

# HAZARD VULNERABILITY ANALYSIS

## COUNTY OF CLARION, PA

April 15, 2015

This analysis was undertaken in cooperation with federal and state efforts to develop an awareness of the hazards facing each county as a basis for improving emergency services and emergency management at all levels of government.

Prepared by: Clarion County Office of Emergency Services (OES)

**County of Clarion:**

**Pennsylvania Emergency  
Management Agency:**

---

Wayne R. Brosius, Chairperson

---

Philip Barker, Western Area Director

---

G. Butch Campbell, Commissioner

---

Gregory A. Faller, Commissioner

---

Vern Smith, OES Director

---

Randall Stahlman, EMA Coordinator



# HAZARD VULNERABILITY ANALYSIS

## TABLE OF CONTENTS

I.	INTRODUCTION.....	4
A.	Purposes.....	4
B.	Methods of Analysis.....	4
C.	Selection of Hazards.....	5
II.	COUNTY PROFILE.....	6
A.	History.....	6
B.	Physiological Features.....	6
C.	Demographics.....	7
D.	Government.....	7
E.	Education.....	8
F.	Healthcare.....	8
G.	Recreation.....	9
H.	Business and Industry.....	9
I.	Communications.....	9
J.	Utilities.....	9
K.	Transportation.....	10
III.	HAZARDS.....	10
A.	Natural Occurring Hazards.....	10
1.	Geological Hazard.....	10
a.	Earthquakes.....	10
b.	Tsunami.....	11
c.	Volcano.....	11
d.	Landslide.....	11
e.	Mudslide.....	12
f.	Subsidence.....	12
g.	Glacier, Iceberg.....	14
h.	Radon.....	14
2.	Meteorological Hazards.....	15
a.	Flood, flash flood, tidal surge.....	15
b.	Drought.....	18
c.	Fire (forest, range, urban, wild land, and urban interface).....	19
d.	Snow, ice, hail, sleet, avalanche.....	21
e.	Windstorm, tropical cyclone, hurricane, tornado, water spout, dust/sand storm.....	23
f.	Extreme temperatures (heat, cold).....	24
g.	Lightning strikes.....	25
h.	Famine.....	25
i.	Geomagnetic storm.....	26
3.	Biological Hazards.....	26
a.	Emerging diseases that humans or animals (plague, smallpox, anthrax, West Nile virus, foot and mouth disease, SARS, pandemic disease, mad cow disease).....	26
b.	Animal or insect infestation or damage.....	28

B.	Technological Caused Events.....	28
1.	Central computer, mainframe, software, or application (internal/external)	28
2.	Ancillary support equipment.....	29
3.	Telecommunications .....	29
4.	Energy/power/utility .....	30
C.	Human Caused Events .....	30
1.	Accidental.....	30
a.	Hazardous Materials .....	30
b.	Explosion/fire.....	33
c.	Transportation accident.....	33
d.	Building/structure collapse .....	36
e.	Energy/power/utility failure .....	36
f.	Fuel/resource shortage .....	37
g.	Air/water pollution, contamination .....	37
h.	Water control structure/dam/levee failure.....	40
i.	Financial issues, economic depression, inflation, financial system collapse.....	41
j.	Communications system interruptions .....	41
k.	Misinformation .....	42
l.	Oil & Gas Wells .....	42
2.	Intentional.....	45
a.	Terrorism (explosive, chemical, biological, radiological, nuclear, cyber)	45
b.	Sabotage .....	48
c.	Civil disturbance, public unrest, mass hysteria, riot.....	49
d.	Enemy attack, war.....	50
e.	Insurrection .....	50
f.	Strike or labor dispute .....	50
g.	Disinformation .....	50
h.	Criminal activity (Vandalism, arson, theft, fraud, embezzlement, data theft).....	51
i.	Electromagnetic pulse .....	51
j.	Physical or information security breach.....	52
k.	Workplace violence .....	52
l.	Product defect or contamination.....	53
m.	Harassment.....	53
n.	Discrimination .....	54
IV.	SUMMARY.....	55
V.	REFERENCES.....	56

Tables

1	Flood History for Clarion County.....	57
2	Major Winter Storms.....	58
3	Tornadoes and Windstorms.....	59
4	Clarion County Major Traffic Routes Map .....	60

# **I. INTRODUCTION**

## **A. Purposes**

1. To develop a common awareness among emergency service agencies, public officials and the public of the major hazards existing in Clarion County.
2. To identify the locations, the number of persons and the major facilities that may be vulnerable to each type of hazard.
3. To encourage cooperative management of emergency situations based on a common understanding of hazards and their impacts.
4. To enhance our emergency and disaster response and recovery capabilities for all hazards.
5. To encourage plans and actions for preventive measures and effective response to preserve life and property in areas vulnerable to effects of natural and man-made hazards.

## **B. Methods of Analysis**

How often disasters occur (frequency) and the effects or severity of the event is important as a basis for planning emergency response and mitigation. Natural occurring hazards tend to reoccur over time whereas technological caused and human caused events tend to change as technology changes and our way of doing things change.

Four criteria were selected to assure a systematic and comprehensive approach to analyzing all hazards:

1. History: a record of past events is particularly helpful in evaluating natural hazards. Both the frequency and severity of past events are useful in predicting the future. The past records of other events also offer valuable information when tempered with the knowledge of preventive efforts, and changes in technology that may reduce the frequency or severity of such an event. Other hazards exist and must be analyzed without the benefit of past experience.
2. Vulnerability: the susceptibility of a community to destruction, injury, or death. The degree of vulnerability may be related to geographic location as with floodplains, or to the type of facility or structure. Certain population groups may be more vulnerable to some hazards because of immobility or their inability to take protective action.
3. The maximum threat or worst case disaster should be considered for each hazard. The maximum threat provides an upper boundary for the level of preparedness that may be necessary.
4. The probability of an occurrence in the future is another important factor to be considered when deciding on priorities, the level of preparedness and planning appropriate for a hazard. An event which occurs annually, though relatively minor in impact, may deserve more emphasis than a major event which occurs once in 50 or 100 years.

