010
2101	Au		Bolikhamsai	Halkham	103.65	18.48	alluvial	Quaternary	Bo002
2101	Au		Oudomxai	Pak Tha	100.60	20.10	alluvial	Quaternary	Oi001
2104	Au		Xaignabouli	Pak Lay	101.41	18.22	hydrothermal		Xa001
2101	Au		Attapeu	Nam Panang	107.35	14.67	alluvial	Quaternary	A004
2101	Au		Xekong	Nong Ta	107.43	15.10	alluvial	Quaternary	UN, 1990
2104	Au		Oudomxai	Koka	100.90	20.05	hydrothermal		Xe001
2104	Au		Xaignabouli	Pak Leng	101.42	18.05	hydrothermal	limonitised quartz veins similar to Don Men (<134 g/t)	Oi003
2101	Au		Vientiane	Khin Ho	102.42	18.60	alluvial	Quaternary	Xa002
2101	Au		Xiangkhong	Ban Song Hat	102.36	19.62	alluvial	Quaternary; previously worked	V011
2101	Au		Xiangkhong	Nam Ngum	103.12	19.63	alluvial	Quaternary	Xk003
2104	Au		Xiangkhong	Xiang Ai	103.29	19.67	hydrothermal	pyritic quartz vein; 0.5 g/t Au, 20 g/t Ag	Xk002
2114	Au		Xiangkhong	Ban Houay Peung	103.63	19.95	(unknown)	pyrite vein in blocks; Au 0.5 g/t, Ag 5 g/t	Xk017

Main Metallic and Non-metallic Mineral Occurrences in Lao PDR (excluding fuel minerals and construction materials) (2/8)

ID Code	Commodity	Map sheet No.	Province	Locality	Longitude	Latitude	Type	Notes	Reference
Data source : BGS (1991)									
2101	Au		Savannakhet	Houay Min	106.08	16.77	alluvial	2-3 g Au/t up to 25 g Au/t	Repertoire Sv001
2101	Au		Savannakhet	Nam Kok	105.90	16.79	alluvial		Repertoire Sv007
2101	Au		Attapeu	Pou Salieng	107.02	14.90	alluvial		Repertoire A006
2114	Au		Houaphan	Ban Him	104.25	20.18	(unknown)		To Van Thu 1982 H002
2101	Au		Savannakhet	Muang Van	106.05	16.87	alluvial	Sand of the Sa Segui	Repertoire Sv005
2101	Au		Savannakhet	Ban Segui	106.04	16.88	alluvial		Repertoire Sv006
2101	Au		Savannakhet	Nam Hou	102.67	21.06	alluvial	previously worked	Repertoire P004
2101	Au		Phongsali	Na Kha	102.48	18.20	alluvial		Pham Van Hung 1 V019
2101	Au		Vientiane	Ban Hakharn	102.25	20.12	(unknown)		UN, 1990 Lp006
2114	Au		Louangphabang	Ban Na Mong	104.52	19.88	(unknown)		To Van Thu 1982 H003
2114	Au		Houaphan	Ban Kong	102.58	20.58	(unknown)		UN Lp009
2114	Au		Louangphabang	Ban Kaleum	106.75	15.73	(unknown)		UN, 1990 Xe002
2114	Au		Xekong	Ban Kaleum	106.75	15.73	(unknown)		UN, 1990 Xe003
2114	Au		Xekong	Dakchung	107.25	15.47	(unknown)		UN, 1990 Xe003
2101	Au		Vientiane	Huoi Cui	102.09	18.32	alluvial		Pham Van Hung 1 V018
2101	Au		Boikhamxai	Houay Sang Ngoi	104.75	18.59	alluvial	old working exploited by the Thais	Repertoire Bo013
2101	Au		Boikhamxai	Nam Kading	103.99	18.36	alluvial	previous workings.	Repertoire Bo001
2101	Au		Boikhamxai	Vieng Kham	102.42	18.36	alluvial		Pham Van Hung 1 V020
2101	Au		Vientiane	Ban Long Mon	102.97	19.04	alluvial		Banitsky 1976 Xk025
2101	Au		Xiangkhoang	Houay Tabos	107.13	14.86	vein		Repertoire A005
2111	Au		Attapeu	Houay Xa	100.57	19.93	alluvial	1-6 g/t old working	Repertoire OI005
2101	Au		Oudomxai	Houay Xa	100.57	19.93	alluvial	old working	Repertoire Xk009
2101	Au		Xiangkhoang	Muang Kham	103.31	19.32	alluvial		Repertoire Xk007
2101	Au		Louangphabang	Houay Tchick	102.46	20.30	alluvial		Repertoire Xk010
2101	Au		Xiangkhoang	Muang Nham	103.75	18.98	alluvial		Repertoire OI008
2101	Au		Oudomxai	Houay Song	101.04	19.94	alluvial		Repertoire Xk011
2101	Au		Xiangkhoang	Sop So	103.19	19.35	alluvial		Repertoire Xk023
2101	Au		Xiangkhoang	Ban Kan Keo	103.47	19.55	alluvial		Cheymol, 1960 Xk012
