

Anomalous Radioactivity at the Wanderer Mine, Halloran Springs area, San Bernardino Co., CA

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Introduction

In about 2012 I read somewhere on the internet (I don't remember where, but not on MinDat) that the Wanderer Mine was a silver mine that was also radioactive. In February 2021, I decided to explore it further. This is an account of my findings.

The Wanderer Mine (Wander mine, Wonder mine) is located at 35.4022,-115.9642 and consists of approximately 9 shafts and cuts. It is hosted in the 95 ma Teutonia granite (occasionally called monzonite in some reports).

Radiation survey was performed using an Exploranium GR-101A scintillometer. Normal background radiation is approximately 10 cps.

Findings

The area around the mines as a whole reads 30 cps, or 3x normal background. I surveyed the dumps of the mines looking for rocks which with increased radioactivity. Of all the searching, only one such rock was found, and its radiation level was 20 cps when measured in a area free of elevated background radiation. The makeup of the rock is pending.

The dirt roads consist of loose sand with occasional areas of exposed bedrock. When surveying the road in the area, the exposed bedrock showed no increased radioactivity. The sand areas, however, showed up to 120 cps, or 12x normal background. The elevated readings disappeared as soon as I left the road to either side. The location with the highest readings was the road adjacent to the southernmost two shafts.

In an attempt to isolate the source of the radiation, I dug into the sandy road in an area showing the greatest radiation. The hole was roughly circular, 18 inches diameter, and 6-8 inches deep. I alternated digging with taking readings both in the hole and of the dirt removed. As the hole was enlarged to about 24 inches diameter and 10-12 inches deep, the radiation quickly dropped to less than 70 cps. All the while, the dirt removed was checked. NONE of the dirt removed showed any elevated radiation. The edges of the hole showed high, but not as high, radiation, about 80 cps. I dug laterally still looking for the source. Still, the readings in the hole dropped and the removed dirt showed no elevated radioactivity.

I noticed the dirt in the hole had three layers:

Top: loose sand, about 1-3 inches thick, easy to dig by hand.

Middle: relatively hard, compacted sand which can be crumbled by hand with some effort, about 2 inches thick, requires tools to dig, but breaks apart easily.

Bottom: lightly compacted clayey sand as deep as I dug. Requires tools to dig.

At this point I gave up and filled the holes (since they are in the road).

Discussion

Since the host rock is granite, it may be assumed that zircon is the source of radioactivity because zircon commonly includes thorium in its structure. Since no rocks showed noticeably elevated radioactivity, the zircons are probably widely dispersed and relatively tiny.

How would the radioactivity concentrate in the road? Perhaps the large area of thorium bearing zircon is releasing radon gas as a part of natural radioactive decay. That radon gas is being trapped under the hard, compacted middle layer of the road sediments. The accumulation of the radon would account for the increase of radioactivity. When the second layer is broken, radon is released, and the radiation level drops. Since radon is a gas, it does not mix with the excavated sediments, so those sediments show no radioactivity. The inside of the hole, now open, releases all most or all of its radon and shows much reduced radiation levels. This is consistent with the fact that exposed bedrock, which was open to the elements, showed no elevated radiation since it was unable to concentrate radon. The same is also true with the waste rock around the mines.