

LAO PEOPLE'S DEMOCRATIC REPUBLIC
MINISTRY OF INDUSTRY AND HANDICRAFT - DEPARTMENT OF GEOLOGY AND MINES

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RECORD BOOK OF MINERAL DEPOSITS AND ORE OCCURRENCES

**Project: " Mineral Investigation and Geological Mapping at
1: 200,000 scale of Mid Central Laos region"**

VIENTIANE - 2000

CONTENT

No	Location	Number on map	Kind of mineral	Name of deposit, ore occurrence	CHARACTERISTICS of deposit, ore occurrence	Stage of investigation	Size
fuel							
1	E-48-104 B. NA POUNG 17°12'05" 105°51'35"	142	Coal	B. Poug Bon	Coal bearing sediments are aged Early Carboniferous, Boualapha formation (<i>C₁ bl</i>) consisting of sandstone, quartzitic sandstone, clay schist, siltstone. Lenses of coal with thickness 0.1-0.40m are intercalated in the above sediments. Coal is of good quality. Analysis result : W : 1.4-2.08% ; A ^k : 9.3-21.88% ; V ^{ch} : 9.1-12.58% ; Q ^{ch} : 8485-8874cal/kg. Genesis: sedimentary.	General prospecting by Nguyen Van Canh 1997	Ore occurrence with unknown prospectiveness
metals							
<u>Ferrous metal group</u>							
2	E-48-105 B. CHA LA 17°05'35" 106°04'58"	150	Iron	Chalet	The ore body is located at about 1.5 km NNW of B. Chalet. The limonite ore body is 5m, 10m long, occurs in silty sandstone. Limonite is of Black brown color, with massive structure, of crust form. The country rocks include fine grained sandstone intercalated with grey, light grey strongly crumbled and sheared siltstone, of Boualapha formation (<i>C₁ bp</i>). Analysis result: Fe: 32.51%; Zn: 0.25%; Pb: 0.06%; Cu: 0.01%; Ag: 0.4%; S: 0.65%. Genesis: hydrothermal.	General prospecting by Trinh Xuan Hieu 1998	Ore occurrence with unknown prospectiveness
3	E-48-91 MAHA XAI 17°35'34" 105°24'55"	56	Iron	Boneng	This ore occurrence is in the cluster of deposits in Nam Paten valley. The ore is strongly weathered, forming large in situ blocks and boulders (eluvial and deluvial forms). The mineralization occurs in three areas: - Peak 351 area: The ore bodies are 6-12m thick, distributed within an area approximately 1km ² . - H. Ngiou area, covering 0.3km ² , with ore thickness 4.8m. - H. Thoun area, covering 0.2km ² , with ore thickness 4.8m. Oew minerals: Hematite, limonite, magnetite. Reserve: 4 - 6 Mt. Genesis: Hydrothermal	Archive data of Department of Geology and Mines of Laos	Small deposit

No	Location	Number on map	Kind of mineral	Name of deposit, ore occurrence	CHARACTERISTICS of deposit, ore occurrence	Stage of investigation	Size
<u>Non-ferrous metal group</u>							
4	E-48-91 MA HA XAI 17°35'34" 105°24'55"	78	Copper	B. Bo	The ore is disseminated in fine grained sandstone sequence with thickness > 2m, pertaining to Nam Phouan formation (J_3 <i>np</i>). Ore minerals include: pyrite, chalcopyrite, bornite, chalcosine, with disseminated granular and massive pocket structure. Analysis result : Cu : 0.19-0.522% ; Pb : 0.007% ; Zn : 0.0007% ; Fe : 1.7% ; Ag : 1.2g/t. Genesis: sedimentary (?)	General prospecting by Hoang Van Dai 1997	Ore occurrence with unknown prospectiveness
5	E-48-105 B. CHA LA 17°12'00" 106°14'11"	144	Copper	B. Hon	The mineralization is located in the broken and altered zone of silty sandstone of Boualapha formation (C_1 <i>bp</i>). The ore is disseminated in quartz veins of penetrating and filling type. The mineralized zone is 15-20m long, in NW-SE direction. Ore minerals include chalcopyrite, galena, little barite in the form of small veins. Analysis result : Cu : 0.88% ; Pb : 0.025% ; Zn : 0.007% ; Hg : 1.2 ppm ; S : 0.95% ; F : 3.94%. Genesis: hydrothermal.	General prospecting by Nguyen Van Canh Le Thanh Van 1998	Ore occurrence with unknown prospectiveness
6	E-48-91 MA HA XAI 17°41'00" 105°09'00"	73	Copper	B. Lao	The mineralization occurs in calcareous shale, claystone of Nam Phouan formation (J_3 <i>np</i>) with a thickness of 1-4m, extending near 1 km in NW-SE direction. Ore minerals include pyrite, arsenopyrite of fine grains, with disseminated and small pocket structure. Analysis result: Cu: 0.0015-0.0079%; Pb: 0.014-0.032%; Zn: 0.01%; Fe: 3.3-6.5%; Ag: 0.5-2.5g/t. Genesis: sedimentary (?)	General prospecting by Hoang Van Dai 1997	Ore occurrence with unknown prospectiveness
7	E-48-66 KHAM KEUT 18°12'35" 104°32'20"	30	Copper	Phonhai	The ore is disseminated in sandstone of Nam Phouan formation (J_3 <i>np</i>) with a thickness of > 5m and maintains in strike over 300m. Ore minerals include pyrite, chalcopyrite. Genesis: sedimentary (?)	Discovered by Tran Van Ban 1996	Mineral show
8	E-48-66 KHAM KEUT 18°13'20" 104°32'50"	26	Copper	Peak 802	The ore is disseminated in small pockets, attaching traces in greenish grey silty sandstone of Nam Phouan formation (J_3 <i>np</i>). Ore minerals include pyrite, chalcopyrite which are disseminated, forming pockets with dimension 1x2.5m to 3x4.5m.	Discovered by Tran Van Ban 1996	Mineral show

No	Location	Number on map	Kind of mineral	Name of deposit, ore occurrence	CHARACTERISTICS of deposit, ore occurrence	Stage of investigation	Size
					Genesis: sedimentary (?)		
9	E-48-105 B. CHA LA 17°30'00" 106°09'20"	152	polymetals	B Pha Kat	<p>Ore veins occur in sheared zone of conglomerate, sandstone, siltstone of Koduk formation (O_3-S_1 <i>kd</i>), quartz sandstone, calcareous sandstone, limestone lenses of Boualapha formation (C_1 <i>bp</i>). Ore veins have a thickness of 0.4-4m, 100-400m long. The trending direction of the of mineralized zone coincides with that of the country rock with steep dipping angle 70-85°. Ore minerals include: barite, galena, sphalerite, malachite. Analysis result: Pb: 1.16-18.94%; Zn: 0.02-31.66%, Cu: 1.44%; BaO: 57.07-60.14.</p> <p>Genesis: hydrothermal.</p>	General prospecting by Nguyen Manh Can 1998	Ore occurrence with unknown prospectiveness
10	E-48-53 B. PHA PHEUNG 18°25'25"- 18°30'39" 104°23'46"- 104°30'00"	13 15	Antimony-mercury	Nam Kang	<p>The mineralization is distributed in 2 areas:</p> <ul style="list-style-type: none"> - B. Na Nhip area is characterised by mercury mineralization, distributed along broken zone in clay schist, calcareous shale of Boualapha formation (C_1 <i>bp</i>). The rocks are rather strongly dolomized, with development of many small stockworks of quartz, calcite. Ore minerals: cinnabar, pyrite. The result of bed rock panning shows that cinnabar content is 5-100 grains/1 sample, exceptional samples reach 800 grains/sample. - B. Houay Khai area is characterized by antimony mineralization. The ore is in the form of boulders developed from B. Houay Khai to B. Thaphe, extending over about 4km along the NW-SE trending fault, 50-100m wide. Antimony ore is of black color, in pocket, vein form, when weathered has typical yellow color. Analysis result: Sb: 23.4-48.19%; Pb <0.001% ; Cu : 0.0007-0.0022% ; S : 5.4-11.08% ; Fe: 0.96-1.4%. <p>Genesis: hydrothermal.</p>	General prospecting by Hoang Van Dai, Tran Sung 1998-1999	Ore occurrence with unknown prospectiveness

No	Location	Number on map	Kind of mineral	Name of deposit, ore occurrence	CHARACTERISTICS of deposit, ore occurrence	Stage of investigation	Size
<u>Rare and precious metal group</u>							
11	E-48-67 B. NA PE 18°08'55" 105°12'22"	44	Tungsten (gold)	Poung Kuak	<p>The mineralization occurs mainly in quartz veins crossing magmatic rocks of Poung Kuak complex (γ MZ₃ ? <i>pk</i>) and sediments of Nam Houay formation (O₃-S₁ <i>nh</i>₁), include 3 main veins:</p> <p>+ Vein No 1: 2m thick, >20m long containing tungsten ore of platy form, black brown color. Analysis result : W : 1.6% ; Sn : 0.02% ; Au : 0.4g/t.</p> <p>+ Vein No 2: > 5m thick, >50m long occurs at boundary between schist and two-mica granite. Analysis result : W : 3.2% ; Sn : 0.02% ; Au : 0.4g/t.</p> <p>+ Vein No 3: 0.7m thick, contains sulfide. Analysis result: Au: 0.4g/t.</p> <p>Genesis: hydrothermal.</p>	General prospecting by Vu Van Chuong 1998	Ore occurrence with unknown prospectiveness
12	E-48-65 B. NA KHUA 18°11'20" 104°18'50"	36	Tin	Nam Khou	<p>Mineralization occurs in sandstone, quartzitic sandstone of Phon Tiou formation (D_{2,3} <i>pt</i>) and biotite granite of Phou Thoun complex (γ P₂-T₁ <i>pt</i>), include 2 main types of ore:</p> <p>+ Type 1: Quartz - tourmaline - cassiterite occur inside and at the margin of the intrusive massif, include quartz veins and stockworks developed in sub-meridian direction. Analysis result : Distributed : 0.001-0.003% ; Zn : 0.002-0.008% ; Sn : 0.01-0.03%.</p> <p>+ Types 2: Quartz - sulfide - cassiterite, comprising quartz veins and stockworks, forming zones developed in sub-meridian direction, the margin of the ore veins have been altered by muscovitization and chloritization. Analysis result: Pb: 0.002-1.77%; Zn: 0.02-0.027%; Sn: 0.01-0.11%.</p> <p>Genesis: hydrothermal.</p>	General prospecting by Nguyen Khac Hien 1998	Ore occurrence with unknown prospectiveness
13	E-48-55 B. NONG KHOAY 18°29'30" 105°01'00"	12	Tin	B. Nong Khoay	<p>Mineralization occurs in skarn alteration zone (?) between biotite granite of Nape complex (γ a C₁ <i>np</i>) and calcareous shale, carbonate-flogopite schist of Nam Houay formation (O₃-S₁ <i>nh</i>). In the rocks are developed fractures filled with secondary calcite (10-15cm thick) disseminated with fine grained pyrite. Bed rock panning analysis result: pyrite: 98%; galena: little, arsenopyrite: little, cassiterite: some grains.</p> <p>Genesis: skarn (?)</p>	Discovered by Le Van Dieu 1996	Mineral show

