expenses (Smith, 2004). With Pennsylvania's economy so integral to the national economy, economic losses from a pandemic or infectious disease threat could be significant.

4.3.11.9. State Facility Loss Estimation

The physical plant and facilities of the Commonwealth are not likely to be damaged by a pandemic disease outbreak. However, high rates of absenteeism associated with a pandemic or an infectious disease will likely lead to significant economic costs in lost productivity and increased medical costs in nearly all state agencies.

4.3.12. Radon Exposure

4.3.12.1. Location and Extent

Radioactivity caused by airborne radon has been recognized for many years as an important component in the natural background radioactivity exposure of humans, but it was not until the 1980s that the wide geographic distribution of elevated values in houses and the possibility of extremely high radon values in houses were recognized. In 1984, routine monitoring of employees leaving the Limerick nuclear power plant near Reading, PA, showed that readings on Mr. Stanley Watras frequently exceeded expected radiation levels, yet only natural, non-fission-product radioactivity was detected on him. Radon levels in his home were detected around 2,500 pCi/L (pico Curies per Liter), much higher than the 4 pCi/L guideline of the Environmental Protection Agency (EPA) or even the 67 pCi/L limit for uranium miners. As a result of this event, the Reading Prong section of Pennsylvania where Watras lived became the focus of the first large-scale radon scare in the world.

Radon is a noble gas that originates by the natural radioactive decay of uranium and thorium. Like other noble gases (e.g., helium, neon, and argon), radon forms essentially no chemical compounds and tends to exist as a gas or as a dissolved atomic constituent in groundwater. Two isotopes of radon are significant in nature, 222Rn and 220Rn, formed in the radioactive decay series of 238U and 232Th, respectively. The isotope thoron (i.e. 220Rn) has a half-life (time for decay of half of a given group of atoms) of 55 seconds, barely long enough for it to migrate from its source to the air inside a house and pose a health risk. However, radon (i.e. 222Rn), which has a half-life of 3.8 days, is a widespread hazard.

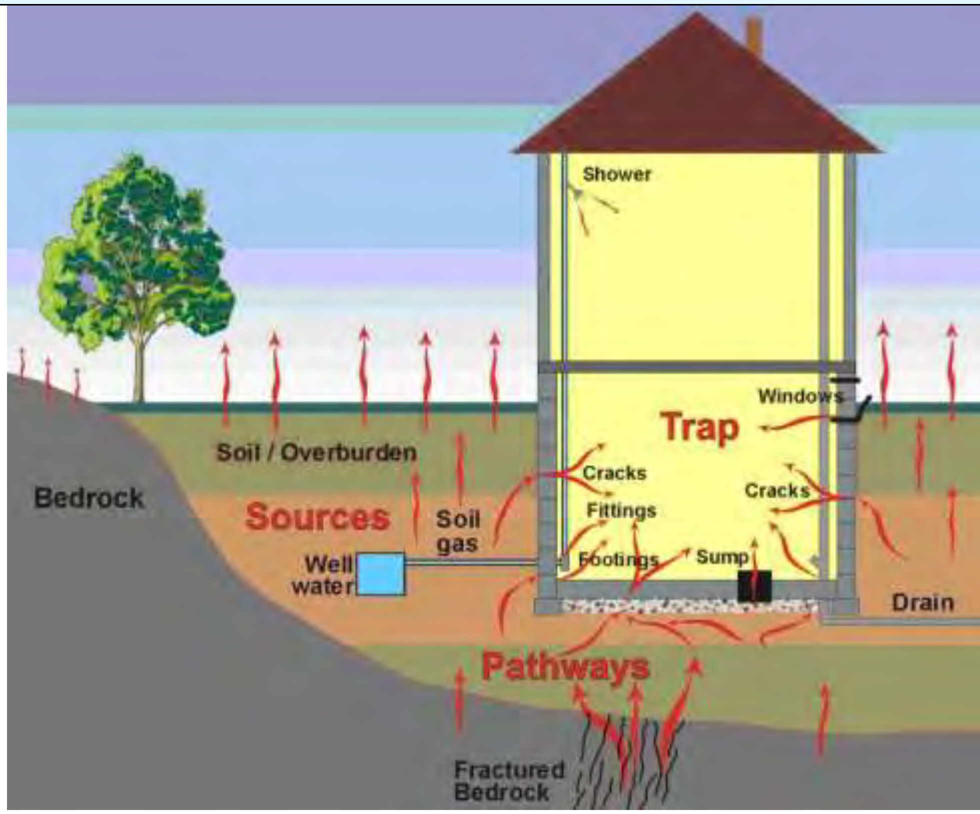
The distribution of radon is correlated with the distribution of radium (i.e. 226Ra), its immediate radioactive parent, and with uranium, its original ancestor. Due to the short half-life of radon, the distance that radon atoms can travel from their parent before decay is generally limited to distances of feet or tens of feet.

