

## Geologic Hazards

### Earthquake

#### General

Earthquakes are very rare in Pennsylvania and have caused very little damage and no reported injuries or casualties. Since the Commonwealth does not reside on an active fault, earthquakes that do occur are typically deep within the earth’s crust. In most cases, these are non-measurable events. However, earthquake standards are still a valuable consideration when determining building codes. The Richter Scale describes the magnitude of an earthquake and can be seen below.

<b>The Richter Scale</b>			
<b>Descriptor</b>	<b>Richter Magnitude</b>	<b>Earthquake Effects</b>	<b>Worldwide Annual Average</b>
Micro	Less than 2.0	Micro earthquakes, not felt.	About 8,000/day
Very Minor	2.0-2.9	Generally not felt, but recorded.	About 1,000/day
Minor	3.0-3.9	Often felt, but rarely cause damage	49,000 (estimated)
Light	4.0-4.9	Noticeable shaking of indoor items, rattling noises. Significant damage unlikely.	6,200 (estimated)
Moderate	5.0-5.9	Can cause major damage to poorly constructed buildings over small regions. At most slight damage to well-designed buildings.	800
Strong	6.0-6.9	Can be destructive in areas up to about 100 miles across in populated areas.	120
Major	7.0-7.9	Can cause serious damage over larger areas.	18
Great	8.0 or greater	Can cause serious damage in areas several hundred miles across.	1

**Source: U.S. Geological Survey (USGS)**

## **History**

No earthquakes have been recorded in Huntingdon County, according to the Pennsylvania Department of Natural Resources' *Earthquake Catalog and Epicenter Map of Pennsylvania*. Parts of southeastern Pennsylvania, such as Lebanon and Berks Counties, have experienced minor earthquakes with minimal damage.

## **Vulnerability**

Huntingdon County has a low vulnerability to earthquakes. No earthquakes have been documented in County history.

## **Probability**

The probability of an earthquake affecting Huntingdon County is low. Huntingdon County does not lie on a major fault line. Yet, it is likely the County has experienced minor, unrecorded quakes with minimal to no damage.

## **Maximum Threat**

Because Huntingdon County does not rest on a major fault, no one area is at a great threat to experience an earthquake.

## **Secondary Effects**

If an earthquake of significant magnitude were to strike the County, some secondary effects could be utilities failure, dam failures, fire, landslides, subsidence, and transportation accidents (especially pipeline breaks). Even minor quakes can cause power outages, as well as hazardous material spills, dam failures, and landslides.

## **Landslides**

### **General**

Landslides are a natural movement of earth down a slope. Deaths and injuries from landslides have not been a problem in Huntingdon County in the past, however this does not mean they will not occur. The worst damage by a landslide is usually done to utilities (pipelines, power lines/poles), roadways, and buildings.

### **History**

Landslide history is not documented as well as other hazards, primarily because landslides are not always seen. Landslides have occurred all over Pennsylvania and have caused various degrees of damage. While no landslides have been documented in Huntingdon County, the Pennsylvania Department of Transportation estimates it spends \$10 million annually on repairs of roadways damaged by landslides throughout the Commonwealth.

### **Vulnerability**

The total number of landslides and their damage in Pennsylvania is unknown. Reporting varies widely from county to county. Landslides are mostly seen in Allegheny, Armstrong, Beaver, Tioga, and Washington Counties. Most landslides are the result of heavy precipitation. Contributing to this is the removal of vegetation, changing the slope of a hillside, and earthquakes. Huntingdon County's vulnerability to a landslide is high. The most vulnerable and dangerous places for landslides are along transportation routes and pipeline pathways. Roadways are often blocked with soil and rocks from recent landslides. The most likely time an injury or death from a landslide will be reported is when it happens on a roadway. Pipelines are dangerous places for landslides, because of the materials in the pipeline. Pipeline breaks from landslides can contaminate soils, waterways, and other natural habitats because they often carry hazardous materials through rural areas. Some of the secondary effects of a landslide include utilities failures, dam failures, hazardous materials spills, and transportation accidents/roadway damage. Much like earthquakes, landslides may go unnoticed.

### **Probability**

There is a relatively high probability that a landslide will affect Huntingdon County. History shows a frequency of occurrence every 30 years or less. While susceptibility and probability may be high in Huntingdon County, most events are minor and cause little to no damage.

### **Maximum Threat**

The threat of landslides is greatest along high-volume traffic areas. Therefore, municipalities along Interstate 76 (I-76), as well as the principal arterials of U.S. Routes 22 and 522, and major collectors such as State Routes 550, 350, 305, 553, 641, 35, and 994 face the greatest risk associated with a severe landslide.

### **Secondary Effects**

Similar to earthquakes, secondary effects of landslides can cause traffic disruptions and accidents. These events can lead to power outages or hazardous material spills.

## **Radon**

### **General**

Radon is a naturally occurring, colorless, odorless, inert, radioactive gas. It forms as a product of the natural decay of uranium. Radon and its radioactive products are dangerous to health. Alpha particles are a probable cause of lung cancer. Studies instituted in Pennsylvania since 1984 show that indoor radon levels are controlled by the radon-emanation properties of the soil and rock on which homes are built.

