

Influence On The Environment In The Lima Megalopolis, Of The Mining Tailings Located In The Middle And Headboard Basins, Of The Chillón, Rímac And Lurín Rivers. Left By The Exploitation Of Metallic Mineral Resources.

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SUMMARY

We think that the liabilities or mining tailings, which now remain apparently static and inactive on the surface of their base accumulated for years, are active on their surface exposed to weathering, the passage of time and the various external geodynamic processes produced by climatic stations such as the rainy summer, which erodes and transports its particles to the water flows of the Chillón, Rímac and Lurín rivers, the mineral tailings are the result of the treatment by grinding rocks in concentration plants, they contain, in addition to metallic metals, reagents harmful to the health of the people who live in Lima, such as sodium cyanide, copper sulfate, pine oil, Aeroflot, arsenic, sulfur and iron, these solid wastes, also exposed to the weathering process and pluvial and wind events, are what raise or eroded to be transported to river plains, slopes, peaks or river and marine deposition basins where they are decant, contaminating their various soil horizons with toxic substances and negatively impacting the local and regional environments, which form the ecological spaces where man lives.

It is evident that when man arrived in Peruvian territory it was 5000 thousand years ago, they first used obsidian to make their tools, followed by pre-Inca cultures or civilizations located in various environments or sectors of the erogenous, events that occurred before it began. The Inca Empire the following human cultures are cited: Chinchorro, Churajon, mayo-Chinchipe, Marañón, Caral, Sechín, Valdivia, Chavín, Cupisnique, Lima, Chancay, Paracas, Wari among others.

KEYWORD: Exploitation of minerals with metallic elements, obtaining metallic elements from sulfides, solid waste or mining tailings in central Peru.

Fields with solid mining waste, tailings or mining tailings present on plains and river terraces, in the department. Lima - central Peru.

PROBLEMATIC SITUATION

The population of Megapolis Lima is 10,104,141 inhabitants, representing 29.9% of the population of Peru, according to the National Institute of Statistics and Informatics (INEI), plus Venezuelan emigrants of 1,1004,00 total 11,1004,141 inhabitants. , are people who need to cover their primary needs such as food, clothing, housing, education, health and work, to achieve this they need to get around every day using the vehicle fleet, which in a high percentage is obsolete, in addition, drinking water consumption is very good. according to SEDAPAL reports, which is based on quality standards given by the World Health Organization (WHO). On the other hand, Lima is one of the most polluted cities in Latin America due to the discharge of toxic gases from its old vehicles (50 and 70 years old), its desert climate contributes, an obstacle to reducing pollution, reported by the Ministry of the Environment. . However, the drinking water does not have metal contaminants that exceed the maximum permissible limits. mg As L-1 = 0.010. mg SO4 L-1 = 250. mg Fe L-1 = 0.4. mg Mo L-1 = 0.07. mg Hg L-1 = 0.001. mg Mn L-1 = 0.4. mg Al L1 = 0.2. mg Cu L-1 = 2.0. mg Pb L-1 = 0.010. mg Zn L-1 = 3.0. mg Na L-1 = 200, mg Ni L-1 = 0.20. According to the Regulation of quality of water for human consumption of the Ministry of Health.

HYPOTHESIS

1. GENERAL

The mining tailings located in the middle basins and headwaters of the Chillón, Rímac or Lurín rivers, left by the exploitation of metallic mineral resources, may impact the environment of the Lima megalopolis.

SPECIFIC

2. When studying the environment (soil, water, air) of the Lima megalopolis, there will be evidence that it was the mining tailings located in the middle basins and their headwaters, of the Chillón, Rímac or Lurín rivers, left by the exploitation of metallic mineral resources.

3. The on-site treatment of mining tailings will reduce the presence of metallic elements such as: sulfur, iron, lead, arsenic and mercury, which will impact the influence of the environment of the Lima megalopolis, if these are the mining tailings located in the middle basins and their headwaters, of the Chillón, Rímac or Lurín rivers, left by the exploitation of metallic mineral resources [impact matrix]

GOALS

1. GENERAL

Analyze the influence of the Lima megalopolis on the environment, the mining tailings located in the middle basins and headwaters of the Chillón, Rímac and Lurín rivers, left by the extraction of metallic mineral resources.