### **C. Selection of Hazards**

NFPA 1600 was used as the basis for determining hazards for Clarion County. Each hazard was analyzed and rated with regard to the frequency of past occurrences, likely to reoccur or the potential for occurrence in the county.

#### **1. Natural Occurring Hazards**

##### **a. Geological Hazard**

- 1). Earthquake
- 2). Tsunami
- 3). Volcano
- 4). Landslide
- 5). Mudslide
- 6). Subsidence
- 7). Glacier, Iceberg
- 8). Radon

##### **b. Meteorological Hazards**

- 1) Flood, flash flood, tidal surge
- 2) Drought
- 3) Fire (forest, range, urban, wild land, and urban interface)
- 4) Snow, ice, hail, sleet, avalanche
- 5) Windstorm, tropical cyclone, hurricane, tornado, water spout, dust/sand storm
- 6) Extreme temperatures (heat, cold)
- 7) Lightning strikes
- 8) Famine
- 9) Geomagnetic storm

##### **c. Biological Hazards**

- 1) Emerging diseases that humans or animals (plague, smallpox, anthrax, West Nile virus, foot and mouth disease, SARS, pandemic disease, mad cow disease)
- 2) Animal or insect infestation or damage

#### **2. Technological Caused Hazards**

- a. Central computer, mainframe, software, or application (internal/external)
- b. Ancillary support equipment
- c. Telecommunications
- d. Energy/power/utility

#### **3. Human Caused Events**

##### **a. Accidental**

- 1). Hazardous Materials
- 2). Explosion/fire
- 3). Transportation accident
- 4). Building/structure collapse
- 5). Energy/power/utility failure
- 6). Fuel/resource shortage
- 7). Air/water pollution, contamination
- 8). Water control structure/dam/levee failure
- 9). Financial issues, economic depression, inflation, financial system collapse
- 10). Communications system interruptions
- 11). Misinformation
- 12). Oil and Gas Wells

b. Intentional

- 1). Terrorism (explosive, chemical, biological, radiological, nuclear, cyber)
- 2). Sabotage
- 3). Civil disturbance, public unrest, mass hysteria, riot
- 4). Enemy attack, war
- 5). Insurrection
- 6). Strike or labor dispute
- 7). Disinformation
- 8). Criminal activity (Vandalism, arson, theft, fraud, embezzlement, data theft)
- 9). Electromagnetic pulse
- 10). Physical or information security breach
- 11). Workplace violence
- 12). Product defect or contamination
- 13). Harassment
- 14). Discrimination

## II. **COUNTY PROFILE**

### A. **History**

Clarion County is a rural sixth-class county in Western Pennsylvania. It has a land area of 602 square miles and water area of 7 square miles with a 2010 population of 39,988. The overall population density of the county is 66 persons per square mile.

Clarion County, erected on March 11, 1839 from parts of Venango and Armstrong Counties, is named for the Clarion River. Clarion County was the 54<sup>th</sup> county in the state to be formed.

The history of the county has been dominated by extra active industries. Timber resources of white pine and hemlock rapidly stimulated an influx of population and as a result small lumber villages developed along the major streams. The discovery of bituminous coal provided further impetus to settlement and has played an important part in shaping the recent history of the county. Oil and natural gas have, at various times, spurred short-lived economic development. Currently drilling for natural gas in Marcellus shale has spurred a growth in the drilling industry and support industries. Bituminous coal, clay and stone products are important yet today.

### B. **Physiological Features**

Clarion County is located in the west central part of the state on the Allegheny Plateau. Redbank Creek forms the southern boundary and the Allegheny River forms a large part of the western boundary.

Clarion County has a forest area of over 159,000 acres. The largest stand of virgin white pine east of the Mississippi River is located in Cook Forest State Park of which the largest part is located in the county. There are 10.03 square miles of state parks and 18,183 acres of state game lands. These areas include facilities for boating, camping, fishing, and hunting, mountain biking and swimming.

### **C. Demographics**

Clarion County is composed of 12 boroughs and 22 townships.

The boroughs, and their populations (2010 U.S. Census), consist of: Callensburg – 207; Clarion – 5,276; East Brady – 942; Foxburg – 183; Hawthorn – 494; Knox – 1,146; New Bethlehem – 989; Rimersburg – 951; Shippenville – 480; Sligo – 720; St. Petersburg – 400; and Strattanville – 550.

The townships, and their populations (2010 U.S. Census), are: Ashland – 1,114; Beaver – 1,761; Brady – 55; Clarion – 4,116; Elk – 1,490; Farmington – 1,934; Highland – 525; Knox – 1,036; Licking – 536; Limestone – 1,858; Madison – 1,207; Millcreek – 396; Monroe – 1,544; Paint – 1,699; Perry – 947; Piney – 453; Porter – 1,348; Redbank – 1,370; Richland – 494; Salem – 881; Toby – 991; Washington – 1,887.

The county seat is Clarion Borough, located in the central portion of the county, and has the highest percentage of the population.

### **D. Government**

The county government is headed by an elected, three-member, Board of Commissioners, in addition to the offices of the Judge, Sheriff, District Attorney, Treasurer, Register & Recorder, Prothonotary's, Auditors, and Coroner. The county also operates a corrections facility, parks and airport.

The boroughs operate with a seven-person elected Council, together with a Mayor who serves as the chief executive officer. The townships have governments headed by a three-person, elected Board of Supervisors.