No	Location	Number on map	Kind of mineral	Name of deposit, ore occurrence	CHARACTERISTICS of deposit, ore occurrence	Stage of investigation	Size
14	E-48-78 B. MOUANG KHAI 17°52'55" 104°36'05"	62	Tin	Phon Tiou	Mineralization includes quartz veins, stockworks penetrating the schist, sandstone, milonite breccia containing quartz - sulfide, ~30m thick. Here is developed the cassiterite - sulfide ore type. Sn grade: 0.01-1% in average 0.24%. Ore reserve C ₁ +C ₂ : 4.400 thousand tons. Tin reserve C ₁ +C ₂ : 14.400.	Data from (former) Soviet geologists, 1984. Archives, Department of Geology and Mines of Laos	Large deposit
15	E-48-78 B. MOUANG KHAI 17°57'40" 104°35'15"	58	Tin	Bo Neng	Distributed in the NE of Nam Paten valley, covering 1.4km ² . In 1979 evaluative prospecting was started. In 1980-1983 the final report of the evaluative prospecting work was prepared. The area of the deposit is complicated by terrigenous - carbonate sediments aged D _{2,3} , C ₁ , C ₂ -P ₁ (?), T ₁ (?), acidic sub-volcanic rocks. The Quaternary formation (Q) has a thickness of 1m. The ore-bearing sub-volcanic formations have irregular, isometric, knobby shapes. Faults play the important role in ore formation, with brown iron ore bodies, quartz-sulfide veins. Ore minerals include: pyrite, arsenopyrite, chalcopyrite, galena, sphalerite. Tin mineralization is accumulated in all rocks, except limestone. Sn grade: 0.21%. Ore reserve: C ₁ +C ₂ +P: 5.118.000 t, tin reserve: 11.579 t.	Data from (former) Soviet geologists, 1984. Archives, Department of Geology and Mines of Laos	Large deposit
16	E-48-78 B. MOUANG KHAI 17°57'10" 104°31'35"	59	Tin	Nong Xun	Distributed on the NW of Nam Paten. In 1980-1981 detailed exploration was carried out in 1.3km ² with drilling, trenching, shafting, etc. The deposit is composed of terrigenous sediments (O-S ?) hornfelsified into feldspar - quartz mica - andalusite hornfelse, rhyolite (T). Muscovitization, pyritization, limonitization processes are rather common. Sub-meridian trending faults are developed together with horizontal beds, forming the basic structure around the ore bodies. Mineralization forms a quartz - limonite, sulfide, iron oxide vein zone with thickness 0.6-0.4m, complicated by stockworks with vein thickness 0.5-1cm to 0.3-5m, rarely 1.2m. This zone is 40-50m to 350m long extending in meridian direction dipping East with angle 60-80°. Ore minerals: cassiterite, stannine, arsenopyrite. Sn ore grade: 0.2-0.7%. In eluvial rhyolite Sn: 5%.	Data from (former) Soviet geologists, 1984. Archives, Department of Geology and Mines of Laos	Small deposit

No	Location	Number on map	Kind of mineral	Name of deposit, ore occurrence	CHARACTERISTICS of deposit, ore occurrence	Stage of investigation	Size
17	E-48-54 B. NA CHENG 18°26'30" 104°52'22"	16	Gold	S«p Chat	<p>Mineralization occurs in distribution area of terrigenous sediments of the lower sub-formation of Nam Houay formation (O₃-S₁ nh₁), comprising two 2 main types of ore:</p> <p>+ Gold - sulfide - quartz: of vein, stockwork form, developed in NW-SE direction. Ore minerals are mainly pyrite of granular form, concentrated in pockets, small masses.</p> <p>+ Gold - sulfide in sheared and broken rocks, usually 0.5-10m wide, 2-10m long. Ore minerals mainly are pyrite in the form of small crystals disseminated in the rock. Analysis result: Au: 0.2-0.6g/t; Ag < 10g/t.</p> <p>Genesis: hydrothermal</p>	General prospecting by Tran Sung 1998	Ore occurrence with unknown prospectiveness
18	E-48-66 KHAM KEUT 18°18'29" 104°56'00"	20	Gold	Phon Kham	<p>Mineralization occurs in quartz veins quartz 0.4-0.7m thick, quartz stockworks forming zones 1-2m wide distributed clay schist, siltstone, quartzitic sandstone. Ore minerals: pyrite, galena, sphalerite, arsenopyrite. Analysis result: Au: 0.2-3g/t.</p> <p>Genesis: hydrothermal</p>	General prospecting by Mai Quy Trung 1998	Ore occurrence with unknown prospectiveness
19	E-48-67 B. NA PE 18°16'18" 105°10'41"	23	Gold	Phongnot	<p>Mineralization occurs in broken zone of Nam Houay formation (O₃-S₁ nh), 10m wide, 15-20m long, developed in NW-SE direction. Ore minerals include: pyrite, sphalerite. Analysis result: Au: 0.2-1g/t; Pb: 0.003-0.01%; Zn: 0.008-0.03%; Sn: 0.03%.</p> <p>Genesis: hydrothermal</p>	General prospecting by Tran Sung 1998	Ore occurrence with unknown prospectiveness
20	E-48-67 B. NA PE 18°06'45" 105°09'24"	46	Gold	Nam Houay	<p>Mineralization is developed in metasediments of Nam Houay formation (O₃-S₁ nh) comprising: sericitic schist, sandstone, tuffaceous sandstone, silty sandstone. The rocks dip NE with angle 35-50°.</p> <p>Based on the characteristics ore bearing properties, 2 main types of ore can be distinguished:</p> <p>- Quartz - sulfide - gold type includes quartz veins, vein zones with disseminated sulfide penetrating or occurring nearly in conformity with the schistose surface of the country rocks. Ore minerals: pyrite, arsenopyrite, chalcopyrite, galena, sphalerite, native gold. Analysis results of fire assay: Au: 0.4-2g/t, bedrock panning: Au: 1-30 grains/7kg.</p>	Detailed prospecting by Vu Van Chuong, 1998	Prospective Ore occurrence

No	Location	Number on map	Kind of mineral	Name of deposit, ore occurrence	CHARACTERISTICS of deposit, ore occurrence	Stage of investigation	Size
					<p>- Sulfide - gold bearing altered rock zone type (Houay Ha area): closely related with NE-SW trending fault system. Sandstone, tuffaceous sandstone are strongly sheared, broken, altered. forming a zone ~ 1km long, 60-140m wide, with sulfide disseminated in the rock. Hydrothermal alterations include: sericitization, chloritization, quartzification. Ore minerals include: pyrite, pyrrhotine, chalcopyrite, galena. Fire assay result shows Au: 1-5g/t, bedrock panning result shows Au: 1-10 grains/7kg.</p> <p>Genesis: hydrothermal.</p>		
21	E-48-67 B. NA PE 18°11'45" 106°06'00"	35	Gold	Nam Ke	<p>Comprises 2 vein systems: the quartz - sulfide - gold vein system is developed in the broken zone of sub-latitudinal and sub-meridian fault systems in sandstone, siltstone, clay sericitic schist of Nam Houay formation (O₃-S₁ <i>nh</i>).</p> <p>- Sub-latitudinal system comprises quartz - sulfide veins, stockworks with thickness 0.1-1.2m, steep dipping angle 60-80°. Ore minerals include arsenopyrite, pyrite, sphalerite, chalcopyrite, galena, native gold. Fire assay result shows Au: 1-63g/t, bedrock panning shows Au: 1-500 grains/7kg, spectrometric analysis shows As: 0.002-1%, Zn: 0.01-1%.</p> <p>- Sub-meridian system includes quartz - sulfide veins, vein systems with thickness 0.2-3m. They penetrate the country rocks with dipping angle 30-50°. Ore minerals include pyrite, arsenopyrite, chalcopyrite, galena, gold. Fire assay result shows Au: 0.4-0.6g/t, bedrock panning shows Au: 1-185 grains/7kg, spectrometric analysis shows As: 0.001-0.3%, Cu: 0.001-0.007%; Pb: 0.001-1%; Zn: 0.02%.</p> <p>Genesis: hydrothermal</p>	Detailed prospecting by Ha Xuan Binh, 1998	Prospective Ore occurrence
22	E-48-79 B. NONG BOUA 17°56'29" 105°22'41"	60	Gold	Xoklek	<p>Quartz - sulfide stockworks filling in broken zone along NW-SE trending and sub-latitudinal fault systems inside the magmatic massif of Na Pe complex (γ a C₁ <i>np</i>).</p> <p>Fire assay results show Au: 0.4-1g/t.</p> <p>Genesis: hydrothermal</p>	General prospecting by Tran Sung 1998	Ore occurrence with unknown prospectiveness
23	E-48-90 THA KHEK 17°38'50"	76	Gold	Pakpakan	<p>Quartz - sulfide veins cuts across crumbled black clay schist of Boualapha formation (C₁ <i>bp</i>). Bedrock panning shows: 19 grains of gold.</p>	Discovered by Nguyen The Viet 1998	Mineral show

No	Location	Number on map	Kind of mineral	Name of deposit, ore occurrence	CHARACTERISTICS of deposit, ore occurrence	Stage of investigation	Size
	104°37'45"				Genesis: hydrothermal		
24	E-48-41 MUANG MOK 18°05'00" 104°20'00"	48	Gold	Vang Phe	Quartz veins occurs in conformity with the foliation surface of schist of Boualapha formation (C_1 bp). Bedrock panning result shows Au: 2 grains (1 sample). Genesis: hydrothermal	Discovered by Vu Dinh Chau 1998	Mineral show
25	E-48-53 B. PHA PHEUNG 18°40'00" 104°16'00"	5	Gold	Tha Dua	Quartz veins, stockworks containing sulfide cutting across Devonian sedimentary rock. Bedrock panning result shows: Au: 10 grains (1 sample), arsenopyrite: 85%; pyrite: 10%. Genesis: hydrothermal	Discovered by Vu Dinh Chau 1998	Mineral show
26	E-48-53 B. PHA PHEUNG 18°37'15" 104°29'30"	7	Gold	Nong Lieng	Black clay schist and siltstone sequence containing sulfide 3-4m thick, of Boualapha formation (C_1 bp). Bedrock panning result of 1 sample shows: Au: 25 grains, corundum: 2 grains, scheelite: 17 grains. Genesis: hydrothermal	Discovered by Ta Quoc Dat 1998	Mineral show
27	E-48-53 B. PHA PHEUNG 18°42'00" 104°55'00"	3	Gold	Song Khon	Quartz - sulfide veins cutting across Devonian sedimentary rocks. Altered sandstone is ~10m long, 1m wide. Bedrock panning result of one sample shows: Au: 3 grains, arsenopyrite: 90%. Genesis: hydrothermal	Discovered by Vu Dinh Chau 1998	Mineral show
28	E-48-79 B. NAMEO 17°51'00" 105°32'40"	63	Gold	Nam Pheo	Mineralization occurs in 2 main types distributed in the rocks of Nam Houay formation (O_3 - S_1 nh): - Quartz - sulfide vein, stockworks type, filling and cutting across 2 mica schist, quartzitic sandstone with a thickness of 0.3-1.5m. Fire assay result shows Au: 0.3-1g/t.	General prospecting by Nguyen Khac Hien 1998	Prospective ore occurrence

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					<p>- Sulfide mineralization type in altered contact zone with granite with thickness 2-12m, ~ 200m long. Fire assay result shows Au: 0.4-1.2g/t exceptionally one sample gives Au: 25g/t.</p> <p>Alterations: chloritization, quartzification, sericitization.</p> <p>Genesis: hydrothermal.</p>		
29	E-48-77 BOUNG KOANG 17°58'45" 104°17'42"	57	Gold	Lingkho	<p>Mineralization occurs in broken, sheared and altered zone containing fine grained sulfide (pyrite), with disseminated structure, forming pockets, fine veins according to the shearing direction of NW-SE trending fault system, developed in tuffaceous sandstone, silty sandstone of Lingkho formation (<i>T₂ lk</i>) with a length 1.5km and a width of 100m. Panning results shows 1-10 grains of gold/sample.</p> <p>Genesis: hydrothermal.</p>	General prospecting by Ha Xuan Binh 1999	Mineral show
30	E-48-67 NA PE 18°09'30" 105°08'17"	43	Placer gold	Nakadok	<p>Gold occurs in unconsolidated sediments which include cobbles, pebble, sand clay in the basin of Nam Kata, Nam Houay rivers, aged Pleistocene to Holocene. There are 10 gold bearing placer ore bodies, 200-600m long, 20-70m wide. These ore bodies are at the depth from 2m to >6m. Au grade: 1.96-2.81g/m³ (ore body No 1: Au: 7.2g/m³).</p> <p>Prognostic resource: 122.96kg</p> <p>Genesis: sedimentary</p>	Detailed prospecting by Trinh Xuan Hieu, 1997	Prospective ore occurrence
INDUSTRIAL MINERALS							
<u>Chemical and fertilizer raw material group</u>							
	E-48-105	153		Phakat -	<p>Barite ore occurs in sandstone, siltstone, gravelite of Koduk formation (<i>O₃-S₁ kd</i>). The ore bodies are in the of stratiform, vein form, nearly in conformity with the country rock. usually extending in NW-SE direction, but with more steep dipping angle. There are 2 main types of ore:</p>	General prospecting by Trinh Xuan Hieu 1999	Prospective ore occurrence