2101	Au		Xiangkhoang	Vong Pong	103.30	19.16	alluvial		Repertoire Xk021
2101	Au		Xiangkhoang	Nam Phan	103.42	19.41	alluvial		Cheymol, 1960 Xk013
2101	Au		Xiangkhoang	Nam Huock	103.13	19.44	alluvial		Repertoire Xk013
2101	Au		Bokeo	Ban Dame Time	100.50	20.17	alluvial		Repertoire Bk002
2101	Au		Xiangkhoang	Houay Kham	103.24	19.35	alluvial		Repertoire Xk014
2111	Au		Attapeu	Ban Pa Kha	107.27	14.72	vein		Repertoire A008
2101	Au		Xiangkhoang	Muang Pan	103.40	19.44	alluvial		Repertoire Xk015
2111	Au		Attapeu	Ban Tasseng	107.37	14.70	vein		Repertoire A007
2101	Au		Xiangkhoang	Muang Ngan	103.70	19.20	alluvial		Repertoire Xk016
2101	Au		Oudomxai	Houay Tone	101.10	20.07	alluvial	previously worked	Repertoire OI010
2101	Au		Louangphabang	Nam Khong	101.98	18.79	alluvial	incorrect general reference, confirmed by Anwell (Oct 1960) at this locality	Repertoire/Annells Lp008
2101	Au		Vientiane	Vang Kinn Ho	102.55	18.59	alluvial		Repertoire V016
2104	Au		Xiangkhoang	Ban Houay Lun	103.44	19.85	hydrothermal	0.5 g/t Au, 5 g/t Ag.	Cheymol, 1960 Xk019
2108	Au		Xiangkhoang	Ban Muon	103.25	19.60	sedimentary		Cheymol, 1960 Xk024
2101	Au		Oudomxai	Nam Ngao	100.79	19.91	alluvial		Repertoire OI007
2101	Au		Khammouan	Thong Ac	105.47	17.78	alluvial	old chinese working	Repertoire K002
2101	Au		Xiangkhoang	Nam Seun	103.28	19.42	alluvial	previously worked	Cheymol, 1960 Xk022
2101	Au		Savannakhet	Houay Kassang	105.94	16.69	alluvial	local working, river west of Phou La Loi	Repertoire Sv002

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ID Code	Commodity	Map sheet No.	Province	Locality	Longitude	Latitude	Type	Notes	Reference
Data source : BGS (1991)									
2101	Au		Attapeu	Ban Het	107.50	14.71	alluvial		Repertoire A009
2101	Au		Vientiane	Tha Dua	102.71	17.88	alluvial		Pham Van Hung 1 V021
2101	Au		Bolikhamxai	Nam Kato	105.29	18.18	alluvial		Repertoire Bo012
2101	Au		Vientiane	Pac Ton	102.26	18.13	alluvial		Pham Van Hung 1 V022
2101	Au		Vientiane	Nam Tiane	101.85	18.13	alluvial	old working	Repertoire V015
2101	Au		Vientiane	Na Kham	102.03	18.50	alluvial		Pham Van Hung 1 V023
2101	Au		Oudomxai	Houay Soua	100.55	20.01	alluvial		Repertoire O1006
2101	Au		Oudomxai	Houay Xang	101.05	19.92	alluvial	8 - 14 g/t	Goloubinoff 1934 O1009
2101	Au		Xiangkhouang	Pha Saman	103.75	19.95	alluvial	Quaternary; previously worked.	Banitzky 1976 X1020
2101	Au		Savannakhet	Houay Yeng	105.63	18.83	alluvial	local working	Repertoire Sv008
2101	Au		Vientiane	Wat Tai	102.47	17.98	alluvial		Repertoire V017
2114	Au		Phongsali	Houay Ka	102.23	21.78	(unknown)		Repertoire P002
2101	Au		Phongsali	Houai Ka	102.09	21.74	alluvial		Repertoire P003
2101	Au		Vientiane	Ban Hat Kham	102.75	17.96	alluvial	2 g/m ³ ; old working	Repertoire V012
2101	Au		Bolikhamxai	Hat Kham	103.79	18.86	alluvial	old working	Repertoire Bo010
2101	Au		Vientiane	Ban Hom	102.45	17.98	alluvial		Repertoire V013
2101	Au		Vientiane	Ban Pak Tiane	102.41	18.00	alluvial		Repertoire V014
2101	Au		Bolikhamxai	Nam Kham Nai	103.61	18.87	alluvial	In the Mekong near the Nam Tiane confluence	Repertoire Bo011
2114	Au		Xiangkhouang	Ban Na Tine	103.58	19.81	(unknown)	old working	Repertoire Xk029
2114	Au		Xiangkhouang	Cha Mun	103.86	19.44	(unknown)	pyrite vein; 0.5 g/t Au, 5 g/t Ag	Cheyamol, 1960 Xk026
2101	Au, Ag		Attapeu	Attapu	106.88	14.80	alluvial	Quaternary	Repertoire A002
2501	Ba		Houaphan	Ban Kang	104.93	20.08	alluvial		UN, 1990 H007
