



**pennsylvania**  
DEPARTMENT OF ENVIRONMENTAL  
PROTECTION

**Chevron Well Fire – Greene County**

PA DEP – Radiological Sampling

Feb. 13- Feb. 14, 2014

## **Executive Summary**

On Feb. 13 and 14, 2014, the Pennsylvania Department of Environmental Protection's (DEP) Bureau of Radiation Protection (BRP) responded to the Chevron well fire in Dunkard Township, Greene County to ensure that releases from the fire did not contain elevated radiation levels or levels above the natural ambient "background" levels.

The data collected by BRP at the sampling locations found no radiation levels that were above normal background levels. These results include both direct field measurements and air particulate matter samples collected on two separate days.

## **Field Report**

Naturally occurring radioactive material is present at some level in all areas. This results in local radiation levels, which are identified as background. To determine if there is an increase in radioactivity, it is necessary to determine the appropriate background level. The difference between a measured level and the background level would represent the increase due to some activity.

The U.S. Environmental Protection Agency (EPA) categorizes natural background radiation into terrestrial, internal, cosmic and radon contributors. This natural background radiation accounts for approximately 50 percent of a person's annual dose, while the remaining dose comes from sources such as medical x-rays, CT scans, nuclear medicine studies and occupational exposure. According to the EPA, individuals in the United States receive an average dose of approximately 620 millirem per year.

The results listed below use specific units to describe how much radiation is present - a microrem per cubic meter (uR/hr) and picocuries per cubic meter (pCi/m<sup>3</sup>).

**Microrem Per Hour (uR/hr):** The typical natural ambient radiation in western Pennsylvania ranges from 2 to 10 uR/hr. To put this in perspective, a resident of western Pennsylvania who spends several hours outdoors each day at approximate background levels of 10 uR/hr, would be exposed to about 8-10 millirem per year, which is a small fraction of the 620 millirem received on average by individuals in the United States.

**Picocuries Per Cubic Meter (pCi/m<sup>3</sup>):** The typical natural ambient radiation in western Pennsylvania ranges from 1.0 to 1.5 pCi/m<sup>3</sup>. The EPA sites an indoor radon action level of 4000 pCi/m<sup>3</sup>, or more commonly published as 4 pCi/L, as an acceptable radon level in a residence.

Based on predominant wind direction and the proximity of the fire site to a residence, BRP determined that three sample locations would provide enough data (Fig. 1) to ensure the public were not being exposed to unsafe radiation levels. The data was broken down into direct field measurements and particulate matter samples. These samples were sent to the DEP Bureau of Laboratories for analysis.

Lower Limit of Detection (LLD) was established for each instrument prior to sampling. If the samples collected showed radiation levels below the LLD, the levels measured were below the capability of the instrument to accurately differentiate between the radiation level in the sample and no radiation being present. The results from this effort show all samples to be below the LLD.

(Fig. 1)



**Sample Location 1**

<b>2/13/14 - 2:55 PM</b>
Direct Measurement 5 to 8 uR/hr

<b>Gross Alpha</b>	pCi/m <sup>3</sup> <b>&lt;LLD</b>
<b>Gross Beta</b>	<b>&lt;LLD</b>

<b>2/14/14 - 11:40 AM</b>
Direct Measurement 5 to 8 uR/hr

<b>Gross Alpha</b>	pCi/m <sup>3</sup> <b>&lt;LLD</b>
<b>Gross Beta</b>	<b>&lt;LLD</b>

**Sample Location 2**

<b>2/13/14 - 3:26 PM</b>
Direct Measurement 5 to 8 uR/hr

<b>Gross Alpha</b>	pCi/m <sup>3</sup> <b>&lt;LLD</b>
<b>Gross Beta</b>	<b>&lt;LLD</b>

<b>2/14/14 - 11:50 AM</b>
Direct Measurement 5 to 8 uR/hr

<b>Gross Alpha</b>	pCi/m <sup>3</sup> <b>&lt;LLD</b>
<b>Gross Beta</b>	<b>&lt;LLD</b>

**Sample Location 3**

<b>2/13/14 - 3:40 PM</b>
Direct Measurement 5 to 8 uR/hr

<b>Gross Alpha</b>	pCi/m <sup>3</sup> <b>&lt;LLD</b>
<b>Gross Beta</b>	<b>&lt;LLD</b>

<b>2/14/14 - 11:55 AM</b>
Direct Measurement 5 to 8 uR/hr

<b>Gross Alpha</b>	pCi/m <sup>3</sup> <b>&lt;LLD</b>
<b>Gross Beta</b>	<b>&lt;LLD</b>