No	Location	Number on map	Kind of mineral	Name of deposit, ore occurrence	CHARACTERISTICS of deposit, ore occurrence	Stage of investigation	Size
31	B. CHA LA 17°03'20" 106°09'15"		Barite	Chalet	<p>steep dipping angle. There are 2 main types of ore:</p> <ul style="list-style-type: none"> - Barite: 4 ore veins + Vein 1: 4m thick, with continuous length >100m. + Vein 2: 2m thick, with continuous length >200m. + Vein 3+4: 0.4m thick, with discontinuous length ~200m. <p>Main ore mineral is barite. Analysis result: BaO: 59.34%; Pb: 1.16%; Fe₂O₃: 0.14%; SiO₂: 3.85%.</p> <ul style="list-style-type: none"> - Barite - galena: The ore bodies are subjected to in situ destruction (eluvial) with thickness > 0.5m. Main ore minerals are barite and galena. Analysis result: BaO : 57.07% ; Pb : 18.94% ; Fe₂O₃ : 0.095% ; CaO : 0.26% ; S : 12.99%. - Polymetals: The ore occurs in sub-latitudinal sheared zone, about 5m wide. Ore minerals: sphalerite, chalcopyrite. Non-ore minerals include quartz. Analysis result: Zn: 31.66%, Cu: 1.44% <p>Genesis: Hydrothermal</p>	1998	
32	E-48-105 B. CHA LA 17°12'00" 106°14'11"	145	Barite	B. Hon	<p>Mineralization occurs in sediments of Boualapha formation (C₁ bp), includes 2 main types of ore:</p> <ul style="list-style-type: none"> - Barite - galena: The ore vein is >20m long, >2m thick, extending in W-E direction. Ore minerals include: Muddy white, heavy barite; grey galena with clear metallic luster in the form of small veins or large crystals. Analysis result : SiO₂ : 1.28% ; Fe₂O₃ : 0.101% ; CaO : 0.325% ; Pb : 10.49% ; S: 13.81%; BaO: 58.89%. - Barite: The ore is in the form of small veins developed in N-S or NW-SE direction with a thickness of 0.8-1m, a length of 10-30m. Ore minerals are mainly barite, less galena, chalcopyrite. Analysis result: Pb: 0.012-0.0172%; BaO: 50.72-52.8%. <p>Genesis: hydrothermal</p>	General prospecting by Le Thanh Van, Nguyen Van Canh 1998	Ore occurrence with unknown prospectiveness

No	Location	Number on map	Kind of mineral	Name of deposit, ore occurrence	CHARACTERISTICS of deposit, ore occurrence	Stage of investigation	Size
33	E-48-91 MA HA XAI 17°30'05" 105°03'08"	98	Pyrite	Mouang Khai	Pyrite occurs in a broken zone of the marbleized and dolomized limestone of Khammouan formation (C-P ₁ km). There is 1 ore body 5-10m wide, ~70m long trending 320°. Pyrite is in the form of small massive pockets. Analysis result: S: 6.2-35.3%; Fe: 3.6-44%; Ag: 1.0g/t. Genesis: hydrothermal	General prospecting by Hoang Van Dai 1996	Ore occurrence with unknown prospectiveness
34	E-48-91 MA HA XAI 17°27'14" 105°05'22"	105	Pyrite	Natoung	Pyrite occurs in a broken and sheared zone in silty sandstone of Boualapha formation (C ₁ bp) distributed along NW-SE trending fault. Pyrite is in the form of disseminated fine grains, forming pockets ore fine veins. The main ore minerals are pyrite, less chalcopyrite, galena, limonite, goethite, malachite. The ore is weathered forming limonite. There are 3 main ore bodies: + Ore body No 1: is 3.5m thick 1.8km long, with attitude 200∠80. Analysis result: Cu: 0.00375%; Pb: 0.03%; Zn: 0.07%; Fe: 59.72%; Au: 0.4-0.8g/t. + Ore body No 2: is 2-4.5m wide, 200-400m long, with attitude 210∠80. + Ore body No 3: consists of 2 small lenses 100-150m long. Genesis: hydrothermal	Detailed prospecting by Ha Xuan Binh, 1997	Ore occurrence with unknown prospectiveness
35	E-48-91 MA HA XAI 17°26'35" 105°21'26"	114	Pyrite	Nahy	Pyrite is in the form of massive pockets, of microgranular form, forming small veins developed in the broken zone of terrigenous rocks of Boualapha formation (C ₁ bp) and Khammouan formation (C-P ₁ km) developed in NW-SE and W-E directions. The sulfide veins have a thickness of 5-20cm, occurring in conformity with the foliation surface of compressed clay schist, besides, it is also disseminated in breccia. They form 3 mineralized zones: + Zone 1: Occurs in marbleized limestone, calcareous breccia of Khammouan formation (C-P ₁ km) ~ 200m long,	General prospecting by Ha Xuan Binh 1997	Ore occurrence with unknown prospectiveness

No	Location	Number on map	Kind of mineral	Name of deposit, ore occurrence	CHARACTERISTICS of deposit, ore occurrence	Stage of investigation	Size
					<p>trending 320°.</p> <p>+ Zone 2: Occurs in strongly sheared and broken clay schist extending in W-E direction for ~1km.</p> <p>+ Zone 3: Occurs in the sediments of Boualapha formation ($C_1 bp$), ~300m long.</p> <p>Analysis result: Cu: 0.0026%; Pb: 0.015%; Zn: 0.0649%; S: 6.67%; Fe: 46.94%; Ag: 0.5g/t.</p> <p>Genesis: hydrothermal</p>		
36	E-48-90 THA KHEK 17°30'45" 104°52'30"	94	Pyrite	Nase	<p>Mineralization occurs in the clay schist sequence of Boualapha formation ($C_1 bp$). It was discovered in a water well of the village people at the depth of 10m.</p> <p>Genesis: hydrothermal</p>	Discovered by Nguyen The Viet 1997	Mineral show
37	E-48-65 NA KHUA 18°01'00" 104°18'30"	51	Pyrite	Na Lieng	<p>Mineralization occurs in the lower part of the Khammouan formation ($C-P_1 km$) composed of siliceous limestone. The ore is disseminated in the form of small pockets, ~2m thick.</p> <p>Analysis result S: 22.13%; Pb: 0.011%; Cu: 0.0011%; Zn: 0.0012%.</p> <p>Genesis: hydrothermal</p>	Discovered by Tran Van Ban 1999	Mineral show
38	E-48-91 MA HA XAI 17°20'44" 105°20'53"	129	Pyrite	Phonxai	<p>Pyrite occurs along the sub-latitudinal sheared and broken zone, developed in sandstone, clay schist, siliceous limestone of Boualapha formation ($C_1 bp$). The rocks are rather strongly altered with chloritization, sericitization and quartzification. The ore has disseminated structure, in the form of massive pockets, fine veins and veins, forming zones 100-180m wide, extending over 5km in W-E direction. with 2 main ore bodies:</p> <p>+ Ore body No 1: 1.5-5.5m thick, 100-200 m long. Analysis result : S : 3.54-16.24% ; Ag : 0.3-43.5g/t ; Au: 0.4-1.2g/t.</p> <p>+ Ore body No 2: 2-4m thick, 150-250m long, with attitude 170-190/50-80. Analysis result: S: 17.86-36.45%; Ag: 0.3-0.4g/t; Au: 0.8-2.4g/t.</p>	Detailed prospecting by Ha Xuan Binh, 1998	Prospective ore occurrence

No	Location	Number on map	Kind of mineral	Name of deposit, ore occurrence	CHARACTERISTICS of deposit, ore occurrence	Stage of investigation	Size
					Genesis: hydrothermal		
39	E-48-79 B. NONG BOUA 17°50'40" 105°05'00"	64	Gypsum	Tha Lang	The gypsum bed is exposed on the left side of Nam Theum river, about 3.5km upstream of Tha Lang bridge, occurring in Nong Boua formation ($K_2 nb$). The ore bed is 70-80m long, >7m thick, with attitude $240 \angle 5^\circ$. It occurs under a Quaternary unconsolidated sand layer (Q) 1-4m thick. The gypsum is of white milky white, grey color. Analysis result: $CaSO_4 \cdot 2H_2O > 95\%$. Genesis: sedimentary	Discovered by Nguyen The Viet 1998	Prospective ore occurrence
40	E-48-102 B. NONG BOUA 17°47'35" 105°09'30"	66	Gypsum	B. Bo	Claystone mixed with gypsum is met in a borehole at the depths of 16.22-17.61m and 33.40-36.07m, occurring in Nong Boua formation ($K_2 nb$). Genesis: sedimentary	According to drilling data, 1990, INTERGEO Division	Mineral show
41	E-48-79 B. NONG BOUA 17°45'45" 105°07'00"	67	Gypsum	B. Na Kay	Claystone mixed with gypsum is met in a borehole at the depths of 8.72-10.98m occurring in Nong Boua formation ($K_2 nb$). Genesis: sedimentary	According to drilling data, 1990, INTERGEO Division	Mineral show
42	E-48-79 B. NONG BOUA 17°43'25" 105°12'40"	69	Gypsum	B. Nong Boua	Gypsum is met in a borehole at the depths of 61.76-68.06m and 153-155m. The ore is unconsolidated, intercalated in clay schist of Nong Boua formation ($K_2 nb$). Genesis: sedimentary	According to drilling data, 1990, INTERGEO Division	Prospective ore occurrence
43	E-48-103 B. PHA KHONG NUA 17°07'22"- 17°10'37" 105°00'00"- 105°01'41"	148	Gypsum	B. Bung Houana - B. Tung	Gypsum is exposed at two locations: SE of peak 217m and in exploratory boreholes. The deposit area extends from B. Bung Houana to B. Tung, in the western part of Thakhek depression. Red color evaporite sediments containing gypsum and rock salt belong to Nong Boua formation ($K_2 nb$). According to the result of exploratory drilling, here gypsum is 1.8-3m under the cover layer. The thickness of gypsum bed is 7-14.5m, in average 8.55m. $CaSO_4 \cdot 2H_2O$ grade is 89.67-96.63%, in average 93.35%. Reserve: 16.570.570 t	Exploration data from Thai Gypsum products public Co. LTD. Archives Department of Geology and Mines of Laos	Large deposit
	E-48-102	140			Salt is stratiform, occurs in Nong Boua formation ($K_2 nb$).		

No	Location	Number on map	Kind of mineral	Name of deposit, ore occurrence	CHARACTERISTICS of deposit, ore occurrence	Stage of investigation	Size
44	B. NONG BOK 17°16'15" 105°50'30"		Rock salt	B. Tha Ngam	Salt was discovered by boreholes at the depth of 130m, the thickness of the salt bed is >70m. The salt is of white grey color. Here the local authorities extract with output ~100t/year. Genesis: sedimentary	According to drilling data of INTERGEO Division, 1999	Prospective ore occurrence
45	E-48-79 B. NONG BOUA 17°43'25" 105°12'40"	70	Rock salt	Nong Boua	Salt is stratiform, occurs in Nong Boua formation (K_2 nb). Salt was discovered by borehole at the depth of 68-153m, 65m thick. The salt is of grey white color, rather pure. Genesis: sedimentary	According to drilling data of INTERGEO Division, 1999	Prospective ore occurrence
46	E-48-104 B. NA POUNG 17°16'20" 105°45'00"	139	Phosphorite	Tham Mo	Ore is distributed on the floor of a limestone cave in Khammouan formation (C-P ₁ km). It is of light grey color. The cave is 207m long, 2.50m wide, the ore is >4m thick. The phosphorite distributed on the cave floor is earth-like, loose, of brown grey, black grey color. Contents : P ₂ O ₅ : 5.45-7.82% ; Fe ₂ O ₃ : 3.43% ; Al ₂ O ₃ : 2.95-3.82% ; MgO : 0.5-1.45% ; CO ₂ : 1.24-1.27% ; Prognostic resource : 4650 t. Genesis: sedimentary - infiltration.	Detailed prospecting by Tran Sung, 1998	Prospective ore occurrence
47	E-48-104 B. NA POUNG 17°16'20" 105°44'48"	138	Phosphorite	Tham Bing	The ore is distributed in a limestone cave of Khammouan formation (C-P ₁ km). The limestone has light grey color, massive structure. The cave has 2 levels with elevation difference 20m. + Lower level: Phosphorite is distributed on the cave floor, 143m long, 3-4m wide, in some places 10-15m and the ore thickness is >2.5m. Phosphorite is of grey, yellow grey color, with crust, banded structure, relatively hard. Contents: P ₂ O ₅ : 3.81-29.1%; Fe ₂ O ₃ : 0.88-2.2%; Al ₂ O ₃ : 0.56-6.85% +Upper level: Phosphorite fills the bottom of the cave, with an area of 1500m ² , a thickness of 2.1m. Phosphorite is loose, friable, of brown grey, black grey color, in some places banded. Here the local people extract the phosphorite for cultivation. Contents: P ₂ O ₅ : 6.5-19%; Fe ₂ O ₃ : 1.97-4.35%; Al ₂ O ₃ : 2.4-6.29%	Detailed prospecting by Tran Sung, 1998	Prospective ore occurrence