The following Fire, EMS, Law Enforcement and emergency service agencies provide primary services to the county:

#### Law Enforcement:

- Clarion Borough Police
- Clarion County Sheriff Department
- Clarion University Police
- Emlenton Police
- Knox Borough Police
- New Bethlehem Borough Police
- Pennsylvania State Police – Clarion & Marionville

Fire:

- Callensburg Volunteer Fire Company
- Clarion Fire & Hose Company
- Corsica Volunteer Fire Company
- East Brady Volunteer Fire Company
- Farmington Twp. Volunteer Fire Company
- Hawthorn Volunteer Fire Department
- Knox Volunteer Fire Department
- Limestone Township Volunteer Fire Department
- Millcreek Twp. Volunteer Fire Department
- New Bethlehem Fire Company #1
- Parker City Volunteer Fire Department

Perry Twp. Volunteer Fire Department  
Rimersburg Hose Company, Inc.  
Shippenville-Elk Twp. Volunteer Fire Dept.  
Sligo Volunteer Fire Department  
St. Petersburg Volunteer Fire Department  
Strattanville Volunteer Fire Company  
Washington Twp. Volunteer Fire Dept.

EMS: Clarion Hospital EMS (2 stations)  
East Brady Ambulance  
Emlenton Area Ambulance  
Knox Area Ambulance  
Shippenville Ambulance (2 stations)  
Southern Clarion County EMS

QRS: Hawthorn Volunteer Fire Department  
Limestone Township Fire  
Millcreek Twp. Fire

SPECIALTY UNITS: Special Hazard Responders of Clarion County (Defensive HazMat Team)  
Limestone Volunteer Fire Department (Mass Casualty Unit)  
County Technical Rescue Team

#### **E. Education**

Clarion County is home to Clarion University of Pennsylvania (CUP), a state owned institution of higher learning (enrollment is approximately 6,000 students), located in Clarion Borough.

There are 7 public school districts with 16 school buildings, 2 private schools and 1 vocational-technical school (which also offers adult education courses), along with other educational support/providers within Clarion County.

#### **F. Healthcare**

Two hospitals serve the county.

**Clarion Hospital** is a 78-bed acute care facility with 10 rehabilitation nursing beds. The hospital is licensed by the Pennsylvania Department of Health and is accredited by the American Osteopathic Association. The hospital provides a full spectrum of services on an inpatient and outpatient basis. These services are: Cardiopulmonary Services, Laboratory Services, Radiology Services, Nuclear Imaging, Cancer Care, 24 hour Emergency Medical Services, and Wound Care Center. The hospital participates in regional disaster preparedness activities. The ambulance service has 2 wheelchair transport vans, 8 Advanced Life Support (ALS) equipped ambulances. The facility can provide portable and onsite decontamination at Level C protection.

**Clarion Psychiatric Center (CPC)**, a 74-bed behavioral health care facility, is situated on 11 acres located adjacent to Clarion Hospital. CPC offers assessment 24/7 and referral to appropriate level of care with credentialed professionals. Services available include adult program, adult drug and alcohol education, substance abuse rehabilitation services, day treatment for children and adolescents, inpatient adolescent and children's program, adolescent residential treatment facility and wraparound services for Clarion County.



**G. Recreation**

The 7,182-acre Cook Forest State Park lies in scenic northwestern Pennsylvania, near the Allegheny National Forest. Once called "The Black Forest," the area is famous for its stands of old growth forest. The "Forest Cathedral" of towering white pines and hemlocks is a Natural National Landmark. The Clarion River is the eastern border of the Park, and is popular for canoeing and rafting.

Cook Forest State Park is known for its excellent fishing streams and ponds, plus hundreds of miles of hiking trails that wind their way through the forest. Cook Forest is classified as a National Natural Landmark by the National Park Service.

Several local festivals take place in Clarion County throughout the year. The largest festival is the Autumn Leaf Festival (ALF). This is an annual tourist attraction, celebrating Clarion County's beautiful foliage. The event started in 1953. ALF has grown from a one-day event to a nine-day event with music, sports, majesty and fun activities, for all to enjoy. Autumn Leaf Festival brings between 500,000 and 750,000 people to the Clarion area.

The county operates the Clarion County Park consisting of 49.5 acres located in Paint Township. It consists of a baseball field, soccer field, softball fields, basketball court, tennis court, volleyball court, horseshoe pit, nature trail, playground, nine pavilions, 4-H Area, barn, Community Center, archery range, and a children's garden. The county also maintains a 3 acre park located at Helen's Furnace and approximately 1 acre across from the county courthouse.

**H. Business and Industry**

Agriculture has always been an important element of the county's economy. The market value of products sold for 2013 was 53 million dollars. There are approximately 1,182 farms using approximately 158,000 acres with the average size of each farm at 175 acres. These figures are based on the numbers released in 2012 for year ending, 2011. The number of individual farms and farm employment has increased over the years. (This information is current as of March 2015 according to the Department of Agriculture).

Presently, agriculture, including forestry, contributes significantly to the local economy. Many industrial businesses also support the area with the modular home and service industries providing much of the economic basis for the county.

**I. Communications**

Three local newspapers; The Derrick, The Clarion News and The Leader-Vindicator and three radio stations; WCCR, WWCH and WCUC, provide communications media to the area.

**J. Utilities**

The Pennsylvania American Water Company, along with 16 community water systems and small transient water systems provide public water throughout most of the County. The more rural areas receive their water supply from private wells or springs.

Sanitation services are provided by Pennsylvania American Water Company and a number of small, independent/local companies or 14 Municipal Sanitation Plants.

Most of the electric power is provided to residents, business and industry by Allegheny Power, United Electric, Central Electric and Penelec.

Natural gas service is furnished primarily by Columbia Gas, Dominion Peoples, Equitable Gas, National Fuel, T.W. Phillips Gas, UGI Central Penn Gas and a few small suppliers of natural gas located throughout the county.

The major suppliers for telephone service are Verizon, Sprit, Venus and Windstream.

County residents have the opportunity to choose their electric, natural gas and local telephone suppliers.