SPECIFIC

2. Study the environment of Lima (soil, air and water) impacted by metallic elements from mining tailings located in the basins and headwaters of the Chillón rivers. Rímac or Lurín.

3. Verify the results of the quantitative studies of the Ministry of Health carried out on a part of its population 11,1004,141 people residing in Lima, 18.5% (2,053,576 inhabitants), who are from 0 to 14 years of age.

WORK METHODOLOGY

To conclude this investigation we developed the following work by items: We reviewed part of the existing bibliography on the topic of this project, such as: Technical reports and existing books in public and private libraries (SEDAPAL, MINISTRY OF THE ENVIRONMENT, MEM, SALUD, THESIS UNIVERSITIES, CIP AND INTERNET CONSULTATIONS).

The physical space where the accumulated mining liabilities are located was mapped, as well as the mining liabilities settled on the river terraces, a process that was at a scale of 1/1000 and 1/10000 and in the three basins at a scale of 1/100000, in the first We will sample the mining tailings and monitor the waters before and after the location of the mining liabilities, or that sporadically come out of the plants where sulfide minerals are still being treated, like Tamboraque, the same thing we did with the winds that were monitored in the rainy summer.

We study the numerical results of the analyzes obtained from the Plenge laboratory, and compare them with international standards.

We obtained statistics from the Ministry of Health to analyze the child population from 0 to 14 years old that is likely to be negatively impacted by As, Fe, Pb, Hg and S We held virtual workshops coordinating with local authorities to take preventive mitigation measures against possible contamination since it was not found. We generated a standard that was virtually delivered to local authorities so that, after printing, they could reach their population.

The mitigation of these mining tailings, such as the Varón that will be refloated, was coordinated with the MEM and MINAM, in order to prevent its particles from reaching the waters of the Rímac River, which if done we will propose its mitigation with lime oxide, there were no contaminants of metallic elements found in the sands settled on the river terraces and marine sands

MINE TAILINGS FROM THE HUAMANTANGA MINE

We verified that a part of the mining tailings left by the flotation treatment of sulfide substances containing metallic elements in its concentrator plant with a capacity of 500 tml/day, are still stored on site, its central point identified with UTM coordinates zone 18, N 8723484 E 313317 height 1784 meters above sea level, the area is located at km 82, of the Lima Canta road, right bank of the Chillón River downstream. This solid waste is protected by an irregular perimeter concrete parapet 3 meters high, 60cm at its crown and 150 meters long. Another parapet parallel to this structure 10 meters away, with a mixed texture between concrete and cyclopean rocks, surrounds it. an old transport route whose embankment is partially covered with vegetation such as grasses and bushes, at the foot of this wall, the axis of the Chillón River is 100 meters away and its sector or area is covered by molles, guarangos, bushes and grasses as well as everything The area located in the delta that limits it to the perimeter of the old camp, warehouses, includes the mining tailings, when calculating its area by metric measurements in situ, 1'000,000.00 cubic meters, we take a sample of all the layers decanted by the treatment or management that was given to them in 1985, their spontaneous recovery and due to the passage of time that they have decanted it packed and caked, we had the sample analyzed geochemically for 30 elements, we also prepared a briquette from it to analyze it with the metallographic microscope, part of the result geochemistry of the contaminating elements was as follows:

Geochemical analysis carried out in the PLENGLaboratory:

No Mta	Al %	P ppm	As ppm	Mn %	Cd ppm	Mo ppm	Sb ppm	Ag ppm	Cu %	Pb %	Zn %	Fe %	Au ppm
076201	3,23	882	180.	0.11	3,0	16.	584.	36.	0.23	0.14	0.10	5.0	-

According to Leslie Renselaer Holdridge Holmes, the soils of the three sectors where the research was carried out are (a-MET), relationship of the variables; SNM height, rainfall in mm of water, humidity life with characteristics of an arid tropical thorny mountain, its maximum temperature is 30°C, the minimum annual average is 15°C, the average rainfall for the year 2024 was 60mm, and the I get a minimum of 30mm. The pH. = 6.5 of the waters in the three rivers and the suspended solids was 116, see UNI - SGS Peru tables.