2511	Ba		Vientiane	Nalang	102.00	18.57	vein		UN, 1990 V027
2601	Cr		Oudomxai	Houay Teck	101.05	19.98	alluvial	estimated reserves over 200,000 tons; 2.2 - 4.5 m thick & 300 m long; Baraga 94-5, 98-9x	UN, 1990 V027
2210	Cu		Champasak	Nongkhounthong	105.72	14.43	stratalluvial		Goloubinoff 1934 O1012
2214	Cu		Attapeu	Me Sang	106.48	14.77	(unknown)		C007
2204	Cu		sayaboury	Ban Viangxai	101.48	18.92	hydrothermal		Xa007
2214	Cu		Kammouan	Ban Bo	105.45	17.80	(unknown)		K003
2214	Cu		Savannakhet	Houei Hok	106.08	16.58	(unknown)		Sv009
2214	Cu		Saravan	Khamthong	105.83	15.53	(unknown)		Sn001
2214	Cu		Champasak	Ban Duong	106.02	15.20	(unknown)		C010
2214	Cu		Champasak	Phu kao	105.83	14.75	(unknown)		C006
2214	Cu		Champasak	Houei Phai	105.75	14.63	(unknown)		C006
2214	Cu		Houaphan	Na mat	104.52	20.03	(unknown)		H018
2214	Cu		Houaphan	Na thong	104.45	19.83	(unknown)		H015
2214	Cu		Houaphan	Muong Phao	104.82	20.08	(unknown)		H014
2209	Cu		Xiangkhouang	Phu Bo	103.33	19.95	Skarn		Xk030
2209	Cu		Xiangkhouang	Ban Phatang	103.30	19.85	Skarn		Xk031
2214	Cu		Xiangkhouang	Ban Tan	103.15	19.78	(unknown)		Xk032
2214	Cu		Xiangkhouang	Ban Namun	103.50	19.77	(unknown)		Xk034
2204	Cu		Xiangkhouang	Ban Bothong	103.60	19.67	hydrothermal		Xk033
2210	Cu (Ag)		Attapeu	Houei Pho	106.88	15.08	stratalluvial		A010
2210	Cu (Au, Ag)		Sekong	Houei Vi	106.95	15.22	stratalluvial		Xe005
2210	Cu (Au, Ag)		Attapeu	Houai Tahdjet	106.97	14.87	stratalluvial		A011

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ID Code	Commodity	Map sheet No.	Province	Locality	Longitude	Latitude	Type	Notes	Reference
Data source : BGS (1991)									
2210	Cu(Au, Ag)		Attapeu	Sekhong	106.70	14.70	stratabound	Mz1	A012
2210	Cu(Au, Ag)		Attapeu	Sepain	106.48	14.72	stratabound	Str	A013
2204	Cu(Au, Ag)		Vientiane	Pha Thon	102.40	18.95	hydrothermal	Hyd	V032
2210	Cu(Sn)		Vientiane	Phu Huat	102.83	18.67	stratabound	Str	V033
2214	Cu		Xiangxiang	Ban Bo	103.20	19.53	(unknown)	-	Xk035
2214	Cu		Xiangxiang	Nakin	103.28	19.43	(unknown)	-	Xk036
2214	Cu		Xiangxiang	Nakin	103.50	19.42	(unknown)	-	Xk037
2214	Cu		Phongsali	Ngay Nua	101.90	21.85	(unknown)	-	P005
2214	Cu		Oudomxay	Phu Thong	101.92	21.05	(unknown)	-	O1020
2214	Cu		Luang Namtha	Nam Phak	101.85	21.05	(unknown)	-	O1014
2214	Cu		Oudomxay	Nachang	102.00	20.87	(unknown)	-	O1015
2214	Cu		Oudomxay	Thamklok	101.97	20.90	(unknown)	-	O1016
2214	Cu		Luang Prabang	Phu Thung	101.77	20.05	(unknown)	-	O1018
2214	Cu		Luang Prabang	Nam Leun	102.12	19.95	(unknown)	-	Lp013
2614	Fe		Xiangkhoang	Ban Mon	103.22	19.63	(unknown)	Gisement Tran-Ninh 1905 30cm thick massive magnetite at muscovite granite contact	Repertoire Nguyen Xuan Lien Xk042
2609	Fe		Xiangkhoang	Phuthen	103.28	19.71	skarn	Skn	Repertoire Nguyen Xuan Lien Xk046
2609	Fe		Houaphan	Phulek	104.18	20.61	skarn	Skn	Repertoire Nguyen Xuan Lien Xk046
2614	Fe		Xiangkhoang	Pha Way	103.80	19.49	(unknown)	-	Baniczky 1976 Xk047
2602	Fe		Xiangkhoang	Phaek	102.95	18.98	contact-metasomatic	Cnt	magnetite, porphyras in Devonian-carboniferous shales Baniczky 1976 Repertoire
2609	Fe		Boikhamxai	Ban Nongk	104.57	17.98	skarn	Skn	Repertoire Bo015
2601	Fe		Kam mouan	Ban Na Kok	105.10	17.46	alluvial	Alv	Repertoire K006
2614	Fe		Oudomxay	Muang La	102.11	20.85	(unknown)	locally worked	Repertoire O1023
2614	Fe		Houaphan	Muang Peun	103.79	20.25	(unknown)	-	Baniczky 1976 H022