Comcast Cable Communications and AT&T Broadband are the major suppliers of cable television.

Internet providers include Verizon, Windstream, Comcast, AT&T, Venus and Affiniti.

#### **K. Transportation**

The major transportation network in the county includes: Interstate 80, U.S. 322, and State Routes 28, 58, 66, 68, 208, 338 and 368; and one commercial airport.

The county has six exits from Interstate 80, making it within short traveling distances from the cities of Erie, Pittsburgh and Youngstown (see Table 4).

### **III. HAZARDS**

#### **A. Natural Occurring Hazards**

##### **1. Geological Hazard**

###### **a. Earthquakes**

Earthquakes are caused by a sudden slip of a fault caused by the dynamic pressure of the earth's plates pushing together on both sides of the fault over time. The strength of an earthquake is determined by the size of the slip and how close the slip occurred to the surface. The most active faults are along the Pacific Coast, although some smaller, less active, faults exist in the Eastern United States.

###### History / Vulnerability

There have been no recorded earthquakes occurring in Clarion County, however on December 31, 2011 a 4.0 earthquake occurred around Youngstown, Ohio; August 31, 2011 a 5.9 earthquake occurred in Virginia and on January, 2007, a 2.5 earthquake occurred just north of Meadville. Parts of the county experienced some of the shock waves of these minor earthquakes that have occurred around the region. Clarion County has no earthquake building codes. Therefore should the county experience a substantial earthquake, it would be reasonable to expect that there could be extensive property and infrastructure damage and a significant loss of life.

###### Probability

The probability of such an event occurring is low. The Pennsylvania Hazard Mitigation Plan lists Clarion County in the very slight zone for earthquakes. Clarion County does not sit on any fault lines.

### Mitigation

Due to low probability of occurrence there are currently no mitigation efforts.

#### **b. Tsunami**

Clarion County is not located near a large body of water; therefore, we are not vulnerable to a Tsunami.

#### **c. Volcano**

There are no volcanoes in Clarion County or surrounding areas. The only effects from a volcano incident have been from ash transported by steering winds.

#### **d. Landslide**

A landslide is the downward and outward movement of slope-forming materials reacting to the force of gravity. Slide materials may be composed of natural rock, soil, artificial fill or combinations of these materials. The term landslide is generalized and includes rock falls, rockslides, block glide, debris slide, earth-flow, slump and other such terms.

Those factors which increase a slope's potential for landslides are as follows:

- Excavations that remove lateral support or steepened slopes;
- The adding of loads, such as fill or structures, to natural slopes;
- Poor surface or subsurface drainage;
- The loss of water from leaking sewage and water supply facilities; and
- Changes in vegetation which cause changes in soil moisture and soil density, such as removing vegetation from slopes.

### History/Vulnerability

Landslides are not a serious risk in the majority of Clarion County but are more likely to occur due to the hill and valley areas of Clarion County. Limited areas of steep slopes associated with the banks of major watercourses in the County could collapse under heavy rainfall to produce a localized landslide. The potential of damage to lives or property from this type of natural hazard is low.

Most of Clarion County is in the High to Moderate susceptibility area of Pennsylvania; however, only one major landslide has been recorded up to and including 2014.

This incident occurred when a slide blocked PA Route 28, north of New Bethlehem. This slide occurred May 22, 1983, and caused major problem for emergency traffic for approximately six weeks.

Because of the terrain and geological makeup of the county, such slides can occur again.

### Probability

The frequency of landslides occurring in the county is expected to remain low, and the effects of these incidences will continue to pose a threat to the county. If population and development increases in Clarion County, the number of persons and properties vulnerable to the effects of landslides may increase.

### Mitigation

Some measures do exist to lessen the dangers of landslides. These measures include the Storm Water Management Plan and local ordinances (zoning and subdivision, etc.) that place limitations on construction or development, monitoring construction practices; prepare studies of slide prone areas, erosion protection measures, and drainage considerations. A basic rule of thumb is to know where landslide areas exist and to avoid building on, though, or near them (leave them undisturbed).

### **e. Mudslide**

A mudslide is the downward or outward movement of materials reacting to the force of gravity caused by heavy rain. Slide materials may be composed of natural rock, soil, artificial fill or combinations of these materials.

### History/Vulnerability

Because of the terrain and geological makeup of the county, most of Clarion County is in the High to Moderate susceptibility area of Pennsylvania. There have been no major mudslides in Clarion County.

### Probability

The frequency of mudslides occurring in the county is expected to remain low, and the effects of these incidences will continue to pose a threat to the county. If population and development increases in Clarion County, the number of persons and properties vulnerable to the effects of mudslides may increase.

### Mitigation

Some measures do exist to lessen the dangers of mudslides. These measures include the Storm Water Management Plan and local ordinances (zoning and subdivision, etc.) that place limitations on construction or development, monitoring construction practices; prepare studies of slide prone areas, erosion protection measures, and drainage considerations. A basic rule of thumb is to know where mudslide areas exist and to avoid building on, though, or near them (leave them undisturbed).

### **f. Subsidence**

Subsidence is defined as a sinking movement of the earth's surface usually described as a sinkhole.

Subsidence may be natural or related to mining activities. Areas underlain by coal or other minerals which use deep mining techniques may become susceptible to subsidence. Poor engineering practices at the time of withdrawal or progressive degradation in geological stability contribute to subsidence. Areas of the state that have underlying mines are subject to subsidence and constitute a potential threat to people living in those areas. Isolated incidents throughout the coal regions over the years have been houses, garages, and trees swallowed up by subsidence holes. Lengths of local streets and highways, and countless building foundations have been damaged.

Natural subsidence results from what are considered normal geological processes particular to certain landforms. In Pennsylvania, water movement through carbonate terrain, i.e., limestone and dolomite may result in topographic features such as swales, sinkholes and forms of subsidence.