Análisis parámetro	Valor permisible	Resultado
pH	6.5 – 8.5	7.5
Turbiedad	5 NTU	11.07 NTU
Sólidos suspendidos	116 m/l	Normal
Conductividad	1500 µS/cm	265 µS/cm
TDS	1000 mg/l	563 mg/l
Cloruros	10.21 mg/l CaCO3	20.42 mg/l CaCO3
Dureza total	88.44 mg/l CaCO3	104.52 mg/l CaCO3

According to the seismic intensity map prepared by the Geophysical Institute of Peru, the study area presents active seismic intensities, cited as examples are those recorded by the seismic history of the study area, given on the Richter scale, which varies from grade V (2007 08/15 16.45 p.m.), III (2003 07/27 11:58 p.m.), VIII(1609 10/19, 20.00 p.m.), IX(1 687, 10/20 – 06.00 a.m.), 10/28, 10:30 p.m.), the above determines that the sector is active and earthquakes have been recorded within it in the current century; with hypocenter depths greater than or equal to 20Km. Likewise, according to the seismic zoning map of Peru prepared by the National Institute of Civil Defense INDECI, the area belongs to ZONE No.1, due to its high seismic activity.

Censuses have been carried out on the damage suffered by civilian populations as a result of the seismic events that occurred between 11° 30' to 12° South latitude, and 76°30' to 77° West longitude, the results of their magnitude The earthquakes have been given in statistical tables, the most notable earthquakes due to their magnitude that occurred from the year 1555 to the year 2008, are recorded in the following table:

Fecha	Epicentro	Grados de M.m.
1555-15/11	Lima RSQ.	VII – IV
1687-17/06-19.45pm.	Lima RSQ	VIII – IV
1728-23/03-07.3pm.	Lima SRQ	VII – IV
1940-24/05-11.35am.	Lima SRQ	VIII-IV
1970-09/12-13.23pm.	Nor-Este Perú-SRQ	VIII-IV
2005-10/01-23.32pm.	Lima-SRQ	V-III
2006-27/01-01.43am.	Lima SRQ	V- III
2007-15/08-18.45pm.	Lima-SRQ	VI-VIII-VIII
2008-06/07-13.06pm.	Lima-SRQ	III-IV
2008-15/04-06.22am.	LIMA-SRQ	III-IV
2008-06/10-19.51pm	Lima-SRQ	IV
2008-01/11-15.40pm	Lima-SRQ	IV-V

PERU Seismic Chart – IGP. And Lima Zone 1999 – 2008:

MINE TAILINGS FROM THE PERUBAR MINE

We have verified in situ that a part of the mine tailings left by the extraction of barium (barite S04Ba), was covered by an irregular layer of clayey silt soil 2 to 3 meters thick, it was confirmed that the old mine tailings are still in recovery process due to the current leaching of sulfides, high rainfall, the use of lime oxide and the passage of time, as evidenced by the small vegetation and homes that have been installed on its surface, the current mining tailings were processed in its concentration plant of 1000 t.m./day by flotation, for 15 years it obtained concentrates of metallic elements zinc, copper, silver, lead... Extraction that occurred from the years 1960 to 2000, they still remain stored at altitude of km 50 of the central highway of Peru passing the town of Corcona, a location given by the coordinates UTM zone 18, N 8682588 E 329022 height 1292 meters above sea level, they are on both banks of the Rimac river, on the central highway and the

cauville line of the Central Railway of Peru left bank downstream of the river, they cover a fluvial fan of a stationary stream that contributes to the river, in addition to soil, the mine tailings were treated with lime oxide plus the construction of perimeter and staircase concrete channels, these dispersers of perimeter, transversal energy, parallel to the axis of the fan of the torrent, mitigates erosion due to rainfall and wind erosion, which occurs at dusk. To calculate the approximate volume, we use the operation time of the concentrator plant from 1980 to 2005 at a rate of 1000 t.m./day the area given by in situ metric measurements. We covered 900,000.00 cubic meters, from the two extracted samples, two briquettes were made, one of each and the petrographic study confirmed that it is equal to the contaminating elements that were determined through the geochemical analysis given in the table below:

Geochemical Analysis:

No Mta	Al %	P ppm	As ppm	Mn %	Cd ppm	Mo ppm	Sb ppm	Ag ppm	Cu %	Pb %	Zn %	Fe%	Au ppm
076202	4.0	607	103	0.05	26	22.0	18	7.	0.03	0.14	0.10	5.	-
075803	4.52	664	103	0.05	24.0	21.	15.0	5.	5.0	0.03	018	0.31	-

MINING TAILINGS EL VARON MINE

Through on-site inspection we corroborated that the mining tailings are still in the process of accumulation due to the current extraction of sulfides that are processed in their 100 t.m./day concentration plant that occurs by flotation, obtaining concentrates of metallic elements gold, copper, silver, lead, zinc. The extraction was from the years 1960 to 2024, they still remain partially stored at km 85 of the central highway of Peru passing the city of Matucana, a location given by the coordinates UTM zone 18 N 8693496 E 352429 height 2565 meters above sea level are located between the central track and the cauville line of the Central Railway of Peru, left bank downstream of the Rímac River, on an old river terrace that is part of the left sector of the river, the mining tailings were treated with oxide of lime, forming caliches that are layer upon layer and thus partially mitigates the wind erosion that is strong especially in the evening but not the pluvial erosion, as it shows that a torrent took a part of these mining tailings to the Rímac River and on its bed, a concentrator plant of 100 t.m./day has been installed to portray these mining tailings that still have silver, copper and zinc values when, the physical event occurred, the tailings deposit was divided into two sectors, its accumulation dates back to 40 years of existence. approximately 1000,000 cubes resulting from a concentrator plant of 500 t.m./day, from the mining tailings we extracted two samples to carry out their geochemical analyzes in the Plenge mineral laboratory, we also produced 2 briquettes for petrographic study.

Geochemical Analysis:

No Mta	Al %	P ppm	As ppm	Mn %	Cd ppm	Mo ppm	Sb ppm	Ag ppm	Ag ppm	Pb %	Zn %	Fe %	Au ppm
075904	1.17	202	2373	0.18	6.0	19.	95.0	25.0	0,03	0.05	0.12	5.	-
076005	1.35	195	10000	18.	115	18.	111.	76.	0.45	0.08	2.01	5.	-

TAMBORAQUE MINE MINING TAILINGS

Through on-site inspection we corroborated that the mining tailings are still in the process of accumulation due to the current extraction of sulfides that are processed in their concentration plant of 1000 t.m./day, it is by flotation and gravity for 1000 t.m./day, where it is treated and obtained. concentrates of metallic elements gold, copper, silver, lead, zinc. Extraction that occurred from the years 1960 to 2024, they remain still partially stored at the height of km 85 of the central highway of Peru passing the city of Matucana, a place given by the coordinates UTM zone 18 N 8696989 E 357573 height 2952 meters above sea level. over the river and the cauville line

Geochemical Analysis:

No ta	Al %	P ppm	As ppm	Mn %	Cd ppm	Mo ppm	Sb ppm	Ag ppm	Cu ppm	Pb %	Zn %	Fe %	Au ppm
075106	3.23	506	180.	5,	16.	16.	8.0	3.0	0.01	0.01	0.11	0.11	-

LA PALMA MINING PROJECT

By evidencing the physical processes and activities carried out by man in situ, we corroborate that the waste from diamond drilling and old mining tailings resulting from the exploitation of the VSM La Palma mineral deposit, as well as the accesses and platforms used for its exploitation and the solid waste generated, are still a testimony of the exploration and exploitation activities of mineralized substances within sulfides such as black zinc or marmatite. For this activity, a concentrator plant of 500 t.m./day by flotation was used, in which concentrates of metallic elements copper, silver, lead, zinc. The extraction took place in the 1980s, height of km 60 via Cieneguilla Antioquía Huarochiri, La Palma Occurs location given by the UTM coordinates zone 18 N 8667434 E 329502 height 1295 meters above sea level.