No	Location	Number on map	Kind of mineral	Name of deposit, ore occurrence	CHARACTERISTICS of deposit, ore occurrence	Stage of investigation	Size
					Prognostic resource: 4200 t. Genesis: sedimentary - infiltration.		
48	E-48-92 B. TON PHAO 18°01'10" 105°38'20"	127	Phosphorite	Tham Mo Lung	Ore is distributed in the cave in limestone of Khammouan formation (C-P ₁ km). The limestone is of light grey color, massive structure. Phosphorite is concentrated on the cave floor, with brown grey color, loose. The cave is >30m long, 20m wide, the ore is >2.5m thick. P ₂ O ₅ grade: 9.81%. Prognostic resource: 2.200 t. Genesis: sedimentary - infiltration.	General prospecting by Chu Van Chich 1999	Prospective ore occurrence
49	E-48-92 B. TON PHAO 18°10'30" 105°39'30"	91	Phosphorite	Tham Ton	Ore is distributed in a cave in limestone of Khammouan formation (C-P ₁ km). The limestone is of black grey, light grey color, with massive structure. Phosphorite is loose, earth-like, of black grey color, concentrated on the cave floor. The cave is 120m long, 4-30m wide, the phosphorite is 0.5m thick. P ₂ O ₅ grade is 10.46%. Genesis: sedimentary - infiltration.	General prospecting by Chu Van Chich 1998	Ore occurrence with unknown prospectiveness
50	E-48-104 B. NA POUNG 17°19'40" 105°40'30"	131	Phosphorite	Na Peng	Ore is distributed in a cave in limestone of Khammouan formation (C-P ₁ km)The limestone is of black grey color, massive structure, thick-bedded. Phosphorite is attached on the wall and on the floor of the cave, mixed with soil, of light grey, yellow grey color. The cave is >27m long, <2m wide. The thickness of phosphorite 2.5m. P ₂ O ₅ grade is 31.1%. Genesis: sedimentary - infiltration.	General prospecting by Chu Van Chich 1998	Ore occurrence with unknown prospectiveness
51	E-48-90 THA KHEK 17°26'45" 104°51'50"	113	Phosphorite	Hang 5564	Ore is distributed in a cave in limestone of light color, massive structure of Khammouan formation (C-P ₁ km). Phosphorite is of brown grey color, of earth-like structure, soft and friable. The cave is 30m long, 10m wide. Phosphorite fills the bottom of the cave with a thickness of 0.5m. P ₂ O ₅ grade is 15.2%.	Discovered by Mai Quy Trung 1998	Ore occurrence with unknown prospectiveness

No	Location	Number on map	Kind of mineral	Name of deposit, ore occurrence	CHARACTERISTICS of deposit, ore occurrence	Stage of investigation	Size
					Genesis: sedimentary - infiltration.		
52	E-48-90 THA KHEK 17°26'30" 104°51'50"	115	Phosphorite	Hang 5566	Ore is distributed in a cave in limestone of light color, massive structure of Khammouan formation (C-P ₁ km). Phosphorite is of brown grey color, of earth-like structure, friable. The cave is 20m long, 5m wide. Phosphorite fills the bottom of the cave with a thickness of 1.5m. P ₂ O ₅ grade is 14.6%. Genesis: sedimentary - infiltration.	Discovered by Mai Quy Trung 1998	Ore occurrence with unknown prospectiveness
53	E-48-90 THA KHEK 17°25'45" 104°51'55"	118	Phosphorite	Tham Khau	Ore is distributed in a cave in limestone of Khammouan formation (C-P ₁ km). The limestone is of blue grey, light grey color, massive structure. Phosphorite is concentrated on the cave floor. In the upper part phosphorite is of yellow grey, brown grey color, with banded structure, relatively hard. In the lower part phosphorite is of motley grey color, with earth-like structure, friable. the local people extract the friable phosphorite to manure their crops. P ₂ O ₅ grade is 7.82-23.9%; Fe ₂ O ₃ : 2.08-5.55%. Prognostic resource: 3.200t. Genesis: sedimentary - infiltration.	Detailed prospecting by Tran Sung, 1998	Prospective ore occurrence
54	E-48-90 THA KHEK 17°30'07" 104°49'45"	100	Phosphorite	Khuon Cuc 1	Ore is distributed in a cave in limestone of Khammouan formation (C-P ₁ km). The limestone is of light grey color, with massive structure. Phosphorite fills fractures. The ore is of grey, black grey color of banded structure. Its hardness depends on the degree of weathering. The measured length is 159m long, the width is 0.5-10m. P ₂ O ₅ grade is 9.87-32.7%; Fe ₂ O ₃ : 1.72-3.27%. Prognostic resource: 3.000t. Genesis: sedimentary - infiltration.	Detailed prospecting by Tran Sung, 1998	Prospective ore occurrence
55	E-48-90 THA KHEK	101	Phosphorite	Khuon Cuc 2	Ore is distributed in a cave in limestone of Khammouan formation (C-P ₁ km). The limestone is of grey color, with massive structure. Phosphorite fills the bottom of the cave, with banded structure, loose, >20m long, 4m wide. P ₂ O ₅ grade is 4.62-12.2%; Fe ₂ O ₃ : 7.5%. Prognostic resource: 900t.	General prospecting by	Ore occurrence with unknown prospectiveness

No	Location	Number on map	Kind of mineral	Name of deposit, ore occurrence	CHARACTERISTICS of deposit, ore occurrence	Stage of investigation	Size
	17°30'07" 104°49'52"			2	is 4.63-13.3%; Fe ₂ O ₃ : 7.5%. Prognostic resource: 900t. Genesis: sedimentary - infiltration.	Tran Sung 1998	
56	E-48-90 THA KHEK 17°24'18" 104°56'10"	123	Phosphorite	Tham Non 1	Ore is distributed in a cave in limestone of Khammouan formation (C-P ₁ km). The limestone is of light color, with massive structure. Phosphorite fills fractures, with black grey color, with banded structure, rather hard. The cave is >73m long, 1-2.5m wide and the ore is 20m thick. P ₂ O ₅ grade is 9.36-30.70%. Prognostic resource: 4.000t. Genesis: sedimentary - infiltration.	General prospecting by Ta Quoc Dat 1998	Prospective ore occurrence
57	E-48-90 THA KHEK 17°24'32" 104°54'13"	122	Phosphorite	Tham Non 2	Ore is distributed in a cave in limestone of Khammouan (C-P ₁ km). The limestone is of light color, with massive structure. Phosphorite fills fractures, of yellow brown, light yellow color, with banded structure. The cave is >20m long, 10m wide, the ore is 20m thick. P ₂ O ₅ grade: 30.60%. Prognostic resource: 4.000t. Genesis: sedimentary - infiltration.	General prospecting by Ta Quoc Dat 1998	Prospective ore occurrence
58	E-48-90 THA KHEK 17°25'50" 104°52'05"	117	Phosphorite	Tham But	Ore is distributed in a cave in limestone of Khammouan (C-P ₁ km). The limestone is of light grey color, with massive structure. Phosphorite fills the bottom of the cave. It is of yellow brown, light yellow color, with banded structure, hard, 20m long, 6m wide and 10m thick. P ₂ O ₅ grade: 31.0%. Prognostic reserve 1.200t. Genesis: sedimentary - infiltration.	General prospecting by Ta Quoc Dat 1998	Prospective ore occurrence
59	E-48-90 THA KHEK 17°28'10" 104°50'45"	104	Phosphorite	Khi Chia 1	Ore is distributed in a cave in limestone of Khammouan (C-P ₁ km). The limestone is of light grey color. Phosphorite fills the bottom of the cave, with brown yellow color, banded structure, in some places unconsolidated. The ore body is 75m long, 2.5-20m wide and 3-4m thick. P ₂ O ₅ grade: 8.52-21.1%. Prognostic resource: 3.000t. Genesis: sedimentary - infiltration.	General prospecting by Tran Sung 1998	Prospective ore occurrence

No	Location	Number on map	Kind of mineral	Name of deposit, ore occurrence	CHARACTERISTICS of deposit, ore occurrence	Stage of investigation	Size
60	E-48-90 THA KHEK 17°30'40" 104°52'05"	99	Phosphorite	Tham Pha	Ore is distributed in a cave in limestone of Khammouan (C-P ₁ km). The limestone is of light grey color, with massive structure. Phosphorite is distributed on the cave floor, consisting of two parts. In the lower part the phosphorite is of grey color intercalated with yellow brown color, with banded structure, soft and friable. In the upper part the phosphorite is of grey, black grey color, unconsolidated. It is 55m long, 20m wide and >4m thick. P ₂ O ₅ grade: 5.36-23.8%; Fe ₂ O ₃ : 2.51-2.75%... Prognostic resource: 4.400t. Genesis: sedimentary - infiltration.	General prospecting by Tran Sung 1998	Prospective ore occurrence
61	E-48-90 THA KHEK 17°30'50" 104°55'00"	95	Phosphorite	Tham Keo 1	Ore is distributed in a cave in limestone of Khammouan (C-P ₁ km). The limestone is of light grey color, with massive structure. Phosphorite is accumulated on the cave floor, with grey, light yellow color, with banded structure, friable. It is >20m long, 5m wide and 6m thick. P ₂ O ₅ grade: 27%. Prognostic resource: 600t. Genesis: sedimentary - infiltration.	General prospecting by Mai Quy Trung 1998	Prospective ore occurrence
62	E-48-90 THA KHEK 17°29'30" 104°55'10"	103	Phosphorite	Cave 5576	Ore is distributed in a cave in limestone of Khammouan (C-P ₁ km). The limestone is of light grey color, with massive structure. Phosphorite is of black brown, yellow brown color, soft and friable. It is 20m long, 4m wide and 20m thick. P ₂ O ₅ grade: 23.9%. Genesis: sedimentary - infiltration.	General prospecting by Mai Quy Trung 1998	Ore occurrence with unknown prospectiveness
63	E-48-91 B. MA HA XAI 17°26'40" 105°00'58"	107	Phosphorite	Cave 1721	Ore is distributed in a cave in limestone of Khammouan (C-P ₁ km). The limestone is of blue grey color, with massive structure. Phosphorite is of motley grey color, friable. It is 20m long, 6m wide and 2m thick. P ₂ O ₅ grade: 0.41-3.82%. Prognostic resource: 240t. Genesis: sedimentary - infiltration.	General prospecting by Ta Quoc Dat 1998	Ore occurrence with unknown prospectiveness
	E-48-91	116			Ore is distributed in a cave in limestone of Khammouan (C-P ₁ km). The limestone is of blue grey color, with massive structure. Phosphorite is distributed on the cave floor, with		Ore occurrence with unknown

No	Location	Number on map	Kind of mineral	Name of deposit, ore occurrence	CHARACTERISTICS of deposit, ore occurrence	Stage of investigation	Size
64	B. MA HA XAI 17°26'08" 105°04'03"		Phosphorite	Tham Lom	black brown, yellow brown color, loose. It is 40m long, 4m wide and 2m thick. P ₂ O ₅ grade: 0.15-8.6%. Prognostic resource: 320t. Genesis: sedimentary - infiltration.	General prospecting by Ta Quoc Dat 1998	with unknown prospectiveness
65	E-48-91 B. MA HA XAI 17°26'55" 105°03'15"	111	Phosphorite	Tham Phanangam	Ore is distributed in a cave in limestone of Khammouan (C-P ₁ km). The limestone is of blue grey color, with massive structure. Phosphorite is distributed on the cave floor, with brown yellow, black brown color. It is 80m long, 4m wide and 5m thick. P ₂ O ₅ grade: 0.29-4.36%. Prognostic resource: 1.600t. Genesis: sedimentary - infiltration.	Discovered by Ta Quoc Dat 1998	Ore occurrence with unknown prospectiveness
66	E-48-91 B. MA HA XAI 17°26'32" 105°04'08"	112	Phosphorite	Khi Chia 2	Ore is distributed in a cave in limestone of C-P ₁ km. The limestone is of blue grey color, with massive structure. Phosphorite is distributed on the cave floor, with yellow brown, banded structure, hard. The upper part is friable. It is 90m long, 2-2.5m wide and 10m thick. P ₂ O ₅ grade: 5.36-27.8%. Prognostic resource: 1.550t. Genesis: sedimentary - infiltration.	Discovered by Mai Quy Trung 1998	Prospective ore occurrence
67	E-48-91 B. MA HA XAI 17°25'30" 105°16'10"	119	Phosphorite	Tham Keo 2	Ore is distributed in a cave in limestone of Khammouan (C-P ₁ km). The limestone is of light color, with massive structure. Phosphorite is distributed on the cave floor, with grey, black grey color, loose. It is 90m long, 15-35m wide and 2.5-4m thick. P ₂ O ₅ grade: 0.24-10.9%. Prognostic resource: 7.250t. Genesis: sedimentary - infiltration.	General prospecting by Ta Quoc Dat 1998	Prospective ore occurrence
68	E-48-91 B. MA HA XAI 17°25'45" 105°21'25"	125	Phosphorite	Tham Khoai	Ore is distributed in a cave in limestone of Khammouan (C-P ₁ km). The limestone is of light color, with massive structure. Phosphorite is distributed on the cave floor, with brown yellow color, hard. It is 40m long, 40m wide and 5m thick. P ₂ O ₅ grade: 0.17-13.02%. Prognostic resource: 8.000t. Genesis: sedimentary - infiltration.	General prospecting by Ta Quoc Dat 1998	Prospective ore occurrence