History/Vulnerability

The county is threatened by both major types of subsidence. Over 70% of Clarion County’s Municipalities are subject to surface and subsurface sinkhole occurrence. A number of coal beds have been involved in underground mining. The few mine maps available show that generally the mining that has occurred has been very deep.

There are records of mining in these municipalities by Department of Environmental Protection:

<b>Mining History in Clarion County</b>	
Brady Township	Perry Township
Clarion Borough	Piney Township
Clarion Township	Porter Township
East Brady Borough	Redbank Township
Hawthorn Borough	Rimersburg Borough
Knox Township	St. Petersburg Borough
Limestone Township	Strattanville Borough
Madison Township	Toby Township
Monroe Township	Washington Township
Paint Township	

According to Pennsylvania DEP there are 1,056 active and abandoned coal mines in Clarion County.

There are reports of subsidence in Clarion County:

In August 2003, two sinkholes measuring four feet in diameter and twenty feet deep were discovered near a residential area in Clarion Township. The Department of Environmental Protection’s Bureau of Abandoned Mine Reclamation (BAMR) conducted an investigation and mitigated the holes.

In the spring of 2010 in Clarion Borough at the old Rhea Lumber facility East Wood Street a hole opened that was approximately 4 feet deep and 3 feet wide. Clarion University the current owner mitigated the hole.

Currently there are three mine shaft subsidence located in St. Petersburg Borough.

PA DEP has no records of any other sinkhole activity incidents.

Probability

The frequency of subsidence incidences occurring in the county is expected to remain low. However, considering mine activity that has occurred in the county, subsidence cannot be ruled out.

### Mitigation

Since all municipalities in Clarion County are vulnerable to the hazard of subsidence, local and county officials should follow some of the following hazard mitigation measures: encourage local awareness of the subsidence hazards; compliance with or enactment of building codes and regulations that consider geologic factors; preparedness to respond to and cope with a geologic hazard occurrence; and encourage local property owners to purchase subsidence insurance.

#### **g. Glacier, Iceberg**

Clarion County is not located near an area where glaciers/icebergs can develop; therefore, we are not vulnerable to glaciers or icebergs.

#### **h. Radon**

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, nonfission-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,  $^{222}\text{Rn}$  and  $^{220}\text{Rn}$ , formed in the radioactive decay series of  $^{238}\text{U}$  and  $^{232}\text{Th}$ , respectively. The isotope thoron (i.e.  $^{220}\text{Rn}$ ) 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.  $^{222}\text{Rn}$ ), 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.  $^{226}\text{Ra}$ ), 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.

### History/Vulnerability

According to the EPA 1993 Pennsylvania Radon Zones, Clarion County Falls in to Zone 1, this has the highest potential for Radon exposure. Pennsylvania Hazard Mitigation Plan estimates that 20% of the buildings in the County are impacted by radon with a mitigation cost of approximating \$9,492,720.00.

### Probability

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.

### Mitigation

Enforce building codes for radon mitigation. Encourage residents and businesses to test their buildings and mitigate as per codes.

## **2. Meteorological Hazards**

### **a. Flood, flash flood, tidal surge**

Floods and flash floods is the most prevalent type of natural disaster occurring in the Commonwealth of Pennsylvania. Clarion County is located in the Central Allegheny River Basin, as designated in the State Water Plan.

In the Commonwealth, floods cause over \$1 billion worth of property damage annually. It is, therefore, important for emergency management personnel to analyze floodplains and other critical areas in the county and determine how vulnerable to flooding the community might be.

The county is not located near any tidal surge areas.

### History

Floods and flash floods continue to be frequent and damaging natural disasters in Clarion County (see Table 1). Stream, river, and urban flooding can occur at any time during the year. Flooding may be in the form of flash floods caused by summer storms or rapid snow melt or general, river flooding caused by prolong rains, attributed to multiple storm systems crossing the area over a period of time, or from a tropical disturbance.

In the case of hurricanes, by the time most storms reach Pennsylvania, they fail to satisfy the definition of a hurricane (75 mph sustained winds). But the rains of nine hurricanes have affected Pennsylvania in the past 50 years, in the form of Tropical Storms.

Although floods occur in all seasons, studies of the relationships among storm intensity, duration, affected area, and seasonality suggest a tendency for flooding on principal streams to occur in winter and for floods on small streams to occur mostly in summer.

Large area floods are caused by storms of low rainfall intensity over a long period of time covering the entire area of principal watersheds. Small area floods and flash flood are caused by storms of high rainfall intensity and relatively short duration. An exception to this is tropical storms which normally occur during the summer months and cause extensive flooding over large areas.

Floods are natural occurrences that cause damages and loss of life, primarily because of man's use and encroachment upon the floodplains. Because of this continued encroachment, flood damages have been increasing on a regular basis. Problems associated with storm water runoff are becoming increasingly serious. Development actions such as the removal of vegetation, large scale resurfacing, and storm drainage systems are increasing the rate of runoff, resulting in many new localized flood problems as well as aggravating existing ones.

### Vulnerability

In the county 30 of the 34 municipalities are flood prone. Allegheny River cause flooding in Brady, Madison, Perry, Richland and Toby Townships and East Brady and Foxburg Boroughs. The Clarion River cause flooding in Callensburg Borough and Beaver, Farmington, Highland, Millcreek, Monroe, Paint, Perry, Piney and Richland Townships. Piney Creek causes flooding in the Limestone-Reidsburg areas, Licking Creek floods around Sligo, and Redbank Creek in Red Bank Township and New Bethlehem and Hawthorn Boroughs.

Table 1 presents a general assessment perspective of flooding in Clarion County. There is always the opportunity for more than one flood in a year in any area of the county. In addition, the county is susceptible to seasonal and flash floods because of heavy or prolonged rainfall, rapid thaw of snow and/or ice, or ice jams.