2614	Fe		Xiangkhoang	Ban Na Koun	103.22	19.65	(unknown)	some excavation of limonite looking material	Xk051 Cheymol, 1960 Repertoire
2614	Fe		Houaphan	Muang Khonte	103.34	20.34	(unknown)	-	Repertoire Xk055
2614	Fe		Xiangkhoang	Ban Na Kham	103.44	19.92	(unknown)	-	Cheymol, 1960 Xk057
2614	Fe		Xiangkhoang	Ban Phalang	103.36	19.76	(unknown)	of no interest	Cheymol, 1960 Xk057
2614	Fe		Phongsali	Muang Wa	102.09	21.72	(unknown)	unexplored	Repertoire P007
2614	Fe		Xiangkhoang	Xiang Ai	103.27	19.67	(unknown)	-	Repertoire Xk050
2614	Fe		Xiangkhoang	Ban Yong	103.21	19.43	(unknown)	-	Cheymol, 1960 Xk054
2614	Fe		Savannakhet	Muang Van	105.97	16.75	(unknown)	Small local working	Repertoire Sv011
2614	Fe		Xiangkhoang	Bo Thon	103.45	19.62	(unknown)	old working	Repertoire Xk048
2614	Fe		Xiangkhoang	Ban Lac	103.22	19.71	(unknown)	Old open pit 80 km to the N of Xiengkhoang	Repertoire Xk049
2614	Fe		Houaphan	Tham La	103.40	20.00	(unknown)	Old working to the N of Bo Thon	Repertoire H021
2614	Fe		Xiangkhoang	Ban Do	103.20	19.65	(unknown)	-	Cheymol, 1960 Xk052
2614	Fe		Xiangkhoang	Phou San	103.20	19.68	(unknown)	-	Nguyen Xuan Lien Xk058
2614	Fe		Louangphabang	Ban Moune	102.41	19.62	(unknown)	unexplored, low grade	Repertoire Lp014
2614	Fe		Louangphabang	Houay Natchong	102.05	19.53	(unknown)	-	Repertoire Lp015
2614	Fe		Phongsali	Muang Ma	102.23	21.74	(unknown)	-	Repertoire P006
2614	Fe		Vientiane	Ang Nai	102.19	18.15	(unknown)	-	Pham Van Hung V042
2609	Fe		Xiangkhoang	Ban Nong	103.28	19.66	skarn	Skn	Nguyen Xuan Lien Xk059
2614	Fe		Houaphan	Na Luang	104.29	20.34	(unknown)	-	Bao cao ... 1967-7 H024
2614	Fe		Houaphan	Muang Bo	104.06	19.99	(unknown)	-	Bao cao ... 1967-7 H023
2609	Fe		Xiangkhoang	Muang Khan	103.54	19.72	skarn	Skn	Nguyen Xuan Lien Xk061

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ID Code	Commodity	Map sheet No.	Province	Locality	Longitude	Latitude	Type	Notes	Reference
2614	Fe		Houaphan	Muang Pun	104.44	20.32	(unknown)		Bao cao ... 1967-71 H025
2614	Fe		Oudomxai	Ta Ngai	102.02	20.90	(unknown)		Bao cao ... 1967-71 O1024
2614	Fe		Louangphabang	Nam La	102.45	20.64	(unknown)		Bao cao ... 1967-71 Lp016
2614	Fe		Xiangkhouang	Xiang Khoang	103.40	19.34	(unknown)	hydrogesshite	Nguyen Xuan Lien Xk060
2903	Gp		Kammouan	Ban Tung	105.03	17.22	evaporite	Mz1?	K007
2903	Gp		Savannakhet	Dong Hen	105.25	16.63	evaporite	Mz3?	Sw012
2903	Gp		Savannakhet	keng Kok	105.18	16.50	evaporite	Mz3?	Sw013
2903	Gp		Vientiane	Muong Thouiakhom	102.60	18.37	evaporite	Mz3	V044
2903	Gp		Oudomxay	Natoung	101.83	20.83	evaporite	Mz2?	O1025
2805	Gr		Bokeimxay	Ban Phalia	104.90	18.73	metamorphic?	Mtm	Bo016
2804	Kl		Xiangkhouang	Thamla	103.47	19.90	hydrothermal	Hyd	Xk072
2804	Kl		Champasak	Khampho	106.28	14.63	hydrothermal	Hyd	C012
2804	Kl		Vientiane	Nong Dao	102.82	18.19	hydrothermal	Hyd	Pham Van Hung 1 V054
2804	Kl		Vientiane	Hai Ma La	102.58	18.30	hydrothermal	Hyd	Pham Van Hung 1 V053
2614	Mn		Oudomxai	Ban Houay Lak	101.82	21.18	(unknown)		UN, 1990 O1030
2614	Mn		Xiangkhouang	Phou Hok	103.38	19.60	(unknown)		UN, 1990 Xk075
2614	Mn		Houaphan	Nakay	104.22	20.38	(unknown)		UN, 1990 H036
2614	Mn		Houaphan	Nam Nga	104.15	20.42	(unknown)		To Van Thu 1982 H037
2613	Mn		Xiangkhouang	Ban Pha Hai	103.05	19.07	weathering-residual	With-Res	Cheymol, 1960 Xk078
2614	Mn		Vientiane	Phou Pha Nang	102.25	18.34	(unknown)		Pham Van Hung 1 V063