Having demonstrated our hypotheses and met the objectives we set, we generated the following supports:

In the basin and headwaters of the Chillón River, the mining liabilities located at Kim 82 via Lima Canta, right bank of the river downstream, stand out with an approximate volume of 1,000,000 cubic meters and an area of approximately 30,000 m², the result of the exploitation of elements metals within sulfides in an exploitation period of 30 years, at a rate of 500 tml/day.

RESULTS OF THE ANALYSIS WERE AS FOLLOWS.

When observing the structure of these mine tailings, they are distributed layer upon layer, and between groups of them, management was carried out using soil and lime oxide, plus the coverage of its surface by soils caused by landslides, which even divided its surface into two parts, plus the passage of time (43 years), all this has favored the spontaneous decay of the contaminating elements with As, Fe, Pb, Mo, Sb, Hg and the reagents K or Na cyanides, copper sulfate, Aeroflot and pine oil. The reason is that grass and shrub vegetation (huarangos and molles) has grown on the surface; it also happens on the road that gave access to the industrial area and its entire perimeter area. Even at 100 meters alfalfa, corn and wheat are grown and if there is any probable The spill of these mining tailings will not contaminate the river waters because in the drinking water sample it is below the maximum permissible limits.

In the basin and headwaters of the Chillón River, the mining liabilities located at Kim 82 via Lima Canta, left bank of the river downstream, stand out with an approximate volume of 1,000,000 cubic meters and an area of approximately 40,000 m², the result of the exploitation of elements metals within sulfides in an exploitation period of 43 years at a rate of 500 ml/day. When observing the structure of these mining tailings, they are distributed layer upon layer, and between groups of them, management was carried out using soil and lime oxide, plus the coverage of its surface by soils caused by landslides, which even divided its surface into two. parts plus the passage of time (43 years) all this has favored the spontaneous decay of the elements with As, Fe, Pb, Mo, Sb and the reagents cyanides of K or Na, copper sulfate, Aeroflot and the waters of the river do not shows alteration of drinking water is below the maximum permissible limits.

In the lower and middle basin of the Rímac River, the In the lower and middle basin, the mining tailings located in the Kim 50 area via Lima La Oroya, left bank of the river downstream, stand out with an approximate volume of 900,000 cubic meters and a surface area of approximately 50,000 m², a result of the exploitation of metallic elements within sulfides in an exploitation period of 43 years at a rate of 1000 tml/day. The mining tailings are not observed, these are in the fan of the Leonila Graciela ravine and have been covered with a layer of soil 2 to three meters thick plus the clayey silt detrital materials that have come from the middle and upper basin of the torrentera, originated by weathering and the delta, have arrived in a pasty state distributed by the perimeter and transversal energy dispersers that the PERUBAR company built in its closure process. The contaminating elements since the mine was closed in 2000 to date are As, S, Fe, Pb and Hg and the reactants were K and Na cyanides, copper sulfate, Aeroflot, their formation favored by lime oxide, silt and clay have initiated a facet of spontaneous decay in the tailings, so much so that They observe acidic waters resulting from any leaching, so much so that land invaders have settled on its surface with their mat homes.

In the middle basin of the Rímac River, the mining liabilities located in the Kim 82 area via Lima La Oroya, left bank of the river downstream, stand out with an approximate volume of 2,500,000 cubic meters and an area of approximately 50,000 m², there are the mining tailings, result of the exploitation of metallic elements within sulfides over a period of 40 years at a rate of 500 tml / day. When observing the structure of these mine tailings, they are distributed at a level of 50 above the paved road and at 70 meters with a level of 2 meters below the cauville line, the mine tailings are distributed layer upon layer, they were caked by the action of gravity and its own weight plus the infiltration or percolation of rainwater. Currently they have formed a protective layer of caliche 0.20 cm thick that protects it, it was eroded and its particles were carried by the waters and the wind action, it is sectioned in half by a landslide caused by past children, in that place This installed a 100 tml/day plant to portray these mining tailings by flotation, these are one kilometer from the Rímac River. In the middle basin, the union of the Rímac River and the Millotingo River 100 meters before the intake of the 40 km canal that pours its waters to be turbinated into the Barba Blanca hydroelectric plant, the mining liabilities located in the Kim 95 area via Lima La Oroya, left bank of the downstream river, stand out, with an approximate volume of 1,000,000 cubic meters in an area of approximately 50,000-m², it is the result of the exploitation by accumulated metallic elements within a period of 40 years at a rate of 1000 tml/day. Observing the exterior structure of these mining