No	Location	Number on map	Kind of mineral	Name of deposit, ore occurrence	CHARACTERISTICS of deposit, ore occurrence	Stage of investigation	Size
69	E-48-91 B. MA HA XAI 17°20'35" 105°11'35"	128	Phosphorite	Phanang	Ore is distributed in a cave in limestone of Khammouan (C-P ₁ km). The limestone is of light color, with massive structure. Phosphorite is distributed at the cave floor, with brown, black brown color. It is 30m long, 20m wide and 1m thick. P ₂ O ₅ grade: 6.98%. Prognostic resource: 600t. Genesis: sedimentary - infiltration.	Discovered by Mai Quoc Trung 1998	Ore occurrence with unknown prospectiveness
70	E-48-91 B. MA HA XAI 17°23'15" 105°13'15"	126	Phosphorite	Pha Lek	Ore is distributed in a cave in limestone of Khammouan (C-P ₁ km). The limestone is of light grey color. Phosphorite is of brown grey color, loose. It is 17m long, 5m wide and 1.5m thick. P ₂ O ₅ grade: 28%. Prognostic resource: 130t. Genesis: sedimentary - infiltration.	Discovered by Mai Quoc Trung 1998	Ore occurrence with unknown prospectiveness
71	E-48-65 B. NA KHUA 18°01'10" 104°25'20"	53	Phosphorite	Tham Kang	Ore is distributed in a cave in limestone of Khammouan (C-P ₁ km). The limestone is of light grey color, with massive structure. Phosphorite distributed at the cave floor. The lower part is of brown yellow color, hard. The upper part is of brown grey color, loose. It is 150m long, 40-80m wide and 2.5m thick. P ₂ O ₅ grade: 5.62-9.18%. Prognostic resource: 22.500t. Genesis: sedimentary - infiltration.	General prospecting by Chu Van Chich 1999	Prospective ore occurrence
72	E-48-65 B. NA KHUA 18°01'00" 104°25'20"	54	Phosphorite	Tham Tay	Ore is distributed in a cave in limestone of Khammouan (C-P ₁ km). The limestone is of light grey color, with massive structure. Phosphorite is distributed at the cave floor, divided into 2 parts: The lower part is of brown grey, black grey color, hard. The upper part is of black grey color, friable, with banded structure. Phosphorite is entirely distributed at the bottom of the cave, 190m long, 32-35m wide and 2m thick. P ₂ O ₅ grade: 6.3-31%; Fe ₂ O ₃ grade: 0.88-4.35%. Prognostic resource: 12.700t. Genesis: sedimentary - infiltration.	General prospecting by Chu Van Chich 1999	Prospective ore occurrence
	E-48-65	50			Ore is distributed in a cave in limestone of Khammouan (C-P ₁ km). The limestone is of light grey color, with massive structure. Phosphorite in the lower part is of brown grey color, with banded structure, hard. In the upper part is of grey brown	General prospecting by	Prospective ore occurrence

No	Location	Number on map	Kind of mineral	Name of deposit, ore occurrence	CHARACTERISTICS of deposit, ore occurrence	Stage of investigation	Size
73	B. NA KHUA 18°01'20" 104°25'40"		Phosphorite	Tham En 1	with banded structure, hard, in the upper part is of grey brown color, loose. The ore is entirely concentrated at the cave floor, 230m long, 30-40m wide and 2m thick. P ₂ O ₅ grade: 7.2-33%; Fe ₂ O ₃ : 1.05-12.8%; Al ₂ O ₃ : 2.07-14.5%; MgO: 0.48-2.36%; CO ₂ : 0.7-2.3%. Prognostic resource: 16.000t. Genesis: sedimentary - infiltration.	Chu Van Chich 1999	
74	E-48-78 B. MOUANG KHAI 17°44'10" 104°37'45"	68	Phosphorite	Khi Keo	Ore is distributed in a cave in limestone of Khammouan (C-P ₁ km). The limestone is of light grey color, with massive structure. Phosphorite is of brown, black brown color, friable, distributed at the cave floor, 60m long, 20m wide and 1m thick. P ₂ O ₅ grade: 5.89-34.2%. Prognostic resource: 1.200t. Genesis: sedimentary - infiltration.	General prospecting by Mai Quy Trung 1998	Prospective ore occurrence
75	E-48-78 B. MOUANG KHAI 17°54'07" 104°33'10"	61	Phosphorite	Tham En 2	Ore is distributed in a cave in limestone of Khammouan (C-P ₁ km). The limestone is of light grey color, with massive structure. Phosphorite is of motley grey color, loose, friable, distributed at the cave floor, 100m long, 50m wide and 2.5m thick. P ₂ O ₅ grade: 8.85-16.4%; Fe ₂ O ₃ : 2.08-4.83%; Al ₂ O ₃ : 1.75-3.98%; MgO: 0.18-2.25%; CO ₂ : 2.64-3.51%. Prognostic resource: 12.500t. Genesis: sedimentary - infiltration.	General prospecting by Mai Quy Trung 1998	Prospective ore occurrence
76	E-48-92 B. TON PHAO 17°25'15" 105°31'35"	120	Phosphorite	Pha Bang	Ore is distributed on the floor of a cave in limestone of Khammouan (C-P ₁ km). The limestone is of light grey color, with massive structure. Phosphorite is of brown grey color, loose. It is 30m long, 20m wide and 4m thick. P ₂ O ₅ grade: 6.53-13.6%. Prognostic resource: 2400t. Genesis: sedimentary - infiltration.	General prospecting by Ta Quoc Dat 2000.	Prospective ore occurrence
77	E-48-104 B. NA POUNG 17°17'30" 105°34'30"	137	Phosphorite	Lay Ooc	Ore is distributed on the floor of a cave in limestone of Khammouan (C-P ₁ km). The limestone is of light grey color, with massive structure. Phosphorite is of brown grey, yellow grey color, loose. It is 80m long, 4-15m wide and 2-4m thick. P ₂ O ₅ grade: 13.1-27.8%. Prognostic resource: 2160t. Genesis: sedimentary - infiltration.	General prospecting by Ta Quoc Dat 2000.	Prospective ore occurrence

No	Location	Number on map	Kind of mineral	Name of deposit, ore occurrence	CHARACTERISTICS of deposit, ore occurrence	Stage of investigation	Size
78	E-48-104 B. NA POUNG 17°18'00" 105°36'30"	136	Phosphorite	Pha Phoong	Ore is distributed on the floor of a cave in limestone of Khammouan (C-P ₁ km). The limestone is of light grey color, with massive structure. Phosphorite is of brown grey color, with earth-like structure, loose. It is 140m long, 10-20m wide and 2-5m thick. P ₂ O ₅ grade: 4.6-13.1%. Prognostic resource: 6300t. Genesis: sedimentary - infiltration.	General prospecting by Ta Quoc Dat 2000.	Prospective ore occurrence
79	E-48-104 B. PHA KHONG NUA 17°18'30" 105°19'00"	134	Phosphorite	Khi Chia 6	Ore is distributed on the floor of a cave in limestone of Khammouan (C-P ₁ km). The limestone is of light grey color, with massive structure. Phosphorite is of motley yellow grey color, with earth-like structure, loose. It is 80m long, 10-50m wide and 2-5m thick. P ₂ O ₅ grade: 14.2%. Prognostic resource: 3600t. Genesis: sedimentary - infiltration.	General prospecting by Ta Quoc Dat 2000.	Prospective ore occurrence
80	E-48-103 B. PHA KHONG NUA 17°20'35" 105°26'05"	130	Phosphorite	Khi Chia 3	Ore is distributed on the floor of a cave in limestone of Khammouan (C-P ₁ km). The limestone is of light grey color, with massive structure. Phosphorite is of motley black grey, brown grey color, with earth-like structure, loose. It is 20m long, 6-10m wide and 2m thick. P ₂ O ₅ grade: 5.17%. Prognostic resource: 320t. Genesis: sedimentary - infiltration.	General prospecting by Ta Quoc Dat 2000.	Ore occurrence with unknown prospectiveness
81	E-48-103 B. PHA KHONG- NUA 17°18'40" 105°28'20"	135	Phosphorite	Khi Chia 4	Ore is distributed on the floor of a cave in limestone of Khammouan (C-P ₁ km). The limestone is of light grey color, with massive structure. Phosphorite is of motley grey color, soft and friable. It is 15m long, 10m wide and 2m thick. P ₂ O ₅ grade: 26.1%. Prognostic resource: 300t. Genesis: sedimentary - infiltration.	General prospecting by Ta Quoc Dat 2000.	Ore occurrence with unknown prospectiveness
82	E-48-91 MA HA XAI 17°12'00" 105°24'30"	143	Phosphorite	Tham Ming	Ore is distributed in a cave in limestone of Khammouan (C-P ₁ km). The limestone is of light grey color, with massive structure. Phosphorite grey brown, brown yellow, with earth-like structure, loose. It is 120m long, 6-40m wide and 2-4m thick. P ₂ O ₅ grade: 5.16%; 25%; 28.3%. Prognostic resource: 4800t. Genesis: sedimentary - infiltration.	General prospecting by Ta Quoc Dat 2000.	Prospective ore occurrence

No	Location	Number on map	Kind of mineral	Name of deposit, ore occurrence	CHARACTERISTICS of deposit, ore occurrence	Stage of investigation	Size
83	E-48-91 MA HA XAI 17°24'20" 105°01'45"	124	Phosphorite	Khi Chia 7	Ore is distributed in a cave in limestone of Khammouan (C-P ₁ km). The limestone is of light grey color, with massive structure. Phosphorite is of grey brown color with motley white spots, with earth-like structure, loose, evenly spread on the cave floor. It is 120m long, 5-30m wide and 1-4m thick. P ₂ O ₅ grade: 3.48%; 6.91%; 10.4%. Prognostic resource: 4800t. Genesis: sedimentary - infiltration.	General prospecting by Ta Quoc Dat 2000.	Prospective ore occurrence
84	E-48-91 MA HA XAI 17°37'55" 105°07'30"	77	Phosphorite	Ka Muc	Ore is distributed in a cave in limestone of Khammouan (C-P ₁ km). The limestone is of blue grey color, light grey color, with massive structure. Phosphorite is evenly spread on the cave floor, with brown grey, yellow grey color, with earth-like structure, loose. It is 50m long, 5-10m wide and 2m thick. P ₂ O ₅ grade: 10.3-17.6%. Prognostic resource: 600t. Genesis: sedimentary - infiltration.	General prospecting by Ta Quoc Dat 2000.	Ore occurrence with unknown prospectiveness
85	E-48-91 MA HA XAI 17°34'50" 105°10'00"	81	Phosphorite	Thammut	Ore is distributed in a cave in limestone of Khammouan (C-P ₁ km). The limestone is of blue grey, light grey color, with massive structure. Phosphorite is brown grey, yellow grey color, with earth-like structure, evenly spread on the cave floor. It is >40m long, 5-15m wide and 1-2.5m thick. P ₂ O ₅ grade: 1.58-3.74%. Prognostic resource: 560t. Genesis: sedimentary - infiltration.	General prospecting by Ta Quoc Dat 2000.	Ore occurrence with unknown prospectiveness
86	E-48-91 MA HA XAI 17°33'30" 105°09'35"	84	Phosphorite	Ta Te	Ore is distributed in a cave in limestone of Khammouan (C-P ₁ km). The limestone is of blue grey color, with thick-bedded structure. Phosphorite cover nearly the whole cave floor area, with black brown, yellow brown color, with earth-like structure. It is 40m long, 5-10m wide and 2.0m thick. P ₂ O ₅ grade: 6.53%. Prognostic resource: 400t. Genesis: sedimentary - infiltration.	General prospecting by Ta Quoc Dat 2000.	Ore occurrence with unknown prospectiveness
87	E-48-91 MA HA XAI 17°33'00"	88	Phosphorite	Khi Chia 8	Ore is distributed in a cave in limestone of Khammouan (C-P ₁ km). The limestone is of blue grey, light grey color, with massive structure. Phosphorite is concentrated on the cave floor, with motley brown grey, black grey color, with earth-like structure, loose. It is 30m long, 5-15m wide and 2m thick.	General prospecting by Ta Quoc Dat 2000.	Ore occurrence with unknown prospectiveness