Three sources of radon in houses are now recognized:

- Radon in soil air that flows into the house;
- Radon dissolved in water from private wells and exsolved during water usage; this is rarely a problem in Pennsylvania; and
- Radon emanating from uranium-rich building materials (e.g. concrete blocks or gypsum wallboard); this is not known to be a problem in Pennsylvania.

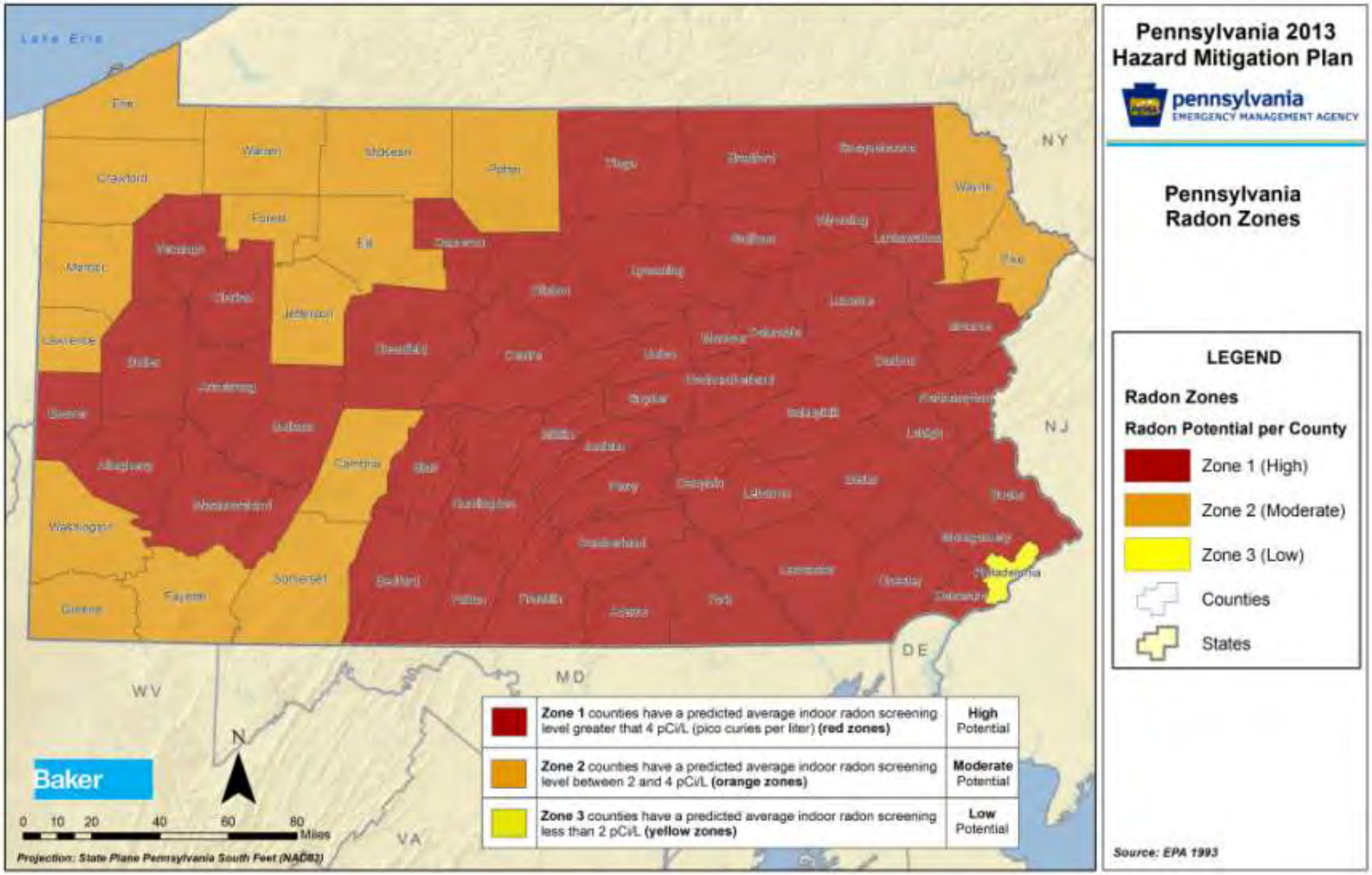
Figure 4.3.12-1 illustrates radon entry points into a home.

Figure 4.3.12-1 Sketch of radon entry points into a house (Arizona Geological Survey, 2006).



Each county in Pennsylvania is classified as having a *low*, *moderate*, or *high* radon hazard potential (see Figure 4.3.12-2). While this analysis has not been repeated since 1993, it represents the best available comprehensive radon hazard potential information available. A majority of counties across the Commonwealth, particularly counties in eastern Pennsylvania, have a *high* hazard potential. The average indoor radon screening level for these counties is greater than 4 pCi/L. The City of Philadelphia is the only jurisdiction designated with a *low* radon hazard potential.

Figure 4.3.12-2 Radon hazard zones in Pennsylvania (USEPA, 1993).