tailings, it is determined that they have been treated with a polyethylene geomembranes, they are distributed in stepped terraces, at their top or upper area a layer of soil has been installed that when liquefied by meteoric waters drains onto the geomembranes. and favors caking and decay due to the passage of time and the use of lime oxide, metallic contaminants such as As, S, Pb, Hg, Sb and cyanide reagents such as Aeroflot and pine oils. At the top there is another dynamic storage with more mining tailings that are constantly treated with the construction of energy dispersers and lime oxide, its surface formed by soils caused by landslides, which even on its surface is sectioned into two parts plus the The passage of time (43 years) has favored the spontaneous decay of contaminating elements with As, Fe, Pb, Mo, Sb and the reagents K or Na cyanides, copper sulfate, Aeroflot and pine oil. Reason that the river waters in the analyzed sample of drinking water are below the maximum permissible limits

CONCLUSIONS

In the Cieneguilla River basin, the mining tailings at the head of the torrent slightly stand out. The mining liabilities occur at the height of the Kim 60 area of the Lima Antioquia road, left bank of the river downstream, in volumes and tenuous areas, it is the result of a fleeting exploitation in the 90s, exploited metallic elements within sulfides such as Zn, Cu and Pb. in an exploitation period of 10 years. [1].

A foreign company has carried out an exploration campaign using diamond drilling holes that has found sulphide bodies. In the town of Ocurure they have built their environment to store the cores, the geometry is massive ovoid VSM, the host rocks are volcanic from the formation Cali puy.

The undersigned launches his theory based on the following arguments In the universe everything is relative (They exist), every metallic element has a half-life and goes into decay (<Fermi and Rutenford), Radiometric dating explains that the oldest rocks on earth are 4747 ma (Arthur Holmes) which are similar to the rocks of the

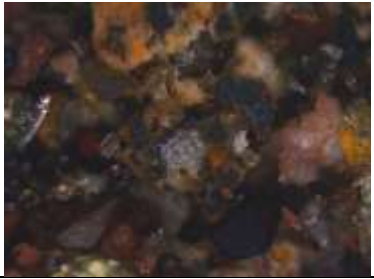
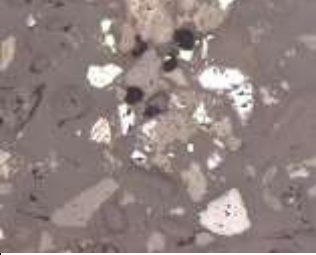



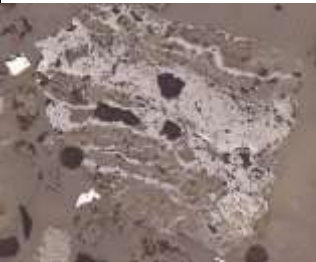
Moon, Mars and Venus, the Sun are thought to be 13000ma. (Hawking) states that before the Bing Bam theory there was nothing, the universe is infinite due to the principle of uniformity there was, is happening and there will be more Bing Bam not necessarily of equal intensity.


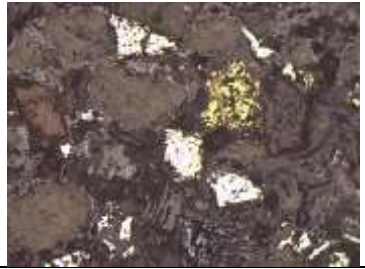


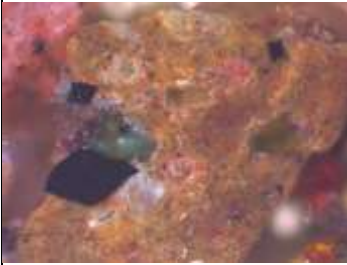

RECOMMENDATIONS







It was sent to the local authorities of Matucana, Santa Rosa de Quives, Cocachacra, Canta, San Mateo, Antioquia and Ocurure, as well as regional authorities such as: Matucana, Huarochiri, Lima and state institutions MEM, MINAM, INDECI and DENSA CIVIL. virtually a copy for your information at the same time carry out the corrective measures proposed in the environmental impact matrix [2-3].

