



## **Soil Evaluation of the School Grounds of Educational Institution N° 20069 Tupac Amaru, Quichas, Oyón District and Province, Lima Department, Peru**

**Sample Collection Date:** July 6, 2024 and July 8, 2025.

### **Report of Results and Recommendations**

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The Environmental Health Council (EHC) is a U.S.-based nonprofit organization dedicated to identifying, evaluating, and remediating the effects of environmental toxins on affected communities. We work through a combination of scientific assessment, advocacy, and collaboration with communities and authorities to promote environmental and public health.

Within the framework of the Environmental Health Council's objectives, the soil of the school grounds of Educational Institution N° 20069, "Tupac Amaru," located in Quichas, Oyón District and Province, Lima Department, Peru, was analyzed.

The town of Quichas is located in a mining-influenced zone of the Lima region, which historically represents a high-risk area for heavy metal contamination. The soils of the educational institution in this area require special attention due to the vulnerability of primary and secondary school children and adolescents to the toxic effects of these contaminants.

The purpose of the technical evaluation was to determine whether contamination from past mining operations—including mineral processing and refining activities dating from the 18th century to the present—had left behind heavy metal pollution (also known as "legacy contamination") and to establish, in particular, the levels of lead (Pb), mercury (Hg), and arsenic (As) potentially affecting primary and secondary students at Educational Institution N° 20069.

Additionally, the evaluation sought to quantify heavy metal concentrations and compare them with the Environmental Quality Standards (ECAs) established by the Peruvian government (*Supreme Decree N° 011-2017-MINAM*) for residential/park soils.

More specifically, the evaluation aimed to identify any critical areas within the school

that require attention, determine the potential health risk to the student community, and propose technical recommendations based on the findings.

In 2024 two soil samples (QUIC-R-8 and QUIC-R-9) were collected from specific areas adjacent to the school grounds. In 2025, The EHC returned to collect additional soil samples on the school property and nearby to better characterize the extent and magnitude of contamination. Samples QUI25-R-5 through QUI25-R-10 were collected on and near the school grounds.

The soil samples were analyzed using a portable field X-ray fluorescence (XRF) spectrometer, with results expressed in ppm (mg/kg), to evaluate heavy metals such as lead (Pb), mercury (Hg), and arsenic (As) in the school soil. The 2024 work field work was accomplished using a Niton xl3t GOLDD+ model XRF and the 2025 work was accomplished using the SciAps model X550 XRF.

The analysis prioritized heavy metals and metalloids of greatest toxicological relevance and typically associated with mining activities: arsenic (As), lead (Pb), and mercury (Hg).

The ECAs for residential/park soils are:

- **Arsenic (As):** 50 mg/kg (ppm)
- **Mercury (Hg):** 6.6 mg/kg (ppm)
- **Lead (Pb):** 140 mg/kg (ppm)

## Discussion of Results

Soil samples collected in 2024 near the entrance of the school had As, Hg, and Pb all above the ECAs. This indicated that additional assessment was needed on the school grounds. In 2025, in the company of the school's director, Dr. José Luis Chumbes Trujillo, soil samples were collected on the school grounds in various areas such as the garden, greenhouse, football field and other areas. Arsenic was detected above the ECA in four out of the six samples. Mercury was not detected above the ECA in any of the samples on the school grounds. Lead was detected in two of the six samples on the school grounds, although not significantly above the ECA for both samples.

- **Arsenic (As):** Results range from 35 to 227 ppm. Both samples near the entrance of the school collected in 2024 exceed the ECA (50 ppm) by about 4 times.
- **Mercury (Hg):** Results range from not detected to 22 ppm. Both samples collected near the school entrance in 2024 exceed the ECA (6.6 ppm). However, the samples collected in 2025 on the school grounds did not exceed the ECA.
- **Lead (Pb):** Results range from 29 to 393 ppm. Both samples collected in 2024 near the school grounds exceed the ECA (140 ppm). Similar to mercury, lead was detected at lower concentrations on the school grounds. Two of the 2025 samples had results above the ECA, one near the entrance of the school and

one near the concrete playground, however they are not significantly above the ECA.

The results indicate contamination near the school entrance for all three contaminants. However, arsenic is the only contaminant that has significant exceedances of screening values on the school grounds. Regardless, arsenic contamination on the school grounds is a concern.

### **Recommendations**

1. Delineate and restrict access to areas contaminated with arsenic, lead, and mercury, and conduct more extensive sampling to confirm the contaminated zones.
2. Remove contaminated soil and dispose following appropriate disposal requirements or cover the contaminated areas with clean materials, applying layers of clean soil and geotextile fabric, followed by grass, to prevent direct contact and dust generation.
3. Notify parents about the findings, preventive measures, and planned actions.
4. Inform the Regional Education Directorate, Regional Health Directorate, and local government authorities of the findings.

### **Attachments**

Table – Soil Results

Figure – Sample Locations

**Soil Sample Results**  
**Tupac Amarau School, Quichas, Oyon, Peru**

Sample Date	Sample ID	Sample Description	As (ppm)	Hg (ppm)	Pb (ppm)
<b>2024 Data</b>					
7/6/2024	QUIC-R-8	Colegio Tupac Amaru de Quichas	217	10	196
7/6/2024	QUIC-R-9	Colegio Tupac Amaru de Quichas	227	22	393
<b>2025 Data</b>					
7/8/2025	QUI25-R-5	Garden area near cement playground at Tupac Amaru.	130	2	146
7/8/2025	QUI25-R-6	Green area on far side of soccer field upon entering	95	1.1	96
7/8/2025	QUI25-R-7	Next to football field behind Tupac Amaru school...field is synthetic	66	ND	29
7/8/2025	QUI25-R-8	Greenhouse	37	ND	67
7/8/2025	QUI25-R-9	From pail of potting soil	35	ND	48
7/8/2025	QUI25-R-10	At entrance to school outside where previous samples taken	102	2.4	154
ECA			50	6.6	140
<p>Note: ppm - parts per million or milligrams per kilogram (mg/kg)            ECA - Environmental Quality Standard per MINAM, Supreme Decree No. 011-2017            ND - Not detected            Red shaded cells indicate that the sample result is above the respective ECA</p>					

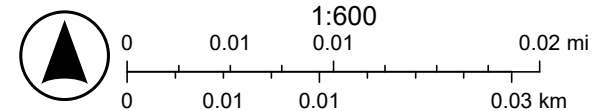
# Tupac Amaru School Sample Locations



11/7/2025

- Peru Colonial Site Assessment
- World Imagery

Low Resolution 15m Imagery  
Citations



Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community