Seasonal flooding occurs in late spring/summer. This type of flooding is generally caused by storms of low to moderate rainfall intensity over a long period of time covering the entire area of principal watersheds. Many state and federal flood protection projects in the area have served to reduce the average annual damages in the basin from \$7.3 million to \$633 thousand per year.

### Probability

Although it is impossible to predict the number or severity of flood incidents that may occur in the county, it is safe to predict that if increased development occurs on presently unused land and the hilly topography of Clarion County; that the damage to crops, roads, businesses, utilities and private residences will increase in the future. Clarion County can safely assume to receive some type of flooding somewhere in the county on an annual basis with major widespread flooding expected every 4-5 years.

To address possible increases in flood related losses, development in floodplain areas should be regulated closely, and structural and nonstructural measures should be reviewed to determine flood damage reduction potential.

### Mitigation

Preventive measures by county and local officials are the most effective way to reduce property damage from flash floods. Such measures include:

- a. Establishing and periodically updating the local Flash Flood Warning system.
- b. Implementing floodplain management via local municipal ordinances
- c. Developing an adequate preparedness and response plan for flash flood emergencies



The following land development policies should be implemented and enforced countywide by the County Commissioners, if not by each local municipality:

- a. New developers must provide that their construction will not increase runoff from existing undeveloped levels.
- b. Storm drains and culverts, located in flood hazard areas, should be sized for 100-year flow with adequate freeboard (1.5 feet) to provide for flow increases caused by future development upstream.
- c. Underground drainage lines should be provided in areas where the allowed average residential density is three housing units per gross acre or greater.
- d. All bridges and culverts should be designed for 100-year flood flow if they have a potential to cause property damage when they become blocked up with storm water deposited debris.

The following floodplain land development policies should also be implemented and enforced by the county, if not by the individual municipality:

- a. Although the 100-year flood flow is used for defining the floodplain, a freeboard of 1.5 feet minimal should be included for potential unforeseen hazards.
- b. All structural development within the 100-year floodplain should be restricted.
- c. Such nonstructural development as parks, recreation areas, athletic fields, and picnic areas could be permitted within the 100-year floodplain.
- d. Strict encroachment regulations should be included in floodplain planning to prevent filling of the floodplain.
- e. Local municipal resolutions should be made to restrict the extension of water, sewer, roads, or other critical or public facilities into the 100-year floodplain. This is not meant to negatively impact services or other infrastructure to current or future development beyond the pertinent floodplain.

Numerous general development policies that may be adopted and/or encouraged by local municipalities (pending review by legal counsel) to assist in averting potential storm water damage include:

- a. Maintenances of the Stormwater Management Ordinance.
- b. Stream banks should be cleared of all loose material which could be carried downstream during a flood. Fines should be levied against offenders.
- c. Citizens' groups should be encouraged to help maintain flood protection measures. For example: removal of debris from culverts, clean stream banks, etc.
- d. Local municipalities should aid debris collection by providing necessary equipment.
- e. Municipal road crews should maintain culverts located under roadways to prevent buildup of debris.
- f. Roadway embankments serving as stream channel banks or dikes should be well stabilized with rock, earth and vegetative cover to prevent road washouts.
- g. A suggested list of runoff reducing measures should be given to builders when they apply for building permits.
- h. Developers should be required to provide 0.25 acre-ft. of storage capacity for every acre of impervious surface material.
- i. Developers should be encouraged to utilize underground utilities wherever possible. Even though underground power lines have a higher construction cost, the annual cost will be lower because these lines lower the maintenance cost and

significantly reduce power outages normally caused by broken or short-circuited lines. Also, underground lines are more aesthetically pleasing than utility poles, thus increasing the property value.

- j. Owners of buildings that are located in the floodplain shall be advised by the municipality on how to flood proof and structurally reinforce their building to at least the 100-year flood elevation.
- k. Developers and municipal authorities should utilize check valves on all sewer and storm drain lines to prevent backup of water into serviced buildings.
- l. An informed public can also go a long way to reduce property damage and loss of life from flash floods. Each property owner in Clarion County should know the following:
  - 1) What rivers and creeks are hazards to their property and at what flood level their property will be affected
  - 2) A safe evacuation route if their house is flooded.
  - 3) If they live on a farm, not to place or allow small animals (calves and pigs) in areas subject to flash floods.
  - 4) Never disregard an official evacuation advisory.

## **b. Drought**

Droughts have hit the Commonwealth many times within the last 30 years. The Commonwealth has been most vulnerable to hydrologic and water management droughts. Hydrologic droughts generally entail a reduction of stream flows, reduction in lake/reservoir storages and the lowering of ground water levels. Water management droughts are a result of abnormally dry periods and the failure to adhere to water management practices during these times. During the summer of 1983, the worst drought in 20 years occurred, causing over \$196 million in damages to the state's crops. Severe droughts have also occurred during 2001 and 2002.

### History/Vulnerability

Clarion County has most recently experienced drought emergencies and water supply deficiencies during the droughts of 1998 and 2002, which resulted in a Governor's Declaration. From 1980 - 2013 Clarion County have had 20 drought watches, 12 drought warnings and 6 drought emergencies (according to PADEP).

Although a severe drought could have a devastating impact on the entire community it was determined to be the least likely to occur. However, communities in Clarion County could potentially experience problems associated with drought conditions. The biggest concern in these communities is the high demand on the water supply and below average rainfall for recharge of aquifers and reservoirs.

The main type of drought that could be included in this all-hazard mitigation plan is a hydrological drought. A hydrological drought occurs when surface and subsurface water levels drop, such as in streams, rivers, lakes, and reservoirs.

Agriculture being an important element of the county's economy (market value of products sold for 2013 was 53 million dollars) could be impacted greatly by a long drought. With approximately 1,182 farms a drought could also affect the families and farm workers.

There have been sporadic instances where municipal water systems have lost their entire water reservoir. The water reservoir loss has been due to system malfunctions; either pumps failure or massive supply line leaks, and have generally been corrected within 24 hours. The farming community is exceptionally vulnerable to drought.