2511	Mo		Xiangkhouang	Ban Namliang	103.30	19.81	vein	Vn	Cheymol, 1960 Xk077
2504	Mo		Xiangkhouang	Pa Hia (Ban Namthong)	103.28	19.05	hydrothermal	Hyd	Banczyk 1976 Xk078
2514	Mo		Vientiane	Vientiane	102.32	19.07	(unknown)		UN, 1990 V065
2214	Pb		Houaphan	Phou Cheng	104.10	20.30	(unknown)		UN, 1990 H043
2214	Pb		Houaphan	Phou Ngeuane	104.23	20.67	(unknown)	previously worked	UN, 1990 H042
2214	Pb		Houaphan	Ban Luang	104.07	20.78	(unknown)		UN, 1990 H041
2214	Pb		Houaphan	Muang Ven	104.15	20.22	(unknown)		UN, 1990 H048
2214	Pb		Bolikhamxai	Sopso	104.47	18.62	(unknown)		UN, 1990 Bo021
2214	Pb		Louangphabang	Namthong	102.22	19.53	(unknown)		UN, 1990 Lp022
2214	Pb		Louangphabang	Muang Xay	102.85	21.02	(unknown)		UN, 1990 Lp019
2214	Pb		Xaignabouli	Phavangsuane	101.65	19.58	(unknown)	very fine grains	Repertoire Xa015
2214	Pb		Houaphan	Lolek / Banhang	104.90	20.03	(unknown)	previously worked by chinese	Repertoire H047
2214	Pb		Phongsavai	Sop Nao	102.77	21.33	(unknown)		UN, 1990 P015
2214	Pb		Louangphabang	Muang Houip	102.77	20.88	(unknown)	antimonous	Repertoire Lp020
2214	Pb		Champasak	Thao tan	105.97	14.62	(unknown)		UNDP, 1987 C015
2204	Pb		Bolikhamxai	Pha Kachan	104.70	18.37	hydrothermal	Hyd	UN, 1990 Bo022
2214	Pb		Houaphan	Muang Heo	104.36	20.27	(unknown)	previously worked	Repertoire H046
2204	Pb		Bolikhamxai	Phou Hai	104.52	18.23	hydrothermal	Hyd	UN, 1990 Bo023
2214	Pb		Louangphabang	Samton	102.92	19.95	(unknown)		UN, 1990 Lp021
2214	Pb		Xiangkhouang	Pak Luong	103.54	19.44	(unknown)		Banczyk 1976 Xk080
2214	Pb		Louangphabang	Phoukoun	102.45	19.40	(unknown)		UN, 1990 Lp023
2214	Pb		Vientiane	Ban Bouakmou	102.30	19.00	(unknown)		UN, 1990 V069
2204	Pb		Savannakhet	Tchepone	105.92	17.03	hydrothermal	Hyd	UN, 1990 Sw015
2214	Pb		Salavan	Phou Sati	105.72	15.68	(unknown)		UNDP, 1987 Sn002

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ID Code	Commodity	Map sheet No.	Province	Locality	Longitude	Latitude	Type	Notes	Reference
2214	Pb		Champasak	Houay Phana	105.72	14.63	(unknown)	-	Baniczky 1976 C013
2214	Pb		Vientiane	Bosoun	101.92	18.97	(unknown)	-	UN, 1990 V067
2204	Pb		Champasak	Phou Mxi	105.98	14.69	hydrothermal	galena, chalcopyrite, baryte in qtz veins in rhyolite	UNDP, 1987 C014
2214	Pb		Savannakhet	Nai Fa	106.45	16.67	(unknown)	-	Sv016
2214	Pb		Xiangkhoang	Ban Nam Seun Moi	103.31	19.43	(unknown)	-	Cheyamol, 1960 Xk088
2204	Pb		Xiangkhoang	Ban Pei	103.47	19.40	hydrothermal	analysis <35% Pb and 150 g/t Ag.	Baniczky 1976 Xk090
2214	Pb		Xiangkhoang	Nam Tchuong	102.76	19.41	(unknown)	-	Baniczky 1976 Xk089
2214	Pb		Attapeu	Mai Phai	106.46	14.73	(unknown)	local working	Repertoire A016
2214	Pb		Champasak	Houay Tapak	105.72	14.63	(unknown)	-	Repertoire C017
2204	Pb		Xiangkhoang	Phou Tapak	106.55	14.73	hydrothermal	-	UN, 1990 A015
2214	Pb		Xiangkhoang	Pou Phai Nong	103.36	19.53	(unknown)	1 kg lead per 3 kg ore; locally worked	Repertoire Xk084
2214	Pb		Xiangkhoang	Ban Pha	103.54	18.42	(unknown)	-	Cheyamol, 1960 Xk087
2214	Pb		Houaphan	Muang Poun	103.79	20.25	(unknown)	galena in a spongy gangue	Repertoire H054
2214	Pb		Champasak	Chong Ang	106.17	14.62	(unknown)	-	UN, 1990 C016
2214	Pb		Xiangkhoang	Ban Nampong	103.57	19.38	(unknown)	-	Xk082
2214	Pb		Houaphan	Muang Poun	104.57	20.33	(unknown)	argentiferous; previously worked	Repertoire H053