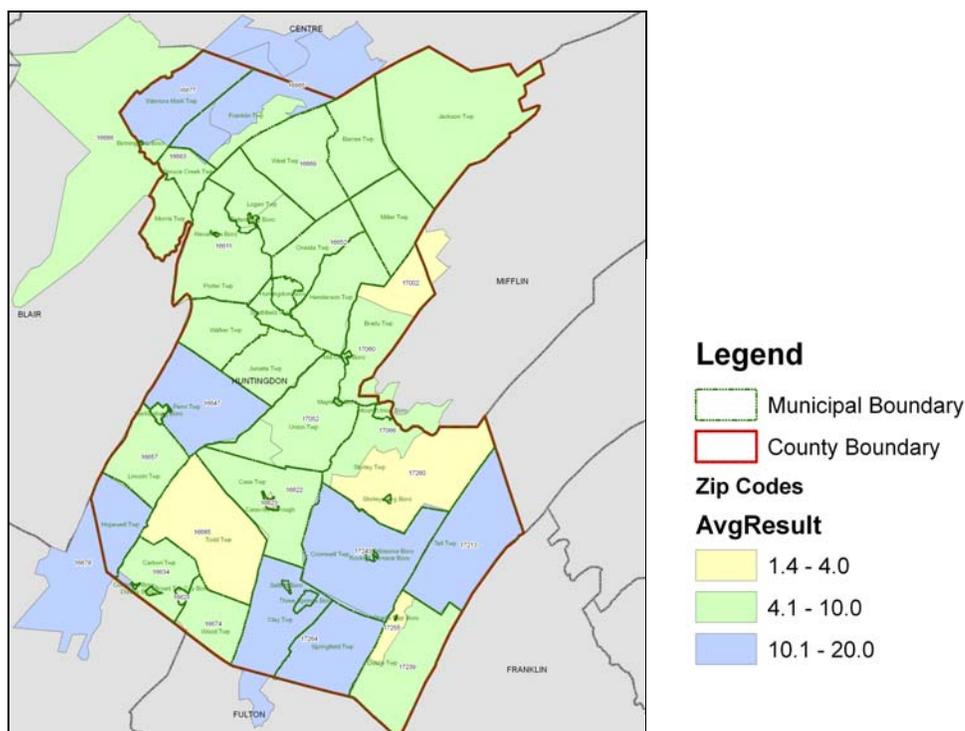
**History**

Pennsylvania has a serious radon problem. While individual instances of radon detection are not well documented, Pennsylvania has seen numerous cases of radon in homes. It is estimated that 40 percent of all homes in Pennsylvania have radon levels above the EPA’s action guideline of 4 pCi/l (picocuries per liter of air). One pCi/l is equal to the decay of two radioactive atoms per minute.

**Vulnerability**

According to the U.S. Environmental Protection Agency (EPA), Huntingdon County is among the Pennsylvania counties which have the highest potential for dangerous radon emission. It is important to remember that no individual location can be assumed to be safe unless proven so by testing. The map below illustrates the average radon levels for the zip codes of Huntingdon County, measured by the Pennsylvania Department of Environmental Protection. The EPA recommends that a homeowner take action to reduce his or her home indoor radon levels if the home’s radon test is 4 pCi/L (pico Cures per liter) or higher.

**Huntingdon County Radon Zones**



*Source: PA Department of Environmental Protection*

**Probability**

Radon gas is emitted from underground decaying uranium. Huntingdon County is located in an area with the highest potential for radon emission in Pennsylvania. Therefore, there is great potential for radon emission in Huntingdon County. No area should be assumed safe until tests have proven so.

**Maximum Threat**

All Huntingdon County municipalities face a high potential for radon gas emission. Only areas that have been tested and found safe can be assumed to not be susceptible to the effects of radon gas emission.

**Secondary Effects**

The secondary effects of radon are more difficult to identify. Often, radon goes undetected and unnoticed. Radon is a probable cause of lung cancer.

## **Subsidence and Sinkholes**

### **General**

Subsidence is caused by the removal of ground water or other resources from the ground. Subsidence is a manmade hazard, whereas sinkholes are natural hazards caused by underground erosion. The United States Geological Survey explains that sinkholes are a characteristic of karst topography. Karst topography results from the dissolution and collapse of carbonate rocks, such as limestone and dolomite, and is characterized by closed depressions or sinkholes, caves, and underground drainage.

### **History**

Sinkholes are a problem throughout Pennsylvania. As stated by the United States Geological Survey, sinkholes have been most dangerous and frequent in Florida, Texas, Alabama, Missouri, Kentucky, Tennessee, and Pennsylvania. However, Huntingdon County is an exception. According to the PA Department of Conservation and Natural Resources, Bureau of Topographic and Geologic Survey, no sinkholes exist in Huntingdon County. Yet, because of the limestone rock formations located in Huntingdon County, there is still the possibility that subsidence or a sinkhole could occur.

There were two reported geologic emergency incident in Huntingdon County between 2001 and 2006, according to the Pennsylvania Emergency Incident Reporting System (PEIRS). A rockslide was reported to PEIRS on April 28, 2004 and, on January 21, 2005, a sinkhole was reported to PEIRS.

### **Vulnerability**

Subsidence and sinkholes strongly correlate with the distribution of carbonic rock. However, not all areas underlain by carbonate bedrock, such as limestone, are at risk. According to the PA Department of Conservation and Natural Resources, Bureau of Topographic and Geologic Survey, no sinkholes exist in Huntingdon County. Yet there is a significant amount of limestone rock within Huntingdon County. The areas of Brady, Franklin, Morris, Spruce Creek, and Warriors Mark Townships, which have karst topography, can be prone to sinkholes.

### **Probability**

The potential for subsidence or sinkholes to occur in Huntingdon County is relatively low. Often, these events occur every 30 years or less with a low impact. There is even less potential for a severe event.

**Maximum Threat**

The entire County is susceptible to sinkholes, due to its geological makeup. Maximum threat would occur in areas that are underlain with carbonic rock, such as limestone. Carbonic rock is found throughout most of Huntingdon County.

**Secondary Effects**

Such hazards often occur without warning and can cause disruption of traffic or accidents. However, subsidence and sinkholes most often occur in remote rural areas with little severe secondary effects.