High radon levels were initially thought to be exacerbated in houses that are tightly sealed, but it is now recognized that rates of air flow into and out of houses, plus the location of air inflow and the radon content of air in the surrounding soil, are key factors in radon concentrations. Outflows of air from a house, caused by a furnace, fan, thermal “chimney” effect, or wind effects, require that air be drawn into the house to compensate. If the upper part of the house is tight enough to impede influx of outdoor air (radon concentration generally <0.1 pCi/L), then an appreciable fraction of the air may be drawn in from the soil or fractured bedrock through the foundation and slab beneath the house, or through cracks and openings for pipes, sumps, and similar features. Soil gas typically contains from a few hundred to a few thousand pCi/L of radon; therefore, even a small rate of soil gas inflow can lead to elevated radon concentrations in a house.

The radon concentration of soil gas depends upon a number of soil properties, the importance of which is still being evaluated. In general, ten to fifty percent of newly formed radon atoms escape the host mineral of their parent radium and gain access to the air-filled pore space. The radon content of soil gas clearly tends to be higher in soils containing higher levels of radium and uranium, especially if the radium occupies a site on or near the surface of a grain from which the radon can easily escape. The amount of pore space in the soil and its permeability for air flow, including cracks and channels, are important factors determining radon concentration in soil gas and its rate of flow into a house. Soil depth and moisture content, mineral host and form for radium, and other soil properties may also be important. For houses built on bedrock, fractured zones may supply air having radon concentrations similar to those in deep soil.

Areas where houses have high levels of radon can be divided into three groups in terms of uranium content in rock and soil:

- Areas of very elevated uranium content (>50 ppm) around uranium deposits and prospects. Although very high levels of radon can occur in such areas, the hazard normally is restricted to within a few hundred feet of the deposit. In Pennsylvania, such localities occupy an insignificant area.
- Areas of common rocks having higher than average uranium content (5 to 50 ppm). In Pennsylvania, such rock types include granitic and felsic alkali igneous rocks and black shales. In the Reading Prong, high uranium values in rock or soil and high radon levels in houses are associated with Precambrian granitic gneisses commonly containing 10 to 20 ppm uranium, but locally containing more than 500 ppm uranium. In Pennsylvania, elevated uranium occurs in black shales of the Devonian Marcellus Formation and possibly the Ordovician Martinsburg Formation. High radon values are locally present in areas underlain by these formations.

Areas of soil or bedrock that have normal uranium content but properties that promote high radon levels in houses. This group is incompletely understood at present. Relatively high soil permeability can lead to high radon, the clearest example being houses built on glacial eskers. Limestone-dolomite soils also appear to be predisposed for high radon levels in houses, perhaps because of the deep clay-rich residuum in which radium is concentrated by weathering on iron oxide or clay surfaces, coupled with moderate porosity and permeability. The importance of carbonate soils is indicated by the fact that radon contents in 93 percent of a sample of houses built on limestone-dolomite soils near State College, Centre County, exceeded 4 pCi/L, and 21 percent exceeded 20 pCi/L, even though the uranium values in the underlying bedrock are all in the normal range of 0.5 to 5 ppm uranium.

4.3.12.2. Range of Magnitude

Exposure to radon is the second leading cause of lung cancer after smoking. It is the number one cause of lung cancer among non-smokers. Radon is responsible for about 21,000 lung cancer deaths every year; approximately 2,900 of which occur among people who have never smoked. Lung cancer is the only known effect on human health from exposure to radon in air and thus far, there is no evidence that children are at greater risk of lung cancer than are adults (USEPA, 2010). The main hazard is actually from the radon daughter products (218Po, 214Pb, 214Bi), which may become attached to lung tissue and induce lung cancer by their radioactive decay.

According to the EPA, the average radon concentration in the indoor air of America's homes is about 1.3 pCi/L. The EPA recommends homes be fixed if the radon level is 4 pCi/L or more. However, because there is no known safe level of exposure to radon, the EPA also recommends that Americans consider fixing their home for radon levels between 2 pCi/L and 4 pCi/L. Table 4.3.12-1 shows the relationship between various radon levels, probability of lung cancer, comparable risks from other hazards, and action thresholds. As is shown in Table 4.3.12-1, a smoker exposed to radon has a much higher risk of lung cancer.

Table 4.3.12-1 Radon risk for smokers and non-smokers (USEPA, 2010).