In 2004, several of Clarion County's municipal water systems experienced system malfunctions or Department of Environmental Protection (DEP) shutdowns. East Brady Water Authority had a main line break that took several days to repair. Redbank Valley Municipal Authority (RVMA) and the Hawthorn Water Authority (HWA) had DEP violations that took several weeks to correct. These incidents are indications of the aging of the infrastructure in Clarion County.

The Department of Environmental Protections' records indicate that there are 15 municipal water suppliers in Clarion County. Of those; five (5) use surface water (rivers, streams) as their source of supply. The remainder use wells and springs.

Currently there are no water suppliers that are projected to experience future yield deficiencies.

#### Probability

Future droughts and water deficiencies are likely to occur in Clarion County as demands increase for water by various industrial, residential and agricultural consumers. In addition, increased new development in the county could affect water supplies.

It would be very difficult to forecast the future frequency and severity of drought emergencies in Clarion County. However, a drought situation could cause major shortages in private and public water supplies and crop damage on an extensive basis.

#### Mitigation

Although difficult to combat a drought, they may be made less threatening if all municipalities in the county utilize proper land use development controls (building restrictions on watershed areas, etc.), erosion controls, enforce irrigation regulations, plan for emergency conservation, and if possible, locate alternate sources of water.

One form of mitigation, in regards to municipal water authorities in Clarion County, is the purchasing of smaller water authorities by larger water providers, or consolidation of water authorities.

Also, expansion of current municipal water service areas would provide more opportunity for spring/well reliant residents to secure a dependable water source.

#### **c. Fire (forest, range, urban, wild land, urban interface)**

Many fires have the potential for disaster or extensive loss of property and death. There are a number of factors which may influence the probability or likelihood that a fire may develop into a disaster. Based on historical record, our own experiences and an examination of the circumstances surrounding various situations, we can improve our understanding of fire hazards that may lead to disaster.

## History

Most fire disasters are averted by early warning and appropriate response. Even though only a small portion of these incidents resulted in significant property damage and even fewer in personal injury or death, a larger portion could have resulted in disaster had the emergency response not been timely and effective. Since 1994, there have been 20 deaths as the result of fifteen fatality-involved fires in Clarion County. The most recent fatality occurred in 2011.

In 2002, New Bethlehem Borough was affected by a large structure fire. Four businesses were totally destroyed and two businesses had minor water and smoke damage. 30 fire departments responded to the incident. No injuries or deaths were reported. A high rise housing many elderly individuals was evacuated to a Red Cross Shelter. The County HazMat Team was also involved.

A summary of fires follows:

**2014:** 87 brush fires were reported in Clarion County most were caused by debris burning. The largest was: 5 acres field fire Cause: Equipment  
Total area burned for the year was 38 acres.

Also there were 98 reported structure fire.

**2013:** 76 brush fires were reported in Clarion County most were caused by debris burning. The largest was: 4 acre field fire Cause: Equipment  
Total area burned for the year was 24.75 acres.

Also there were 144 reported structure fire.

**2012:** 22 brush fires were reported in Clarion County most were caused by debris burning. The largest was: 4 acre field fire Cause: Equipment  
Total area burned for the year was 11 acres.

Also there were 117 reported structure fire.

**2011:** 24 brush fires were reported in Clarion County, 30 day burning ban was in effect during July. Most were caused by debris burning. The largest was:  
70 acre field fire Cause: Debris Burn  
Total area burned for the year was 106 acres.

Also there were 88 reported structure fire with 1 fatality.

**2010:** 100 brush fires were reported in Clarion County, 30 day burning ban was in effect during April-June. Most were caused by debris burning. The largest was:  
260 acre field fire Cause: Equipment (Power Lines)  
Total area burned for the year was 500 acres.

Also there were 125 reported structure fire.

### Vulnerability

The vulnerability of persons and property to fire depends on a number of factors, such as the structural materials used in the facility, the contents stored in the facility, the response time by fire companies, and any lack of fire warning. Clarion County's volunteer fire companies generally have an adequate level of training and have a good response time.

Within the past ten years, many of the county's fire companies have entered into automatic mutual aid agreements with their neighboring companies, thereby increasing the equipment and manpower responding to incidents.

### Probability

Although comprehensive fire figures are not available, it is safe to say that the number of major fires in Clarion County has remained fairly constant. However, the number of smaller fires and fire related deaths remain low. It is expected that with expanded prevention programs, early detection via smoke detectors and better fire department training, this trend will continue.

Given the rural nature of Clarion County including Historic Forests, River Frontage with old stands of timber, vegetation growth on reclaimed mine sites and urban interface, most of the county is exposed to the probability of some type of Wildland Fire. All municipalities are at risk from Wildland fires. Clarion County is located in the medium to high probability for wildfire hazard (Pennsylvania Hazard Mitigation Plan).

### Mitigation -- Forest Fires

Man has been responsible for well over 50 percent of all forest fires in the United States. These fires are usually the result of carelessness, failure to extinguish campfires, arson, etc. The Bureau of Forestry has been credited for the decline in the number of hazardous forest fires. Through their organization of fire observers, equipment, training, public education, and timely issued county wide burning bans; we are relatively free from major forest fires in Clarion County.

### Mitigation -- Fire

Public education and regulations are the two best methods for preventing the start of any fire. Along with adequate training and preparation by the local firefighting agencies, the devastating effects of a fire can be reduced. Another mitigation measure is water supply. Expansion of public water systems will add additional fire hydrants. Adequate fire insurance coverage rounds out the range of fire mitigation measures.

#### **d. Snow, ice, hail, sleet, avalanche**

Winter storms occur on an average of five times a year in Pennsylvania. These storms may include snow, ice and sleet alone or in combination coupled with high winds. The predominant type of air which influences the climate of Clarion County has a polar continental source in Canada and moves in upon the region by way of tracks which vary from almost due north from the Hudson Bay region to a long westerly trajectory resulting from polar outbreaks into the Rockies which progress eastward.