2214	Pb		Houaphan	Ban Mone	104.52	20.28	(unknown)	argentiferous; old working	H051
2204	Pb		Xiangkhoang	Ban Kan Keo	103.47	19.55	hydrothermal	Ag 120 g/t	Cheyamol, 1960 Xk092
2204	Pb		Xiangkhoang	Pha Luong	103.46	19.40	hydrothermal	Devonian carbonate hosted	Nguyen Xuan Lien Xk091
2214	Pb,Zn		Xiangkhoang	Muang Kia	103.46	19.58	(unknown)	-	Baniczky 1976 Xk081
2214	Pb,Zn		Xiangkhoang	Muongkiao	103.49	19.80	(unknown)	-	Repertoire Xk079
2214	Pb,Zn		Xiangkhoang	Ban Na Mone	103.59	19.87	(unknown)	argentiferous; previously worked by Chinese	Repertoire Xk093
2514	Sb		Louangnamtha	Bouak Het	101.08	21.43	(unknown)	-	Ln002
2514	Sb		Vientiane	Bokeo	101.87	18.95	(unknown)	-	V080
2514	Sb		Vientiane	Ban Xon	102.78	18.88	(unknown)	-	V081
2514	Sb		Phongsali	Sop Nap	102.78	21.20	(unknown)	-	P016
2514	Sb		Oudomxay	Houei Hoc	101.37	20.23	(unknown)	-	O1032
2301	Sn		Bolikhamsai	Ban Nappe	105.03	18.25	alluvial	Quaternary	UN, 1990 Bo027
2301	Sn		Vientiane	Muang San	106.02	16.68	alluvial	Quaternary	UN, 1990 Sv017
2301	Sn		Vientiane	Phuphadang	103.04	18.89	(unknown)	-	V082
2301	Sn		Bolikhamsai	Lak Sao	104.95	18.22	alluvial	Quaternary	UN, 1990 Bo026
2314	Sn		Xiangkhoang	Chamun	103.87	19.44	(unknown)	-	Nguyen Xuan Lien Xk100
2304	Sn		Xiangkhoang	Houay Pa	103.08	19.45	hydrothermal	Hyd	UN, 1990 Xk099
2314	Sn		Xiangkhoang	Nong Pet	103.42	19.57	(unknown)	-	UN, 1990 Xk098
2314	Sn		Salavan	Ban Siou	106.88	16.08	(unknown)	Grs related to a granite intrusive	Repertoire Sn003
2314	Sn		Champasak	Phou Khoum	105.92	14.53	(unknown)	-	UN, 1990 C018
2302	Sn		Houaphan	Houay Cheun	104.36	19.92	contact-metasedimentary?	Cnt	UN, 1990 H059
2301	Sn		Xekong	Xekong Phou	106.83	15.19	alluvial	Alv	UNDP, 1987 Xk009
2301	Sn		Bolikhamsai	Ban Thana	104.47	17.93	alluvial	Alv	Nguyen Van Can Bo028
2313	Sn		Bolikhamsai	Ban Boreng	104.62	17.97	weathering-residual	With-Res	Repertoire Bo029
2313	Sn		Bolikhamsai	Nongsun	104.50	17.97	weathering-residual	With-Res	Repertoire Bo030
2313	Sn		Khammouan	Ban Phonitoui	104.62	17.90	weathering-residual	With-Res	Repertoire K015
2314	Sn		Xiangkhoang	Na Men	103.77	19.41	(unknown)	-	Nguyen Xuan Lien Xk101
2314	Sn		Louangnamtha	Ban Meo	100.92	20.93	(unknown)	-	UN, 1990 Ln003

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ID Code	Commodity	Map sheet No.	Province	Locality	Longitude	Latitude	Type	Notes	Reference
Data source : BGS (1981)									
2314	Sn		Houaphan	Ban Na Samong	104.06	20.17	(unknown)		To Van Thu 1982
2314	Sn		Vientiane	Ban Mon	102.29	18.50	(unknown)		Baniczky 1976
Data source : DGMV (2000), Mid-Central Part									
2104	Au	E-48-54		Sop Chat	18.44	104.87	hydrothermal	sulfide in sheared rocks; Au 0.2-0.6g/t, Ag <10g/t	DGMV, 2000
2104	Au	E-48-86		Phon Khom	18.31	104.93	hydrothermal	quartz veins; Au 0.2-0.3g/t	DGMV, 2000
2104	Au	E-48-67		Phongnot	18.27	105.18	hydrothermal	sulfide in sheared rocks; Au 0.2-1.0g/t	DGMV, 2000
2104	Au	E-48-67		Nam Housay	18.11	105.16	hydrothermal	quartz veins, sheared rocks; Au 0.4-5.0g/t	DGMV, 2000
2104	Au	E-48-67		Nam Ke	18.20	106.10	hydrothermal	quartz-sulfide vein, Au 0.4-93g/t	DGMV, 2000
2104	Au	E-48-79		Xoklek	17.94	105.38	hydrothermal	quartz-sulfide stockwork; Au 0.4-1.0g/t	DGMV, 2000
2104	Au	E-48-90		Pakpakan	17.65	104.63	hydrothermal	quartz-sulfide veins	DGMV, 2000
2104	Au	E-48-41		Yang Phe	18.08	104.33	hydrothermal	quartz veins	DGMV, 2000
2104	Au	E-48-53		Tha Dua	18.67	104.27	hydrothermal	quartz veins	DGMV, 2000