RADON LEVEL (pCi/L)	IF 1,000 PEOPLE WERE EXPOSED TO THIS LEVEL OVER A LIFETIME… *	RISK OF CANCER FROM RADON EXPOSURE COMPARES TO… **	ACTION THRESHOLD
SMOKERS			
20	About 260 people could get lung cancer	250 times the risk of drowning	Fix structure
10	About 150 people could get lung cancer	200 times the risk of dying in a home fire	Fix structure
8	About 120 people could get lung cancer	30 times the risk of dying in a fall	Fix structure
4	About 62 people could get lung cancer	5 times the risk of dying in a car crash	Fix structure
2	About 32 people could get lung cancer	6 times the risk of dying from poison	Consider fixing between 2 and 4 pCi/L
1.3	About 20 people could get lung cancer	(Average indoor radon level)	Reducing radon levels below 2 pCi/L is difficult
0.4	About 3 people could get lung cancer	(Average outdoor radon level)	
NON-SMOKERS			
20	About 36 people could get lung cancer	35 times the risk of drowning	Fix structure
10	About 18 people could get lung cancer	20 times the risk of dying in a home fire	Fix structure
8	About 15 people could get lung cancer	4 times the risk of dying in a fall	Fix structure
4	About 7 people could get lung cancer	The risk of dying in a car crash	Fix structure
2	About 4 people could get lung cancer	The risk of dying from poison	Consider fixing between 2 and 4 pCi/L
1.3	About 2 people could get lung cancer	(Average indoor radon level)	Reducing radon levels below 2 pCi/L is difficult
0.4		(Average outdoor radon level)	

NOTE: Risk may be lower for former smokers.
* Lifetime risk of lung cancer deaths from EPA Assessment of Risks from Radon in Homes (EPA 402-R-03-003).
** Comparison data calculated using the Centers for Disease Control and Prevention's 1999-2001 National Center for Injury Prevention and Control Reports.

The worst-case scenario for radon exposure would be that a large area of tightly sealed homes provided residents high levels of exposure over a prolonged period of time without the resident being aware. This worst-case scenario exposure then could lead to a large number of people with cancer attributed to the radon exposure.

4.3.12.3. Past Occurrence

Current data on abundance and distribution of radon in Pennsylvania houses is considered incomplete and potentially biased, but PA DEP’s Bureau of Radiation Protection Radon division provided available radon test results by zip code for Pennsylvania. Test results are available for first floor and basements. Radon testing is typically done under one of two different scenarios, one for real estate and one for non-real estate transactions. In the real estate situation PA DEP collects the basement or lowest livable level to be tested, at a minimum. In non-real estate situations, the protocol says to test the lowest living level. This usually implies the first floor. Figures 4.3.12-3 and 4.3.12-4 illustrate these radon test results. Please note that zip codes with no data do not indicate the absence of results; instead, those zip codes had insufficient results or the existing results were missing some key information, causing the results to be suppressed.

Figure 4.3.12-3 Pennsylvania Average Basement Radon Test Results from 1990-2010 (PA DEP, 2013)