The MEM and MINAM ministries must coordinate with the municipal personnel dedicated to caring for the environment in order to inspect and monitor, twice a year, the mining tailings located within their political jurisdiction of the middle basins of the Chillón, Rímac and Cieneguilla. Arranging the removal of the flotation concentration plant located in half of the EL BARON mining tailings as it will contaminate the environment in the soil, water and air. [4-5].

We assume that when mine tailings are well managed, the passage of time and weathering cause the contaminating elements to enter a decay process and the soils become suitable for vegetation and we have verified that the drinking water used by the human population from the megapolis of Lima, is of excellent quality and is framed by discussion of the WHO quality standards. However, it must be kept in mind that during the rainy summer season, December to April, the degree of turbidity, flow and the presence of contaminating metallic elements such as arsenic, mercury, sulfur, iron and others generated by leaching of these that are present in the tailings must be considered. miners. [5-7].

No	Left	Right	Photo Nicoles //	Photo Nicoles x
1 Huanantanga grain measurement magnification 200x 170u, 70u and 40u.	Faint chalcopyrite, iron and quartz are observed	observe, faintchalcopyrite, iron and quartz		
2 Peru Bar 100x magnification, 280u, 300u and 120 u, light yellow pyrite, light gray galena and iron	In the photoyou can see iron, chalcopyrite and silica.	We observed faint chalcopyrite, iron and quartz		
3 Peru Bar increase 100 400u and 80u	Faint chalcopyrite, iron and quartz are observed	Faint chalcopyrite, iron and quartz are observed		
4 Varón	We observed faint chalcopyrite, iron and	we observe, faint chalcopyrite, iron and		

		quartz		
5 Varón	we observe, faint chalcopyrite, iron and quartz	we observe, faint chalcopyrite, iron and quartz		
6 Tambo-raque	we observe, faint chalcopyrite, iron and quartz	we observe, faint chalcopyrite, iron and quartz		
No.	Left	Right	R.M . Place	R:M. Place
Photo1 y 2	In the photo is a lady of external support, access trail to the Huamantang	In the photo the person in charge of the G.I. TAKING UJNA WATER SAMPLE IN THE RÍMAC		

	<p>a mining tailings</p>	<p>RIVER</p>		
<p>Photo3 y 4</p>	<p>In the photoDr. Escalante shows the mining tailings fromthe Barón mine</p>	<p>In the photo Dr. Escalanteshows the mining tailings from the Barón mine protected with geomembrane</p>		
<p>Fotos 5 y 6</p>	<p>In the photo we see the entrance tothe La Palma mining project</p>	<p>in the photo we see the entrance to the Ocurre human settlement, on the upperleft the diamond drillhouse</p>		

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ANEXOS



Pasivos mineros Huamantanga



Pasivos mina Leonila Graciela



Pasivos mineros “El Varón”



Pasivos mineros “Mina Tamboraque”



PROYECTO MINERO PALMA.



REPORTE DE LABORATORIO N° L000023174

1

Pág.

Cliente:	UNIVER. NACIONAL MAYOR DE SAN MARCOS	Orden de Trabajo:	07/11/2023
Dirección:	20148092282	Fecha de Ingreso:	09/11/2023
RUC / DNI /Otros:		Fecha de Resultado:	ICP MULTIELEMENTOS
Atención:	Mostrador	Tipo de Ensayo:	6
Referencias:		Cantidad de Muestras:	