2104	Au	E-48-53		Nong Ieng	18.62	104.49	hydrothermal	quartz veins	DGMV, 2000
2104	Au	E-48-53		Song Khon	18.70	104.92	hydrothermal	quartz-sulfide veins	DGMV, 2000
2104	Au	E-48-79		Nam Pheo	17.85	105.54	hydrothermal	quartz-sulfide veins, altered zone; 0.3-25g/t	DGMV, 2000
2104	Au	E-48-77		Iingkho	17.98	104.30	hydrothermal	sheared and altered zone	DGMV, 2000
2106	Au	E-48-67		Nakadok	18.16	105.14	placer	1.96-2.81g/m ³ , estimated reserves, 122.96kg	DGMV, 2000
2504	Ba-(Pb)	E-48-105		Phakat - Chalet	17.06	106.15	hydrothermal	veins; Bao 59.34%, Pb 1.16%	DGMV, 2000
2504	Ba-(Pb)	E-48-105		Ban Hon	17.20	106.24	hydrothermal	veins; Bao 58.89%, Pb 10.48%	DGMV, 2000
2208	Cu	E-48-91		Ban Bo	17.59	105.42	sedimentary?	desseminated; Cu 0.19-0.522%	DGMV, 2000
2204	Cu	E-48-105		Ban Hon	17.20	106.24	hydrothermal	quartz veins; Cu 0.88%	DGMV, 2000
2208	Cu	E-48-66		Phonhai	18.21	104.54	sedimentary?	desseminated in sandstone	DGMV, 2000
2204	Cu	E-48-66		Peak 802	18.22	104.55	hydrothermal	desseminated in sandstone	DGMV, 2000
2604	Fe	E-48-91		Chalet	17.09	106.08	hydrothermal	limonite ore body; Fe 32.51%	DGMV, 2000
2604	Fe	E-48-79		Boneng	17.59	105.42	hydrothermal	reserve; 4-6t	DGMV, 2000
2903	Gp	E-48-79		Tha Lang	17.84	105.08	evaporite	Mz2-2 (K2), CaSO4·2H2O>85%	DGMV, 2000
2903	Gp	E-48-102		Ban Bo	17.79	105.16	evaporite	Mz2-2 (K2)	DGMV, 2000
2903	Gp	E-48-79		Ban Na Kay	17.76	105.12	evaporite	Mz2-2 (K2)	DGMV, 2000
2903	Gp	E-48-79		Ban Nong Boua	17.72	105.21	evaporite	Mz2-2 (K2)	DGMV, 2000
2903	Gp	E-48-103		B. Bung Houana - B. Tung	17.15	105.50	evaporite	CaSO4·2H2O 89.67-96.63%, reserves: 16.5Mt	DGMV, 2000
2204	Pb-(Zn-Ba)	E-48-105		Ban Pha Kat	17.50	106.16	hydrothermal	veins; Pb 1.16-18.94%, Zn 0.02-31.86%, Bao 57.07-60.14%	DGMV, 2000
2504	Sb	E-48-53		Nam Kang	18.47	104.45	hydrothermal	Sb 23.4-48.19%	DGMV, 2000
2304	Sn	E-48-65		Nam Khou	18.19	104.31	hydrothermal	Sn 0.01-0.11%	DGMV, 2000
2304	Sn	E-48-78		Phon Tiou	17.88	104.60	hydrothermal	Sn grade 0.01-1.0%, Tin reserve 4.4Mt	DGMV, 2000
2304	Sn	E-48-78		Bo Neng	17.96	104.59	hydrothermal	Sn grade 0.21%, Tin reserve 11.579Mt	DGMV, 2000
2304	Sn	E-48-78		Nong Xun	17.95	104.53	hydrothermal	Sn 0.2-0.7%	DGMV, 2000
2304	W	E-48-67		Poung Kuak	18.15	105.21	hydrothermal	quartz veins; W 16-3.2%, Sn 0.02%, Au 0.4g/t	DGMV, 2000
Source data from DGMV (2007), Northern Part									
2903	Gp	F-47-84	Phongsali	Xiang Fa	21.68	101.86	evaporite	Mz2-2 (K2)	DGMV, 2007
2903	Gp	F-47-96	Phongsali	Xiang Pi	21.53	101.83	evaporite	Mz2-2 (K2), CaSO4·2H2O 70.56%	DGMV, 2007
2903	Gp	F-47-96	Phongsali	Vongkhoun	21.47	101.78	evaporite	Mz2-2 (K2), CaSO4·2H2O 73.96%	DGMV, 2007
2903	Gp	F-47-96	Phongsali	Houay Tou	21.47	101.63	evaporite	Mz2-2 (K2)	DGMV, 2007
2903	Gp	F-47-96	Phongsali	Boun Gnaeng	21.47	101.78	evaporite		DGMV, 2007
2903	Gp	F-47-96	Phongsali	Boun Tai	21.39	101.97	evaporite		DGMV, 2007

Main Metallic and Non-metallic Mineral Occurrences in Lao PDR (excluding fuel minerals and construction materials) (8/8)

ID Code	Commodity	Map sheet No.	Province	Locality	Longitude	Latitude	Type	Notes	Reference
Data source : BGS (1991)									
2903	Gp	F-47-96	Phongsali	Boun Kang	21.38	101.98	evaporite		DGMV, 2007
2903	Gp	F-47-96	Phongsali	Nayay	21.36	101.99	evaporite		DGMV, 2007
2614	Mn-Fe	F-47-141	Bokeo	Xayhaleun	20.28	101.00	(unknown)	Mz2-2 (K2)	DGMV, 2007