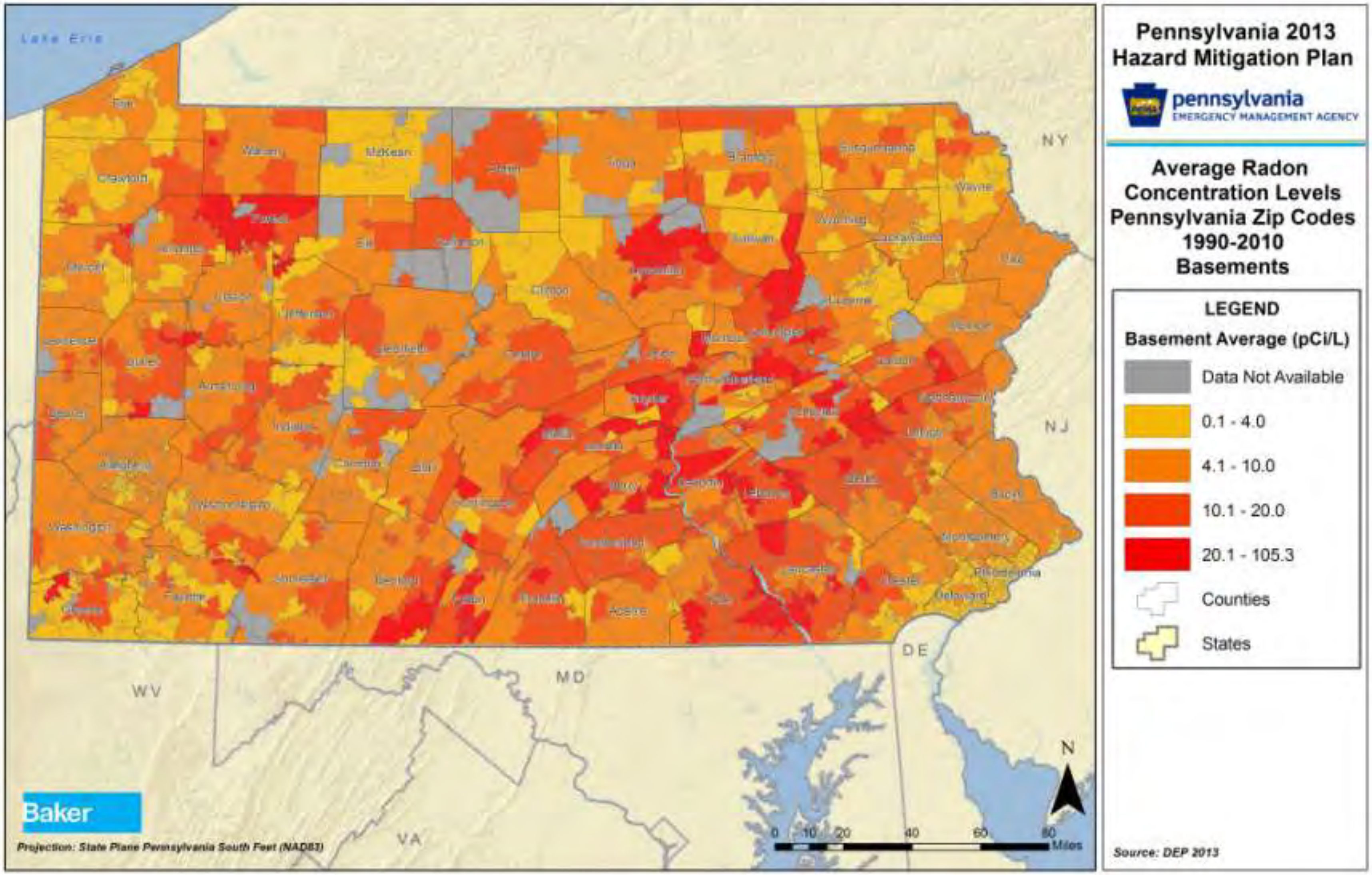
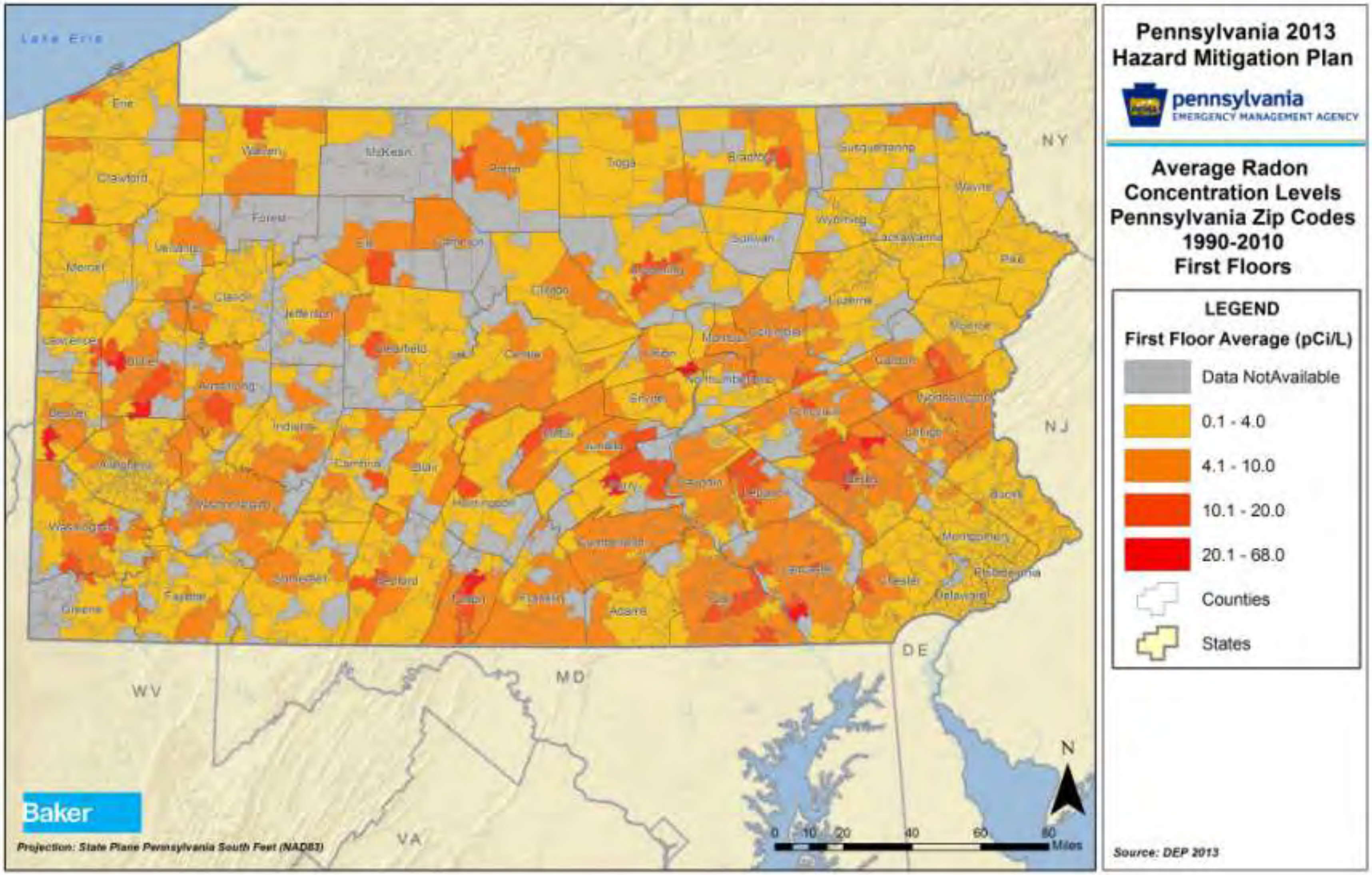