No	Location	Number on map	Kind of mineral	Name of deposit, ore occurrence	CHARACTERISTICS of deposit, ore occurrence	Stage of investigation	Size
	105°03'50"				P ₂ O ₅ grade: 12.0%. Prognostic resource: 600t. Genesis: sedimentary - infiltration.		
88	E-48-91 MA HA XAI 17°24'25" 105°08'55"	121	Phosphorite	Pha Zat 1	Ore is distributed in a cave in limestone of Khammouan (C-P ₁ km). The limestone is of light grey color, with massive structure. Phosphorite is concentrated on the cave floor, with brown grey color, earth-like structure, loose. It is 100m long, 10-17m wide and 2-3.5m thick. P ₂ O ₅ grade: 7.75-13.3%. Prognostic resource: 2000t. Genesis: sedimentary - infiltration.	General prospecting by Ta Quoc Dat 2000.	Prospective ore occurrence
89	E-48-78 B. MOUANG KHAI 17°40'30" 104°40'20"	72	Phosphorite	Pha Kang	Ore is distributed in a cave in limestone of Khammouan (C-P ₁ km). The limestone is of blue grey, light grey color, with massive structure. Phosphorite is evenly spread on the cave floor, with brown grey color, with motley white spots. It is of earth-like structure, loose. It is 40m long, 0.5-4m wide and 10m thick. P ₂ O ₅ grade: 3.45-20.7%. Prognostic resource: 800t. Genesis: sedimentary - infiltration.	General prospecting by Ta Quoc Dat 2000.	Ore occurrence with unknown prospectiveness
90	E-48-78 B. MOUANG KHAI 17°40'15" 104°52'20"	74	Phosphorite	Tham Keo 3	Ore is distributed in a cave in limestone of Khammouan (C-P ₁ km). The limestone is of blue grey, light grey color, with massive structure. Phosphorite is distributed at the cave floor, with brown grey color, loose. It is 20m long, 4-6m wide and 3m thick. P ₂ O ₅ grade: 7.08%. Prognostic resource: 300t. Genesis: sedimentary - infiltration.	General prospecting by Ta Quoc Dat 2000.	Ore occurrence with unknown prospectiveness
91	E-48-78 B. MOUANG KHAI 17°42'55" 104°39'40"	71	Phosphorite	Khi Keo 2	Ore is distributed on the floor of a cave in limestone of Khammouan (C-P ₁ km). The limestone is of light grey color, with massive structure. Phosphorite is of brown grey color, loose. It is 30m long, 10m wide and 2m thick. P ₂ O ₅ grade: 4.68-15.8%. Prognostic resource: 600t. Genesis: sedimentary - infiltration.	General prospecting by Ta Quoc Dat 2000.	Ore occurrence with unknown prospectiveness
92	E-48-90 THA KHEK	86	Phosphorite	Pha Zat	Ore is distributed on the floor of a cave in limestone of Khammouan (C-P ₁ km). The limestone is of light grey color, with massive structure. Phosphorite is of brown grey color,	General prospecting by	Ore occurrence with unknown

No	Location	Number on map	Kind of mineral	Name of deposit, ore occurrence	CHARACTERISTICS of deposit, ore occurrence	Stage of investigation	Size
	17°33'25" 104°47'45"			2	loose. It is 60m long, 4-6m wide and 2m thick. P ₂ O ₅ grade: 19.9%. Prognostic resource: 480t. Genesis: sedimentary - infiltration.	by Ta Quoc Dat 2000.	with unknown prospectiveness
93	E-48-90 THA KHEK 17°35'25" 104°44'25"	80	Phosphorite	Tham Ngan	Ore is distributed in a cave in limestone of Khammouan (C-P ₁ km), 20m from the cave entrance. The limestone is of light grey color, with massive structure. Phosphorite is evenly spread on the cave floor, is of motley black grey color. It is 120m long, 25-30m wide and 2-10m thick. P ₂ O ₅ grade: 6.05-6.53%. Prognostic resource: 600t. Genesis: sedimentary - infiltration.	Detailed prospecting by Ta Quoc Dat, 2000.	Prospective ore occurrence
94	E-48-90 THA KHEK 17°31'30" 104°47'35"	92	Phosphorite	Pha Om	Ore is distributed on the floor of a cave in limestone of Khammouan (C-P ₁ km). The limestone is of blue grey, light grey color, with massive structure. Phosphorite is of motley black grey, with earth-like structure. It is 60m long, 4-6m wide and 3-5m thick. P ₂ O ₅ grade: 8.70%. Prognostic resource: 800t. Genesis: sedimentary - infiltration.	General prospecting by Ta Quoc Dat 2000.	Prospective ore occurrence
95	E-48-66 M. KHAM KEUT 18°07'50" 104°31'05"	45	Phosphorite	Khi Chia 9	Ore is distributed on the floor of a cave in limestone of Khammouan (C-P ₁ km). The limestone is of blue grey color, thick-bedded. Phosphorite is of black grey, brown grey color, with earth-like structure, loose. It is 125m long, 2-8m wide and 1-4m thick. P ₂ O ₅ grade: 15.5-25.0%. Prognostic resource: 1000t. Genesis: sedimentary - infiltration.	General prospecting by Ta Quoc Dat 2000.	Prospective ore occurrence
96	E-48-66 M. KHAM KEUT 18°05'55" 104°31'00"	47	Phosphorite	Cuon Moong	Ore is distributed in a cave in limestone of Khammouan (C-P ₁ km). The limestone is of light grey color, with massive structure. Phosphorite is concentrated at the cave floor, with brown grey color, loose. It is 125m long, 4-10m wide and 1-6m thick. P ₂ O ₅ grade: 3.9%; 15.8%; 16.5%. Prognostic resource: 1875t. Genesis: sedimentary - infiltration.	General prospecting by Ta Quoc Dat 2000.	Prospective ore occurrence
	E-48-66	24			Ore is distributed in a cave in limestone of Khammouan (C-P ₁ km). The limestone is of light grey color, with massive		

No	Location	Number on map	Kind of mineral	Name of deposit, ore occurrence	CHARACTERISTICS of deposit, ore occurrence	Stage of investigation	Size
97	M. KHAM KEUT 18°16'20" 104°43'35"		Phosphorite	Tham Bing	structure. Phosphorite is of motley brown grey, black brown color, loose. It is 120m long, 5-10m wide and 2-5m thick. P ₂ O ₅ grade: 10.7-10.9%. Prognostic resource: 2160t. Genesis: sedimentary - infiltration.	General prospecting by Ta Quoc Dat 2000.	Prospective ore occurrence
98	E-48-66 M. KHAM KEUT 18°14'15" 104°43'15"	25	Phosphorite	Khi Chia 10	Ore is distributed in a cave in limestone of Khammouan (C-P ₁ km). The limestone is of light grey color, with massive structure. Phosphorite is concentrated on the cave floor, with motley brown grey, black grey color, loose. It is 100m long, 0.5-5m wide and 2-3m thick. P ₂ O ₅ grade: 0.85-9.8%. Prognostic resource: 500t. Genesis: sedimentary - infiltration.	General prospecting by Ta Quoc Dat 2000.	Ore occurrence with unknown prospectiveness
99	E-48-66 M. KHAM KEUT 18°13'30" 104°45'00"	29	Phosphorite	Thung Pa Kha	Ore is distributed in a cave in limestone of Khammouan (C-P ₁ km). The limestone is of light grey color, with massive structure. Phosphorite is of brown grey, black grey color, with earth-like structure, loose. It is 75m long, 8-12m wide and 5m thick. P ₂ O ₅ grade: 5.99-10.6%. Prognostic resource: 1800t. Genesis: sedimentary - infiltration.	General prospecting by Ta Quoc Dat 2000.	Prospective ore occurrence
100	E-48-66 M. KHAM KEUT 18°12'00" 104°57'00"	34	Phosphorite	Phi Noong	Ore is distributed in a cave in limestone of Khammouan (C-P ₁ km). The limestone is of light grey color, with massive structure. Phosphorite is of motley brown grey, black grey color, loose. It is 35m long, 1-3m wide and 1-2m thick. P ₂ O ₅ grade: 10.3%. Prognostic resource: 140t. Genesis: sedimentary - infiltration.	General prospecting by Ta Quoc Dat 2000.	Ore occurrence with unknown prospectiveness
101	E-48-66 M. KHAM KEUT 18°12'40" 104°51'25"	28	Phosphorite	Din Dam	Ore is distributed in a cave in limestone of Khammouan (C-P ₁ km). The limestone is of blue grey, light grey color, with massive structure. Phosphorite is concentrated in the inner part of the cave, with structure with earth-like structure, loose. It is 90m long, 3-12m wide and 2-5m thick. P ₂ O ₅ grade: 15.9-21.3%. Prognostic resource: 1620t. Genesis: sedimentary - infiltration.	General prospecting by Ta Quoc Dat 2000.	Prospective ore occurrence
102	E-48-90 THA KHET	109	Dolomite	TL.1225	This is limestone mountain belonging to Khammouan formation (C-P ₁ km), SE of National Road 12. The rock is of	Discovered by	Small deposit

No	Location	Number on map	Kind of mineral	Name of deposit, ore occurrence	CHARACTERISTICS of deposit, ore occurrence	Stage of investigation	Size
	17°27'05" 104°53'40"				muddy white color, massive structure. Analysis result: CaO: 31.18%; MgO: 20.63%; K ₂ O: 0.030%; Na ₂ O: 0.030%. Genesis: Sedimentary	Ta Quoc Dat 1997	
103	E-48-91 B. MA HA XAI 17°27'00" 105°08'00"	110	Dolomite	B. Na Kok	This is a limestone mountain belonging to Khammouan formation (C-P ₁ km), North of National Road 12. The limestone massif is > 2km long, >200m wide, 100m thick. The rock is of milky white color, massive structure. Analysis result: CaO: 30.51%; MgO: 21.10%; K ₂ O: 0.035%; Na ₂ O: 0.030%. Genesis: Sedimentary	Discovered by Ta Quoc Dat 1997	Small deposit
104	E-48-91 B. MA HA XAI 17°32'30" 105°18'30"	96	Dolomite	TL.1195	This is a limestone mountain belonging to Khammouan formation (C-P ₁ km), SW of National Road 12. The rock is of milky white, bluish color, massive structure. Analysis result: CaO: 32.64%; MgO: 19.38%; K ₂ O: 0.050%; Na ₂ O: 0.060%. Genesis: Sedimentary	Discovered by Ta Quoc Dat 1997	Small deposit
<u>Technical raw material group</u>							
105	E-48-42 B. SONG KHON 18°41'10" 104°54'50"	4	Crystalline quartz	Phon Keo	Ore occurrence near B. Phon Keo, upstream of Nam Gnala. Quartz is in the form of small crystals with dimension 3-4cm, concentrated in druses and geodes, developed along a W-E trending broken zone, with an observed length of 40m, a width of 3m. Genesis: Hydrothermal (?)	Discovered by Vu Chau 1997	Ore occurrence with unknown prospectiveness
106	E-48-42 B. SONG KHON 18°42'30" 104°53'50"	1	Crystalline quartz	Phou Toum	Mineralization occurs at the contact boundary between schist and magmatic rock granodiorite ($\gamma\delta$ a ₁ np ₁). Quartz veins occur nearly in conformity with the foliation surface of the schist, trending 60-65°, dipping NNW (30-40°). There are 3 quartz veins ~ 40m long, 3-3.5m thick and 2 small veins with a thickness of 15-30cm. The quartz is of crystalline form, prismatic form, of white and milky white	According to the data of the group of Bulgarian geologists (1985). Archives Department of Geology and Mines	Prospective ore occurrence