2614	Mn	F-47-60	Phongsali	Xiangkeo	22.43	101.74	(unknown)	T Mn 3.24%	DGMV, 2007
2204	Pb-Zn	F-47-72	Phongsali	Ban Tong	22.10	101.85	hydrothermal	fracture zone: Zn 26.19%, Pb 4.1%, Cu 0.952%	DGMV, 2007
2204	Pb	F-48-123	Houaphan	Ban Phonxong	20.36	103.36	hydrothermal	fracture zone: Pb 1.51-7.49%	DGMV, 2007
2204	Pb-Zn	F-47-72	Phongsali	Sinchamay	22.09	101.84	hydrothermal	fracture zone: Pb 19.46%, Zn 29.87%	DGMV, 2007
2204	Pb-Zn	F-47-108	Oudomxay	Nampheng	21.02	101.66	hydrothermal	fracture zone: Pb 0.06-6.06%, Zn 0.72-7.82%	DGMV, 2007
2204	Pb-Zn	F-47-120	Oudomxay	Nathong	20.86	101.83	hydrothermal	fracture zone: Pb 0.43%, Zn 2.77%	DGMV, 2007
2204	Pb	F-48-111	Houaphan	Phou Samsao	20.80	103.45	hydrothermal	quartz veins	DGMV, 2007
2204	Pb-Zn	F-48-123	Houaphan	Ban Bo	20.54	103.32	hydrothermal	fracture zone: Pb 1.44%, Zn 1.33%	DGMV, 2007
2504	Sb	F-47-95	Louangnamtha	Bon Chavang	21.40	101.08	hydrothermal	Sb 27.93-34.57%	DGMV, 2007
2504	Sb	F-48-110	Louangnamtha	Muang Heup	20.99	102.92	hydrothermal	veins: Sb 1.58%	DGMV, 2007
2514	Sb	F-48-111	Louangnamtha	Donggeun	20.70	103.10	(unknown)		DGMV, 2007
2504	Sb	F-47-9	Louangnamtha	Xiang Tong	19.84	100.47	hydrothermal		DGMV, 2007
2504	Sb-Au	F-48-98	Louangnamtha	Paktha	21.10	102.84	hydrothermal		DGMV, 2007
2504	Sb	F-47-143	Oudomxay	Phakham	20.23	101.36	hydrothermal	quartz veins: Sb 12.09-48.49%, Au 0.3-2.1g/t	DGMV, 2007
2708	Cor	F-47-120	Bokeo	Namphet	20.37	100.49	sedimentary	veins: Sb 33.2-51.56%, Au 0.2-3.0g/t	DGMV, 2007
1708	Cor-Sa	F-47-129	Bokeo	Houay Sala	20.29	100.48	sedimentary	1.1-2.0g/m3	DGMV, 2007
Data source data : JICA-DGEO (2008), Attapeu Area									
2413	Al	D-48-XI	Attapeu	B Namang, Attapeu	106.54	15.11	weathering-residual	Al 33.1%, REE 939ppm	JICA, 2008
2413	Al	D-48-XI	Attapeu	B Nonghorn, Attapeu	106.61	14.91	weathering-residual	Al 32.32-36.35%, REE 790-2522ppm	JICA, 2008
2210	Cu	D-48-XI	Attapeu	H. Chouang, Attapeu	106.76	15.30	stratabound	Cu 1.76-7.56%	JICA, 2008
2210	Cu	D-48-XI	Attapeu	H. Chouang, Attapeu	106.76	15.31	stratabound	Cu 1.49-1.97%	JICA, 2008
2207	Cu, Au	D-48-XII	Attapeu	May Phao Sauu Phanh	107.25	14.79	porphyry	Au 6.9g/t, Cu 0.77%	JICA, 2008
2207	Cu, Au	D-48-XII	Attapeu	May Phao Sauu Phanh	107.24	14.80	porphyry	Au 0.7g/t, Cu 6.55%	JICA, 2008
1111	Au	D-48-XII	Attapeu	B. Tai, Attapeu	107.41	14.92	vein	Operating mine under Army	JICA, 2008
2701	Sa (-Rb)	D-48-XII	Attapeu	Nong Fa, Attapeu	107.47	15.05	alluvial	sapphire, ruby	JICA, 2008
2701	Sa (-Rb)	D-48-XII	Attapeu	Nong Fa, Attapeu	107.50	15.11	alluvial	sapphire, ruby	JICA, 2008
Major operating mines in 2008									
1106	Au		Vientiane	Sangthong	18.12	102.22	placer	Phialat Gold Panning	
1106	Au		Boikhamxai	Khamkeut	18.19	105.15	placer	Lao-Chin Gold Mining	
1113	Au		Vientiane	Xaisomboun	18.90	102.91	weathering-residual	Phu Bia Mining Limited	
1207	Cu		Vientiane	Xaisomboun	18.90	102.91	porphyry, skarn	Phu Bia Mining Limited	
1113	Au		Savannakhet	Vialbouly	17.00	106.10	weathering-residual	Sepon Mine, Lane Xang Minerals Limited	
1207	Cu		Savannakhet	Vialbouly	17.00	106.10	porphyry, skarn	Sepon Mine, Lane Xang Minerals Limited	
1903	Gp		Savannakhet	Champhon	16.62	105.23	evaporite	Lao Slate Gypsum Mining Co., Ltd.	
1209	Pb, Zn		Vientiane	Vangvieng	18.79	102.40	skarn	Kaisto Mine, First Pacific Mining (Lao) Ltd.	
1311	Sn		Khammouan	Hinboun	17.89	104.58	vein	Lao-Korean Tin Company	

【付属資料】