Figure 4.3.12-4 Pennsylvania Average First Floor Radon Test Results from 1990-2010 (PA DEP, 2013)



Values exceeding the EPA guideline of 4 pCi/L occur in all regions of the Commonwealth. Glaciated areas in northern Pennsylvania tend to have relatively low frequencies of elevated radon, perhaps because of thin soils and incomplete weathering. The Appalachian Plateaus province in western Pennsylvania also appears to have lower than average radon, as does the Atlantic Coastal Plain near Philadelphia and other areas having a shallow water table. The highest proportion of elevated values is in a zone extending from central Pennsylvania to southeastern Pennsylvania, and in the Reading Prong. High values in the latter area are attributed to known uranium-rich granitic gneisses (Smith, 1976; Gunderson et al., 1988), accentuated by local factors such as shear zones, and include a surprising number of extremely high radon values (>200 pCi/L). Elevated radon values in the larger, northwest-southeast-trending zone (Centre through York Counties) are not understood, but may represent some combination of black shale (Martinsburg Formation), limestone soil, and deep weathering. Some houses (0.6-percent in Cumberland and Dauphin Counties) exceed an extremely hazardous 200 pCi/L.

4.3.12.4. Future Occurrence

Radon exposure is inevitable given present soil, geologic, and geomorphic factors across Pennsylvania. Development in areas where previous radon levels have been significantly high will continue to be more susceptible to exposure. However, new incidents of concentrated exposure may occur with future development or deterioration of older structures. Exposure can be limited with proper testing for both past and future development and appropriate mitigation measures. Overall, the probability of future radon exposure hazards is considered *likely* as defined by the Risk Factor Methodology (see Section 4.1).

4.3.12.5. Environmental Impacts

Radon exposure has minimal environmental impacts. Due to the relatively short half-life of radon, it tends to only affect living and breathing organisms such as humans or pets which are routinely in contained areas (i.e. basement or house) where the gas is released.

4.3.12.6. Jurisdictional Vulnerability Assessment

Vulnerability to radon exposure is primarily being defined as jurisdictions and/or critical facilities located in a zip code whose average first floor and/or basement radon reading is greater than 4 pCi/L, the threshold for action, as described in Section 4.3.12.3.

As a whole, 19 of Pennsylvania's 67 counties have identified radon exposure as a concern in their most recent plan or plan update, as seen in Table 4.3.12-2, along with any ranking provided. As stated in Section 4.1, the decision by a county to profile a hazard is one indicator of the presence of risk from that hazard. This indicator should be viewed complementary to other analysis in this section. Together this analysis from reputable sources addresses different aspects of risk for a full risk profile.

Of the 12 counties which currently have calculated risk factor values for radon exposure, the average value is 2.1; this average does not include Lebanon, Montour, Perry, and Philadelphia, who use an alternate Risk Factor/Ranking system. The State Risk Factor for radon exposure is 2.1, while the Pennsylvania THIRA scored radon exposure as a 4 out of 10. For more details on the State Risk Factor and THIRA rankings, please see Section 4.1.

Table 4.3.12-2 Counties profiling radon exposure with hazard ranking and risk factor (if available).

COUNTY	PROFILED HAZARD	DID NOT PROFILE HAZARD	RANKING (IF AVAILABLE)	RISK FACTOR (IF AVAILABLE)
Adams		X		
Allegheny		X		
Armstrong		X		
Beaver		X		
Bedford	X		Medium	2.0
Berks	X		Not Ranked	No RF
Blair		X		
Bradford		X		
Bucks		X		
Butler		X		
Cambria		X		
Cameron		X		
Carbon		X		
Centre		X		
Chester		X		
Clarion		X		
Clearfield		X		
Clinton		X		
Columbia	X		Low	1.9
Crawford		X		
Cumberland		X		
Dauphin		X		
Delaware	X		Low	1.8
Elk		X		
Erie		X		
Fayette	X		Medium	2.3
Forest		X		
Franklin		X		
Fulton		X		
Greene	X		Low	1.9
Huntingdon		X		
Indiana		X		
Jefferson		X		
Juniata	X		Medium	2.4
Lackawanna		X		

Table 4.3.12-2 Counties profiling radon exposure with hazard ranking and risk factor (if available).				
COUNTY	**PROFILED HAZARD**	**DID NOT PROFILE HAZARD**	**RANKING (IF AVAILABLE)**	**RISK FACTOR (IF AVAILABLE)**
Lancaster	X		High	2.6
Lawrence		X		
Lebanon*	X		Not Ranked	6.9
Lehigh	X		Medium	2.4
Luzerne		X		
Lycoming		X		
McKean		X		
Mercer		X		
Mifflin		X		
Monroe		X		
Montgomery	X		High	2.6
Montour*	X		Not Ranked	5.3
Northampton	X		Medium	2.4
Northumberland	X		Medium	2.2
Perry*	X		Not Ranked	8.4
Philadelphia**		X		
Pike		X		
Potter		X		
Schuylkill		X		
Snyder		X		
Somerset		X		
Sullivan	X		Not Ranked	No RF
Susquehanna	X		Low	1.8
Tioga		X		
Union		X		
Venango		X		
Warren		X		
Washington		X		
Wayne		X		
Westmoreland		X		
Wyoming	X		Not Ranked	No RF
York	X		Medium	2.2