No	Location	Number on map	Kind of mineral	Name of deposit, ore occurrence	CHARACTERISTICS of deposit, ore occurrence	Stage of investigation	Size
					color. The quartz here can be used in the field of optical and piezoelectric techniques. Genesis: hydrothermal	of Laos	
107	E-48-55 B. NONG KHOAY 18°20'20" 105°01'50"	18	Crystalline quartz	B. Houana	Mineralization occurs in a branch of a dry stream NW of B. Houana. It was investigated by Bulgarian geologists in May 1985. Quartz is distributed in a broken zone of granite (γ a C_1 np). The crystals are developed in cavities of the granite in the form of veins and lenses, tens cm long. The quartz crystals here are of small dimensions: < 6cm long, < 2.5cm wide. Large crystals are very rarely met. The crystals are of prismatic form, with rather clear rhombic facets, of white color, transparent. From the result of prospecting for crystalline quartz here, there is still no exact conclusion on its value for use in technical fields.	According to the data of the group of Bulgarian geologists (1985). Archives Department of Geology and Mines of Laos	Ore occurrence with unknown prospectiveness
<u>Ceramic and porcelain raw material group</u>							
108	E-48-67 B. NA PE 18°19'40" 105°02'30"	19	Ceramic clay	Na Huang	Clay is distributed in a valley extending in N-S direction from B. Lak 5 to B. Na Huang, consisting of two 2 clay bodies. Their depth of occurrence is 0.5-10m, intercalated between them is a gravel and sand layer with an average thickness of 3m. The clay is of white, yellowish, bluish, greet color, fine and plastic. Distribution area: 3-4km long, 200-300m (1000m) wide and in average 5.5m thick. Analysis result : Al_2O_3 : 23.94% ; SiO_2 : 57.6% ; TiO_2 : 0.85% ; Fe_2O_3 : 3.64% ; LOI : 8.61%, particle size : 0.1-0.005mm >87%. Prognostic resource: 4.475.000m ³ .	Detailed prospecting by Chu Van Chich 1997	Small deposit

No	Location	Number on map	Kind of mineral	Name of deposit, ore occurrence	CHARACTERISTICS of deposit, ore occurrence	Stage of investigation	Size
					Genesis: Sedimentary		
<u>Construction material group</u>							
109	E-48-91 B. MA HA XAI 17°21'45" 105°16'30"	90	Cement limestone	Ph. Kha	This is a limestone mountain of Khammouan formation (C-P ₁ km). Its is to North of National Road 12. The rock is of milky white, muddy white color, with massive structure. Analysis result: CaO: 55.58%; MgO: 0.29%; K ₂ O: 0.015%; Na ₂ O: 0.040%. Genesis: Sedimentary	Discovered by Ta Quoc Dat 1997	Small deposit
110	E-48-91 B. MA HA XAI 17°29'40" 105°24'20"	102	Cement limestone	B. Na Den	This is a limestone mountain of Khammouan formation (C-P ₁ km). It is North of National Road 12, >20km long, 6-7km wide. The rock is of milky white, bluish color, massive structure. Analysis result: CaO: 54.23-55.43%; MgO: 0.3-0.79%; K ₂ O: 0.015-0.018%; Na ₂ O: 0.022-0.030%. Genesis: Sedimentary	Discovered by Ta Quoc Dat 1997	Small deposit
111	E-48-91 B. MA HA XAI 17°34'40" 105°27'30"	82	Cement limestone	B. Kham He	This is a limestone mountain of Khammouan formation (C-P ₁ km), SE of 12 National Road. The rock is of grey blue color, massive structure. Analysis result: CaO: 53.7%; 55.26%; MgO: 0.28-1.9%; Al ₂ O ₃ : 0.007-0.015%; Fe ₂ O ₃ : 0.027-0.14%. Genesis: Sedimentar	Discovered by Ta Quoc Dat 1997	Small deposit
112	E-48-91 B. MA HA XAI 17°30'20" 105°08'25"	97	Cement limestone	Khama	This is a limestone mountain of Khammouan formation (C-P ₁ km), SE of National Road 12. The rock is of milky white, massive structure. Analysis result : CaO : 54.44% ; MgO : 0.96% ; K ₂ O : 0.23% ; Na ₂ O : 0.022%. Genesis: Sedimentary	Discovered by Ta Quoc Dat 1997	Small deposit
113	E-48-92 B. TON PHAO 17°34'45" 105°33'10"	83	Cement limestone	B. Hang Kang	This is a limestone mountain of Khammouan formation (C-P ₁ km). It is SE of National Road 12. The rock is of milky white color, massive structure. Analysis result : CaO : 55.26%; MgO : 0.28% ; K ₂ O : 0.015% ; Na ₂ O : 0.022%. Genesis: Sedimentary	Discovered by Ta Quoc Dat 1997	Small deposit
114	E-48-66 M. KHAM KEUT	22	Cement limestone	B. Na Pak Van	This is a limestone mountain of Khammouan formation (C-P ₁ km), located North of B. Na Pak Van., The limestone is of light color, massive structure. Analysis result : CaO : 54.23% ; MgO : 0.26% ; K ₂ O : 0.020% ; Na ₂ O : 0.024%	Discovered by	Small deposit

No	Location	Number on map	Kind of mineral	Name of deposit, ore occurrence	CHARACTERISTICS of deposit, ore occurrence	Stage of investigation	Size
	18°16'35" 104°42'20"				CaO : 54.33% ; MgO : 0.36% ; K ₂ O : 0.030% ; Na ₂ O : 0.024%. Genesis: Sedimentary	Vu Chau 1997	
115	E-48-66 M. KHAM KEUT 18°14'20" 104°40'00"	27	Cement limestone	B. Kang Na	This is a limestone mountain of Khammouan formation (C-P ₁ km), North of National Road 8. The limestone is of grey white color, massive structure. Analysis result: CaO : 55.33% ; MgO : 0.33% ; K ₂ O : 0.026% ; Na ₂ O : 0.030%. Genesis: Sedimentary	Discovered by Vu Chau 1997	Small deposit
116	E-48-66 M. KHAM KEUT 18°11'00" 104°50'30"	37	Cement limestone	B. Nong Hin	This is a limestone mountain of Khammouan formation (C-P ₁ km). South of B. Nong Hia. The limestone is of light color, massive structure. Analysis result : CaO : 54.38% ; MgO : 0.61% ; K ₂ O : 0.030% ; Na ₂ O : 0.030%. Genesis: Sedimentary	Discovered by Vu Chau 1997	Small deposit
117	E-48-66 M. KHAM KEUT 18°11'00" 104°57'00"	38	Cement limestone	B. Houay-o	This is a limestone mountain of Khammouan formation (C-P ₁ km), North of National Road 8. The limestone is of muddy white color, massive structure. Analysis result : CaO : 55.45% ; MgO : 0.2% ; K ₂ O : 0.016% ; Na ₂ O : 0.025%. Genesis: Sedimentary	Discovered by Vu Chau 1997	Small deposit
118	E-48-66 M. KHAM KEUT 18°13'30" 104°46'00"	32	Cement limestone	Ph. Kouan Chan	This is a limestone mountain of Khammouan formation (C-P ₁ km), North of National Road 8. The limestone is biogenetic, of light color, massive structure. Analysis result: CaO: 55.26% ; MgO: 0.38% ; K ₂ O: 0.017% ; Na ₂ O: 0.022%. Genesis: Sedimentary	Discovered by Vu Chau 1997	Small deposit
119	E-48-92 B. TON PHAO 17°33'35" 105°50'40"	85	Cement limestone	B. Xam Nua	This is a limestone mountain of Khammouan formation (C-P ₁ km), East of B. Xam Nua. The limestone is of grey, black blue color, massive structure. Analysis result : CaO : 55.13% ; MgO : 0.42% ; K ₂ O : 0.03% ; Na ₂ O : 0.021%. Genesis: Sedimentary	Discovered by Le Dieu 1997	Small deposit
120	E-48-92 B. TON PHAO 17°31'05" 105°48'45"	93	Cement limestone	B. Tang	This is a limestone mountain of Khammouan formation (C-P ₁ km), located South of B. Tang. The limestone is of muddy white color, massive structure. Analysis result : CaO : 54.69% ; MgO : 0.45% ; K ₂ O : 0.023% ; Na ₂ O : 0.030%. Genesis: Sedimentary	Discovered by Le Dieu 1997	Small deposit
	E-48-66	52	Cement		This is a limestone mountain extending in NW-SE		

No	Location	Number on map	Kind of mineral	Name of deposit, ore occurrence	CHARACTERISTICS of deposit, ore occurrence	Stage of investigation	Size
121	M. KHAM KEUT 18°01'20" 104°35'45"		limestone	B. Na Kham	direction, located SW of B. Na Kham, belonging to Khammouan formation (C-P ₁ km). The limestone is of light grey color, massive structure. Analysis result: CaO: 55.5%; MgO: 0.33%; SiO ₂ : 0.3%; Al ₂ O ₃ : 0.21%. Genesis: Sedimentary	Discovered by Ta Quoc Dat 1999	Small deposit
122	E-48-53 B. PHA PHEUNG 18°23'35" 105°29'00"	17	Cement limestone	B. Hin Ngon	Limestone band extending in N-S direction, East of B. Hin Ngon, belonging to Khammouan formation (C-P ₁ km). The limestone is of light grey color, with thick-bedded to massive structure. Analysis result : CaO : 54.08% ; MgO : 1.44% ; SiO ₂ : 0.3% ; Al ₂ O ₃ : 0.21%. Genesis: Sedimentary	Discovered by Ta Quoc Dat 1998	Small deposit
123	E-48-91 B. MA HA XAI 17°33'00" 105°09'40"	89	Building limestone	B. Pha Thoung	This is a limestone mountain of Khammouan formation (C-P ₁ km), west of National Road 12. The limestone is of milky white color, massive structure. Analysis result : CaO: 43.84%; MgO: 10.27%; K ₂ O: 0.015%; Na ₂ O: 0.023%. Genesis: Sedimentary	Discovered by Ta Quoc Dat 1997	Small deposit
124	E-48-66 M. KHAM KEUT 18°12'40" 104°50'40"	31	Building limestone	B. Bo	This is a limestone mountain of Khammouan formation (C-P ₁ km), North of National Road 8. The limestone is of light color, massive structure. Analysis result : CaO : 50.21% ; MgO : 4.44% ; K ₂ O : 0.030% ; Na ₂ O : 0.030%. Genesis: Sedimentary	Discovered by Vu Chau 1997	Small deposit
125	E-48-90 THA KHEK 17°33'15" 104°56'45"	87	Building limestone	Pha Zat	This is a limestone mountain of Khammouan formation (C-P ₁ km), extending in NW-SE direction, located East of B. Phon Ngam. The limestone is of white grey color, massive structure. Analysis result: CaO: 41.18%; MgO: 12.49%; K ₂ O: 0.016%; Na ₂ O: 0.024%; Al ₂ O ₃ : 0.06%; SiO ₂ : 0.15%. Genesis: Sedimentary	Discovered by Ta Quoc Dat 1997	Small deposit
126	E-48-78 B. MOUANG KHAI 17°49'45"	65	Building limestone	Nong Dong	This is a limestone band of Khammouan formation (C-P ₁ km), located ENE of B. Nong Dong. The limestone is of blue color, massive structure. Analysis result: CaO: 49.66%; MgO: 3.96%; K ₂ O: 0.082%; Na ₂ O: 0.057%; SiO ₂ : 1.6%.	Discovered by Ta Quoc Dat 1998	Small deposit

