



Health Physics Society  
Specialists in Radiation Safety

## Uranium at the Grand Canyon—HPS Expert Input

It recently came to light that three buckets containing uranium ore were located in a public area at the Grand Canyon—possibly exposing anyone who came near. Some information speculates that radiation doses were well above allowable public limits.

In the following information, we will address some of the facts.

### Am I at risk?

If you did not travel to the Grand Canyon and visit the museum collections building where these buckets of uranium ore were said to be located, no.

### What if I did visit the museum?

Uranium ore is a low-risk material that, unless ingested, would not be emitting enough radiation from these three buckets to cause harmful effects (see more information about this below).

### What about my children? I think they were close to those buckets.

Again, based on the information provided, the exposure would not have been high enough to harm children either.

### What were the dose rates?

In one newspaper, the dose rate was said to be about 13.9 millirem<sup>1</sup> (millirem or mrem is a unit of effective radiation dose) per hour in an area near the buckets. Our experts at the Health Physics Society (HPS), who have decades of experience working at uranium sites, performed calculations based on what they saw and know about this situation. Our belief is that the reported dose rate was off by a factor of 1,000—so the real dose rate is 1,000 times less than what was reported in the press. We believe the actual dose rate in the vicinity of the buckets may have been 13.9 microrem ( $\mu$ rem) per hour. This is a common error for nonscientists to make, but a very important one to correct.

### So, microrem or millirem, what is the difference and what are the effects?

In either case, whether 13.9 mrem per hour or 13.9  $\mu$ rem per hour, there won't be any health effects unless a person stood next to the buckets for over 700 hours if the dose rate was 13.9 mrem or 700,000 hours (over 29,000 days) if the dose rate

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<sup>1</sup> We are providing this information using traditional radiation units because that is what the media is using. In most cases, it is the practice of the HPS to use only SI (the International System of Units) in accordance with international practice. When you see SI units used, you can convert between traditional and SI units with our conversion table at <http://hps.org/documents/ATESIConversionChart.pdf>. You can also view a diagram to help put radiation information in perspective at <http://hps.org/documents/radiationinperspectiverev4.pdf>. Explanations of radiation terms can be found at <http://hps.org/hpspublications/articles/RadiationTerms.html>.

was 13.9  $\mu$ rem. In any event, the probability of a health effect is extremely low (see the HPS position statement "Radiation Risk in Perspective" at [http://hps.org/documents/risk\\_ps010-3.pdf](http://hps.org/documents/risk_ps010-3.pdf)).

Most people moving through the museum collections building, even if they stopped for an hour or two near the pails, could not have received a harmful dose of radiation.

### **What would be the health effect if someone stood nearby for over 700 hours at 13.9 mrem per hour?**

At that level, the effect would be a possible increased risk of cancer over the person's lifetime. The normal rate of cancer in the United States is about 42%—meaning that for every two of us, one of us is likely to get cancer. Standing next to these buckets for a long period of time may increase that a few tenths of a percent (to maybe 42.5%).

It takes even larger doses of radiation to cause harmful effects like those we associate with atomic bombs. That just won't happen here.

### **More information**

For more information on general radiation topics, visit [www.radiationanswers.org](http://www.radiationanswers.org) or [www.hps.org](http://www.hps.org).

For more information on uranium, take a look at our Uranium Primer at <http://hps.org/publicinformation/ate/uranium.pdf> and our recently updated Uranium Fact Sheet at [http://hps.org/documents/uranium\\_fact\\_sheet.pdf](http://hps.org/documents/uranium_fact_sheet.pdf)