* Lebanon, Montour, and Perry use an alternate weighted ranking where Risk Factor = Frequency x [(0.25 x Critical facilities) + (0.40 x Social) + (0.25 x Economic) + (0.10 x Environmental)]. While this risk factor was used to comparatively rank hazards, the number does not correspond to a high-medium-low rating. **Philadelphia uses an A, B, C rating system where A is high, B is medium, and C is low.

As stated in Section 4.2.2, jurisdictional and state critical facility vulnerability assessments were completed by spatially overlaying hazards with census tracts and state critical facility layers in GIS. When spatial analysis determined that the hazard would impact a census tracts within a county or the location of state critical facilities these locations where deemed vulnerable to the hazard. Loss estimates were prepared based on the value of the facilities impacted by census tract and by state critical facility. Each hazard uses a methodology that is specific to the type of risk it may cause; Table 4.2.2-2 includes a complete methodology description for vulnerability assessments and loss estimates for each hazard.

The vulnerability of state critical facilities was evaluated as identifying facilities that are located in zip codes with average basement and/or first floor radon readings of over 4 pCi/L., the EPA's recommended threshold for action. The geographic area is large, with all 67 counties having at least one vulnerable zip code. Using this criterion, a total of 5,674 vulnerable critical facilities have been identified.

Table 4.3.12-3 Number of State Critical Facilities falling within zip codes with high average radon test results.

COUNTY	NUMBER OF CRITICAL FACILITIES	COUNTY	NUMBER OF CRITICAL FACILITIES
Adams	49	Lackawanna	161
Allegheny	702	Lancaster	140
Armstrong	94	Lawrence	67
Beaver	158	Lebanon	106
Bedford	38	Lehigh	77
Berks	148	Luzerne	234
Blair	84	Lycoming	87
Bradford	74	McKean	18
Bucks	124	Mercer	73
Butler	90	Mifflin	27
Cambria	128	Monroe	31
Cameron	6	Montgomery	198
Carbon	62	Montour	16
Centre	70	Northampton	84
Chester	118	Northumberland	83
Clarion	28	Perry	22
Clearfield	76	Philadelphia	103
Clinton	39	Pike	26
Columbia	73	Potter	13
Crawford	82	Schuylkill	185
Cumberland	69	Snyder	23
Dauphin	180	Somerset	82
Delaware	137	Sullivan	13
Elk	19	Susquehanna	43

Table 4.3.12-3 Number of State Critical Facilities falling within zip codes with high average radon test results.			
COUNTY	**NUMBER OF CRITICAL FACILITIES**	**COUNTY**	**NUMBER OF CRITICAL FACILITIES**
Erie	67	Tioga	45
Fayette	108	Union	15
Forest	5	Venango	44
Franklin	39	Warren	45
Fulton	14	Washington	137
Greene	33	Wayne	42
Huntingdon	45	Westmoreland	253
Indiana	58	Wyoming	22
Jefferson	29	York	98
Juniata	15	**Grand Total**	**5,674**

It was stated in Section 4.3.12.3 that one of the highest proportions of elevated radon values fall within the Reading Prong Section of the New England Physiographic Province, located in parts of Lebanon, Berks, Lehigh, and Northampton Counties (See Figure 2.1-2 for location of New England Physiographic Province). It was found that 415 critical facilities were located in this known elevated radon zone.

4.3.12.7. State Facility Vulnerability Assessment

0lists a breakdown of the types of state critical facilities contained within the zip codes with elevated radon test results. Due to the large number of schools, fire departments, and police stations in the Commonwealth, it is unsurprising that those categories of facility have the highest number of critical facilities.

Table 4.3.12-4 State Critical Facilities vulnerable to High Potential (Level 1) EPA Radon Zones by Critical Facility Type

STATE CRITICAL FACILITY TYPE	NUMBER OF IMPACTED FACILITIES
Agriculture	103
Banking	24
Chemical	11
Commercial Facilities	57
Communications	4
Critical Manufacturing	3
Dams	30
Defense Industrial Base	19
Education	131
Emergency Services	88
Energy	33
Fire Departments (Non-HSIP)	2,222
Government Facilities	41
Healthcare & Public Health	39
Hospital (Non-HSIP)	232
Information Technology	3
Manufacturing	1
National Monuments & Icons	5
Nuclear Reactors, Materials & Waste	7
Police (Non-HSIP)	1,128
Postal & Shipping	6
School (Non-HSIP)	1,407
Transportation	49
Water	31
Grand Total	***5,674***

4.3.12.8. Jurisdictional Loss Estimation

The EPA determines that an average radon mitigation system costs $1,200. The EPA also states that current state surveys show that 1 home in 5 has elevated radon levels. Using this methodology, radon loss estimation is factored by assuming that 20% of the buildings within the zip codes with elevated test results have elevated radon values and each would require a radon mitigation system installed at the EPA estimated average of $1,200, as shown in 0.