No	Location	Number on map	Kind of mineral	Name of deposit, ore occurrence	CHARACTERISTICS of deposit, ore occurrence	Stage of investigation	Size
	104°33'40"				Genesis: Sedimentary		
127	E-48-65 B. NA KHUA 18°01'30" 104°25'00"	49	Building limestone	Thong Lom	This is a limestone mountain located NE of Thong Lom, belonging to Khammouan formation (C-P ₁ km). The limestone is of blue grey, light grey color, massive structure. Analysis result : CaO : 33.02% ; MgO : 18.14% ; Fe ₂ O ₃ : 0.04% ; Al ₂ O ₃ : 0.11%. Genesis: Sedimentary	Discovered by Ta Quoc Dat 1998	Small deposit
128	E-48-66 M. KHAM KEUT 18°10'20" 104°59'50"	40	Cement clay	B. Nam Phao	Clay schist of Boualapha formation (C ₁ bp). The rock is of white grey color, thin-bedded, where weathered became relatively fine clay. The distribution area is rather large, along Nam Phao and SE of B. Nam Phao. On road slope one can see a clay layer 6-7m thick. Analysis result : SiO ₂ : 61.32% ; Al ₂ O ₃ : 20.63%; TiO ₂ : 0.71%; Fe ₂ O ₃ : 3.11%; CaO: 0.22%; MgO: 0.99%; K ₂ O: 3.1%; Na ₂ O: 0.69%. Genesis: Weathering	Discovered by Tran Van Ban 2000	Small deposit
129	E-48-90 THA KHEK 17°27'40" 104°59'10"	106	Cement clay	B. Lao	Clay as a weathering products from clay schist of Boualapha (C ₁ bp). The clay is of yellow color, relatively fine, plastic. This clay deposit is being subjected to evaluative prospecting to serve local industry. Genesis: Weathering	Discovered by Ta Quoc Dat 1999	Small deposit
130	E-48-53 B. PHA PHEUNG 18°30'20" 104°27'10"	11	Brick clay	Tha Phe	Clay as a weathering products from clay schist of Boualapha formation (C ₁ bp), forming a band extending from B. Tha Phe to Viang Thong district ~3km long, in N-S direction. The clay is of yellow color, relatively fine and plastic. On the hill slope one can see a productive layer up to 5-6m thick. Here the local authorities are extracting the clay for making brick. Genesis: Weathering	Discovered by Tran Sung 2000	Small deposit
131	E-48-66 M. KHAM KEUT 18°11'00"	39	Brick clay	B. Nam Phao	Clay as a weathering products from clay schist of Boualapha formation (C ₁ bp) in the area from B.Nam Phao to Lak Sao. On the road slope one can see a weathered clay layer	Discovered by Tran Van Ban 1997	Small deposit

No	Location	Number on map	Kind of mineral	Name of deposit, ore occurrence	CHARACTERISTICS of deposit, ore occurrence	Stage of investigation	Size
	104°59'10"				of motley color, 5 - 6m thick. Here the local authorities are extracting the clay to make brick for construction. Genesis: Weathering		
132	E-48-77 B. BOUNG KOANG 17°58'40" 104°18'30"	55	Facing stone	Say Phou Ngou	Biotite granite of Say Phou Ngou complex ($\gamma T_{2-3} sn$), of pink color, massive structure, porphyritic texture. The rock here is extracted by the local authorities. Analysis result: Water absorption W_{nn} : 0.43%, Dry density γ_k : 2.62g/cm ³ , Saturated density γ_{bh} : 2.63g/cm ³ , Specific gravity ρ : 2.65g/cm ³ , Dry compressive strength σ_{nk} : 1920kg/cm ³ , Saturated compressive strength σ_{nbh} : 1880kg/cm ² , Tensile strength σ_{kk} : 135kg/cm ³ , Bending strength σ_{uk} : 154kg/cm ² , Optical reflection: 90%,: Impact resistance: 10, Abrasion resistance: 0.1g/cm ² x600m. Genesis: magmatic	Discovered by Le Van Dieu 1997	Small deposit
133	E-48-67 B. NA PE 18°09'30" 105°08'17"	42	Roofing slate	Nakadok	Clay schist, sericitic schist of black blue color, belonging to Nam Houay formation ($O_3-S_1 nh$) The rock can be split easily into thin sheets 0.4-1cm thick. It is concentrated in layers 2-3m thick intercalated with sandstone. Analysis result: Water absorption W_{nn} : 0.49%, dry density γ_k : 2.71g/cm ³ , saturated density γ_{bh} : 2.72g/cm ³ , specific gravity ρ : 2.77g/cm ³ , porosity n : 2.17%, dry compressive strength σ_{nk} : 320kg/cm ³ . Climatic impact test: the specimen does not swell, is not split, broken. Acid resistance test: the specimen is not split, cracked, broken, the specimen surface is not blistered, wrinkled, not giving air bubbles. The analysis result show the schist can be used as roofing slate. Genesis: Sedimentary	General prospecting by Trinh Xuan Hieu 1997	Small deposit
134	E-48-54 B. NA CHENG 18°28'10" 105°45'50"	14	Roofing slate	Tham Kouna	Black grey clay schist, when weathered is yellow grey. It is thin-bedded, with beds 1 cm thick, belonging to Nam Houay formation ($O_3-S_1 nh$). The rock can be easily split into thin sheets. They form layers intercalated with medium bedded sandstone. Genesis: Sedimentary	Discovered by Le Van Dieu 1996	Ore occurrence with unknown prospectiveness
135	E-48-91 B. MAHAXAI 17°39'30" 104°23'45"	75	Gravel	B. Maloy	Quaternary gravel distributed along Nam On river, extending from B. Maloy in downstream direction for about 3km. it is composed mainly of quartz, with grain size 3-15mm, mixed with some white mica flakes.	Discovered by Ta Quoc Dat 1999	Small deposit

No	Location	Number on map	Kind of mineral	Name of deposit, ore occurrence	CHARACTERISTICS of deposit, ore occurrence	Stage of investigation	Size
136	E-48-65 B. NAK HUA 17°12'10" 104°15'15"	33	Gravel	Nam Khou	Quaternary gravel occurring under a cover layer with a thickness of 3m, distributed along Nam Khou river. It is mainly composed of quartzitic sandstone, quartz cobbles, etc. The cobbles have a diameter <6cm.	Discovered by Ta Quoc Dat 1997	Small deposit
137	E-48-102 B. NONG BOK 17°06'00" 104°57'00"	149	Gravel	Som Saat	Quaternary sand, cobbles, pebbles distributed along the right bank of Xe Bang Fai river in the area of B. Na Phok Tha. The gravel is mainly composed of quartzitic sandstone, quartz.	Discovered by Le Van Dieu 1999	Small deposit
138	E-48-90 B. THA KHEK 17°27'00" 104°45'30"	108	Building sand	B. Don Don	Sand forming flood plains with large dimension, distributed along the left bank of Nam Khong river, from B. Na Muang to B. Don Don. It is mainly composed of quartz mixed with some mica, well sorted.	Discovered by Ta Quoc Dat 1998	Small deposit
139	E-48-90 B. THA KHEK 17°35'30" 104°36'20"	79	Building sand	B. Hin Boun	Sand bars distributed along the left bank of Nam Khong river, from B. Hat to B. Hin Boun, about 5km long, 200-500m wide. The sand is mainly composed of quartz, with fine to medium grain size.	Discovered by Ta Quoc Dat 1998	Small deposit
140	E-48-102 B. NONG BOK 17°19'00" 104°48'30"	133	Building sand	B. Gngang Ngam	Sand bars distributed along the left bank of Nam Khong river, from B. Mouang Soum to B. Tha, about 10km long, ~200m wide. The sand is mainly composed of quartz, with fine to medium grain size. Here the local authorities are extracting sand to serve the construction projects in the area	Discovered by Ta Quoc Dat 1999	Small deposit
141	E-48-102 B. NONG BOK 17°04'35" 104°51'20"	151	Building sand	B. Bung Xe	Sand bars distributed along the Xe Bang Fai river from B. Xay Sung to B. Bung Xe. The sand is mainly composed of quartz, well sorted, with fine to medium grain size.	Discovered by Ta Quoc Dat 1999	Small deposit
142	E-48-102 B. NONG BOK 17°04'00"	154	Building sand	B. Hat Kham - hiang	Sand bars distributed along both sides of the Xe Bang Fai river. Each sand bar is 200-500m long. The sand is mainly composed of quartz, some mica flakes, well sorted, with fine to medium grain size.	Discovered by Ta Quoc Dat 1999	Small deposit

No	Location	Number on map	Kind of mineral	Name of deposit, ore occurrence	CHARACTERISTICS of deposit, ore occurrence	Stage of investigation	Size
	104°54'15"						
143	E-48-102 B. NONG BOK 17°14'00" 104°49'30"	141	Building sand	B. Dang Tai	Sand bars distributed along the left side of Nam Khong river, extending from B. Dang Tai to B. Xieng Vang Nua, 10km long, 100-1000m wide. The sand is mainly composed of quartz, with fine to medium grain size.	Discovered by Ta Quoc Dat 1999	Small deposit
<u>thermal water, salt water</u>							
<u>Thermal water</u>							
144	E-48-41 M. MOK 18°42'05" 104°12'50"	2	Thermal water	B. Pa Kouay	The water is pressurized, emerges along a fracture extending over 15m in black clay schist. The water is clear, colorless, of astringent taste, with hydro sulfide odor. Water temperature is T° = 52°C. Total dissolved solids: 0.1g/l	Discovered by Nguyen Cong Hoi 1998	Ore occurrence with unknown prospectiveness
145	E-48-53 B. PHA PHEUNG 18°39'30" 104°12'55"	6	Thermal water	B. Sop Hong	The water emerges from fractures in granite. The water flowing out is of salty taste, stenching odor. The water is clear, colorless. The water temperature is T° = 40°C. Total dissolved solids: 0.27g/l	Discovered by Vu Quynh 1998	Ore occurrence with unknown prospectiveness
146	E-48-54 NA CHENG 18°35'08" 104°58'20"	9	Thermal water	B. Nam On	The water emerges in a stream valley ~2km North of B. Nam On. The water is hot, flowing as a current, emerges from alluvial sediments. The water is clear, colorless, astringent taste, stenching odor, The water temperature is T° = 50°C. Total dissolved solids: 0.3g/l	Discovered by Le Dieu 1997	Ore occurrence with unknown prospectiveness
147	E-48-55 B. NONG KHOAY 18°34'30" 105°00'10"	10	Thermal water	B. Me	The water emerges from a unconsolidated Quaternary gravel layer on the right bank of Nam Chat river. Water temperature is T° = 42°C. Total dissolved solids: 0.06g/l	Discovered by Le Dieu 1996	Ore occurrence with unknown prospectiveness
148	E-48-55 B. NONG	8	Thermal	B. Mot	The water emerges on the left bank of Nam Chat river, from fractures of biotite granite, flowing as currents within an	Discovered by	Ore occurrence

No	Location	Number on map	Kind of mineral	Name of deposit, ore occurrence	CHARACTERISTICS of deposit, ore occurrence	Stage of investigation	Size
	KHOAY 18°34'30" 105°00'10"		water		area of ~20m ² . The water is clear, colorless, with astringent taste. The water temperature is T° = 51°C. Total dissolved solids: 0.1-0.15g/l	Le Dieu 1996	with unknown prospectiveness
149	E-48-67 B. NA PE 18°09'20" 105°12'20"	41	Thermal water	B. Poug Kuak	The water emerges from fractures of granite, the springs extends for 25-30m long, in W-E direction. The water is clear, colorless, stenching odor, fresh taste, with much sediment. The water temperature is T° = 50°C. Total dissolved solids: 0.27g/l	Discovered by Nguyen Duy Thanh 1996	Ore occurrence with unknown prospectiveness
150	E-48-67 B. NA PE 18°17'55" 105°04'15"	21	Thermal water	B. Na Pe	The water emerges through alluvial sediments in a small stream valley, near B. Nape. The emergence area is near 50m long. The water source is closely related with the sub-latitudinal fault breaking the O-S rocks and the muscovite granite (?). The water temperature is > 60°C, but the water has not met the standards for mineral water. It can be only used for bathing and medical treatment. The local authorities are exploiting this thermal water source to serve domestic use and tourism.	Data of Bulgarian geologists (1985). Archives Department of Geology and Mines of Laos	Prospective ore occurrence
151	E-48-103 B. PHA KHONG NUA 17°19'10" 105°07'20"	132	Thermal water	B. Poug Intercalated with	The water emerges along the broken zone of NW-SE trending zoning fault. The rock here is red brown siltstone. The water is pressurized, colorless, odorless, tasteless. the water temperature is T° = 40°C. Total dissolved solids: 0.99g/l	Discovered by Le Cong Hoi 1998	Ore occurrence with unknown prospectiveness
<u>Salt water - Rock salt</u>							
152	E-48-102 B. NONG BOK 17°09'35" 105°58'50"	147	Salt water	Nong Khem	The salt water emerges within an area of about 5 ha, in Nong Boua formation (K ₂ nb). The water is relatively salty especially in dry season. Here the local people extract the salt water for producing salt with an output of 1t/month. Genesis: Sedimentary	Discovered by Ta Quoc Dat 1997	Prospective ore occurrence
	E-48-102	146			The salt water emerges in a dug well, in B. Nonsila. The		Prospective

No	Location	Number on map	Kind of mineral	Name of deposit, ore occurrence	CHARACTERISTICS of deposit, ore occurrence	Stage of investigation	Size
153	B. NONG BOK 17°11'15" 104°52'17"		Salt water	Nonsila	water level is at 2.5m depth. The water is relatively salty. Genesis: Sedimentary	Discovered by Ta Quoc Dat 1998	ore occurrence