Código CHP	Descripción de la Muestra	Ag ppm	Al %	As ppm	Ba ppm	Be ppm	Bi ppm	Ca %	Cd ppm	Co ppm	Cr ppm
130757	MUESTRA 2 MINA PERU BAR	7.0	4.00	103.0	259.0	<1	<5	3.22	26.0	12.0	35.0
130758	MUESTRA 3 MINA PERU BAR	5.0	4.52	103.0	264.0	<1	<5	2.98	24.0	12.0	52.0
130759	MUESTRA 4 EL BARON	35.0	1.17	2373.0	156.0	<1	42.0	>5.0	6.0	34.0	21.0
130760	MUESTRA 5 MINA EL BARON	76.0	1.35	>10000	40.0	<1	121.0	2.84	113.0	93.0	19.0
		Cu %	Fe %	K %	Mg %	Mn %	Mo ppm	Na %	Ni ppm	P ppm	Pb %
130757	MUESTRA 2 MINA PERU BAR	0.03	>5.0	0.94	0.68	0.05	22.0	0.94	15.0	607.0	0.17
130758	MUESTRA 3 MINA PERU BAR	0.03	>5.0	1.08	0.77	0.05	21.0	0.93	18.0	664.0	0.18
130759	MUESTRA 4 EL BARON	0.03	>5.0	0.13	0.3	0.18	19.0	0.03	5.0	202.0	0.05
130760	MUESTRA 5 MINA EL BARON	0.45	>5.0	0.34	0.18	0.12	16.0	0.02	2.0	195.0	0.08
		Sb ppm	Sc ppm	Sn ppm	Sr ppm	Ti %	V ppm	W ppm	Y ppm	Zn %	Zr ppm
130757	MUESTRA 2 MINA PERU BAR	18.0	10.0	<5	201.0	0.19	115.0	<1	1.0	0.34	5.0
130758	MUESTRA 3 MINA PERU BAR	18.0	11.0	<5	160.0	0.18	115.0	<1	<1	0.31	2.0
130759	MUESTRA 4 EL BARON	95.0	4.0	21.0	77.0	0.09	24.0	163.0	<1	0.12	6.0
130760	MUESTRA 5 MINA EL BARON	111.0	4.0	14.0	102.0	0.05	18.0	54.0	<1	2.01	1.0

Notas:

vogo
 C.H. PLENGE & CIA S.A.

 ALICIA HUAMÁN ZARRA
 ING. QUIMICO (CIP 31143)

Los remanentes de las muestras se guardarán por un período de 1 mes, vencido el plazo se procederá al desecho de las mismas.

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REPORTE DE LABORATORIO N° **L000023174**

Pág. 2

Cliente:	UNIVER. NACIONAL MAYOR DE SAN MARCOS	Orden de Trabajo:	
Dirección:		Fecha de Ingreso:	07/11/2023
RUC / DNI /Otros:	20148092282	Fecha de Resultado:	09/11/2023
Atención:		Tipo de Ensayo:	ICP MULTIELEMENTOS
Referencias:	Mostrador	Cantidad de Muestras:	6

Código CHP	Descripción de la Muestra	Ag ppm	Al %	Au ppm	Ba ppm	Be ppm	Bi ppm	Ca %	Cd ppm	Co ppm	Cr ppm
130761	MUESTRA 6 (TAMBOPAQUE)	3.0	>5.0	168.0	526.0	1.0	<5	3.57	3.0	17.0	48.0
130762	18L 0313308 UTM 8723468	39.0	3.23	180.0	284.0	<1	30.0	1.13	16.0	8.0	33.0
		Cu %	Fe %	K %	Mg %	Mn %	Mo ppm	Na %	Ni ppm	P ppm	Pb %
130761	MUESTRA 6 (TAMBOPAQUE)	0.01	4.36	2.16	0.99	0.11	16.0	1.89	12.0	883.0	0.01
130762	18L 0313308 UTM 8723468	0.23	>5.0	1.12	0.65	>5.0	19.0	0.08	3.0	506.0	0.14
		Sb ppm	Sc ppm	Sn ppm	Sr ppm	Ti %	V ppm	W ppm	Y ppm	Zn %	Zr ppm
130761	MUESTRA 6 (TAMBOPAQUE)	8.0	10.0	<5	326.0	0.14	108.0	7.0	3.0	0.11	10.0
130762	18L 0313308 UTM 8723468	584.0	9.0	<5	62.0	0.05	57.0	6.0	26.0	0.10	5.0

Notas:

vobo

C.H. PLENGE & CIA. S.A.

 ALICIA HUAMÁN BARRERA
 ING. QUIMICO CIP 32143

Los remanentes de las muestras se guardarán por un periodo de 1 mes, vencido el plazo se procederá al desecho de las mismas.

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