Table 4.3.12-5 Estimated jurisdictional losses in areas with high radon test results

COUNTY	TOTAL NUMBER OF BUILDINGS	NUMBER OF IMPACTED BUILDINGS (20% OF TOTAL)	RADON MITIGATION COSTS (SYSTEM COST x IMPACTED BUILDINGS, THOUSANDS $)
Adams	82,567	16,513	$19,816,080.00
Allegheny	704,188	140,838	$169,005,120.00
Armstrong	71,063	14,213	$17,055,120.00
Beaver	121,767	24,353	$29,224,080.00
Bedford	46,880	9,376	$11,251,200.00
Berks	221,199	44,240	$53,087,760.00
Blair	81,662	16,332	$19,598,880.00
Bradford	40,561	8,112	$9,734,640.00
Bucks	320,122	64,024	$76,829,280.00
Butler	111,671	22,334	$26,801,040.00
Cambria	92,292	18,458	$22,150,080.00
Cameron	17,846	3,569	$4,283,040.00
Carbon	56,555	11,311	$13,573,200.00
Centre	97,410	19,482	$23,378,400.00
Chester	246,212	49,242	$59,090,880.00
Clarion	51,547	10,309	$12,371,280.00
Clearfield	56,636	11,327	$13,592,640.00
Clinton	52,074	10,415	$12,497,760.00
Columbia	63,122	12,624	$15,149,280.00
Crawford	64,840	12,968	$15,561,600.00
Cumberland	136,500	27,300	$32,760,000.00
Dauphin	138,389	27,678	$33,213,360.00
Delaware	264,907	52,981	$63,577,680.00
Elk	31,182	6,236	$7,483,680.00
Erie	138,536	27,707	$33,248,640.00
Fayette	86,910	17,382	$20,858,400.00
Forest	32,605	6,521	$7,825,200.00
Franklin	93,939	18,788	$22,545,360.00
Fulton	25,440	5,088	$6,105,600.00
Greene	26,382	5,276	$6,331,680.00
Huntingdon	52,708	10,542	$12,649,920.00
Indiana	65,380	13,076	$15,691,200.00
Jefferson	48,028	9,606	$11,526,720.00
Juniata	38,398	7,680	$9,215,520.00
Lackawanna	145,424	29,085	$34,901,760.00
Lancaster	255,460	51,092	$61,310,400.00
Lawrence	58,568	11,714	$14,056,320.00

Table 4.3.12-5 Estimated jurisdictional losses in areas with high radon test results

COUNTY	TOTAL NUMBER OF BUILDINGS	NUMBER OF IMPACTED BUILDINGS (20% OF TOTAL)	RADON MITIGATION COSTS (SYSTEM COST x IMPACTED BUILDINGS, THOUSANDS $)
Lebanon	93,575	18,715	$22,458,000.00
Lehigh	207,520	41,504	$49,804,800.00
Luzerne	192,245	38,449	$46,138,800.00
Lycoming	79,873	15,975	$19,169,520.00
Mckean	25,537	5,107	$6,128,880.00
Mercer	68,643	13,729	$16,474,320.00
Mifflin	44,344	8,869	$10,642,560.00
Monroe	134,818	26,964	$32,356,320.00
Montgomery	447,177	89,435	$107,322,480.00
Montour	28,852	5,770	$6,924,480.00
Northampton	181,973	36,395	$43,673,520.00
Northumberland	54,634	10,927	$13,112,160.00
Perry	50,540	10,108	$12,129,600.00
Philadelphia	743,761	148,752	$178,502,640.00
Pike	70,552	14,110	$16,932,480.00
Potter	25,685	5,137	$6,164,400.00
Schuylkill	97,044	19,409	$23,290,560.00
Snyder	35,994	7,199	$8,638,560.00
Somerset	74,988	14,998	$17,997,120.00
Sullivan	24,267	4,853	$5,824,080.00
Susquehanna	32,952	6,590	$7,908,480.00
Tioga	30,452	6,090	$7,308,480.00
Union	45,226	9,045	$10,854,240.00
Venango	59,232	11,846	$14,215,680.00
Warren	48,364	9,673	$11,607,360.00
Washington	142,399	28,480	$34,175,760.00
Wayne	75,404	15,081	$18,096,960.00
Westmoreland	242,653	48,531	$58,236,720.00
Wyoming	35,596	7,119	$8,543,040.00
York	206,911	41,382	$49,658,640.00
Grand Total	***7,840,181***	***1,568,036***	***$1,881,643,440.00***

4.3.12.9. State Facility Loss Estimation

The estimated cost for mitigation of all State Critical Facilities located in zip codes with elevated radon test results is estimated to be $6.8, when using the average radon mitigation system value of $1,200 on its 5,674 facilities.