During the winter season, air from the Gulf of Mexico occasionally reaches the area and causes the normal alternate periods of freezing and thawing. During the winter months about a fourth of the precipitation occurs as snow and there is about a 20

percent chance of precipitation on any day. The first appreciable snowfall is generally late in November and usually the last occurs in early April. Greatest monthly snowfall amounts occur in December and January, however, greatest amounts from individual storms usually occur in March as the moisture supply increases.

Winter storms can produce more damage than any other severe weather event, including tornadoes. These storms cause damages to communication networks, kill vegetation, collapse structures as a result of ice loading and falling tree limbs, and cause traffic accidents. The National Weather Service estimates that 85 percent of ice storm deaths are traffic related. Flooding can also be a damaging by-product of winter storms due to a rapid thaw.

#### History/ Vulnerability

Clarion County experienced major winter storms in 2014 - 2010 (see Table 2). Within the past five years, winter storms in Clarion County have caused the following:

- a. Power failures lasting four hours or longer.
- b. Loss of communication networks lasting four hours or more.
- c. Road closing for 24 hours or longer.
- d. Stranded motorists requiring emergency transportation or temporary shelter, primarily from I-80.
- e. Residents requiring evacuation or provision of supplies.
- f. Loss of water supplies.
- g. Structure collapse

Clarion County is vulnerable to winter storms varying in degrees of severity. These storms can cause road closings in the county, especially on secondary and farm roads that become virtually impassable. Winter storms have left motorists stranded, often requiring emergency assistance.

Winter storms in the county may cause business losses to all commercial centers. There could be property losses to both commercial and residential areas as a result of snow and ice loading, falling tree limbs and frozen pipes. During a winter storm, Clarion County households may become vulnerable to interruptions in utility services for heat and electricity. During power outages, residents either use alternative heating sources or relocate to friends or relatives. During widespread power outages, local fire halls, schools and churches provide heated shelter areas.

Because of Clarion County's rugged terrain, all major roads are prone to being hazardous because of winter storms. Interstate 80 is the major roadway in the county, but is seldom closed, however, is the chief source of stranded motorists. Other main roads that normally remain open but are hazardous during winter storms are U.S. 322, Pennsylvania Routes 66, 68, 28, 38, 208, and others. Township roads are prone to closing, but most residents have alternative routes of travel.

#### Probability

The severity and frequency of major winter storms is expected to remain fairly constant. However, due to increased dependence on various modes of transportation and use of public utilities for light, heat, and power, their disruption by these storms is far more significant today than in the past.

### Mitigation

It is an ongoing responsibility for our county officials and municipal officials to prepare for these winter storms. Means to reduce the hazards of these storms include building codes enforced to prevent structure collapse, discourage travel, early dismissal for public places and businesses, planned emergency measures for dealing with power loss, and emergency measures for rescuing stranded motorists.

#### **e. Windstorm, tropical cyclone, hurricane, tornado, water spout, dust/sand storm**

The Commonwealth is vulnerable to all wind related hazards. Tornadoes and windstorms are common occurrences, especially during spring and summer months. Areas of the Commonwealth are most prone to tornadoes/windstorms are the southeast, southwest and the northwest sectors.

### History/Vulnerability

The National Weather Service archives show that Pennsylvania has experienced over 700 tornadoes, ranging in magnitude from FO to F5 (tornado rating scale) resulting in deaths and over 2 billion dollars of property damage, since 1950. In that same time period, Clarion County has experienced 7 tornadoes (with the magnitude of F2 being the highest) resulting in 1 death and over \$700,000 of property damage.

Tornadoes do occur in Pennsylvania, and at least one tornado has been noted in almost all counties since the advent of severe storm records in 1854. June is the month of highest frequency, followed closely by July and August. A significant exception to this is May 31, 1985. On that day, northwest Pennsylvania experienced 20 different tornados (including 1-F5, 6-F4s, 5-F3s, and 4-F2s). The final figures for this day alone, showed 65 fatalities, hundreds injured, and property damages in the hundreds of millions of dollars.

Windstorms are usually associated with hurricanes or tornadoes, but frequently occur with thunderstorms. Some Windstorms (Microbursts) often mistaken for Tornadoes, can be just as devastating as a Tornado. Wind Sheers are usually found when a violent weather front is moving through and wind speeds of up to 100 mph have been recorded. Thunderstorms normally occur during all months except the midwinter ones, and have a maximum frequency in midsummer.

The National Weather Service has reported severe Windstorms in Clarion County: 5 each in 2013 and 2014, 3 in 2012, 1 in 2011, and 3 in 2010. All of the severe windstorms during these storms show wind gusts between 50 and 52 knots (see Table 3).

The destruction from these storms can be tremendous, destroying buildings, uprooting trees and injuring people. Winds associated with these storms can reach 100 mph and cause major damage. These winds, called microburst, caused straight-line winds estimated to be in excess of 100 mph. Fire Companies were dispatched for trees down during these storms, 2014 there were 175 dispatches and 2013 saw 220 dispatches.

Many County residents claim that the high wind damage was caused by tornadoes. Whether these storms were tornadoes or downburst/microburst are actually irrelevant because windstorms of all types have caused the following problems within the county:

- a. Power failures lasting four hours or longer.
- b. Loss of communications networks lasting four hours or more.
- c. Residents requiring evacuation or provision of supplies or temporary shelter.
- d. Severe crop losses/damage.

#### Probability

Given past history, including the fact that tornadoes occurred in all counties surrounding Clarion County in May of 1985, the odds are heavily in favor of a tornado or downburst/microburst-type storm occurring at any time in Clarion County.

If population increases and development continues in Clarion County, the number of persons and properties vulnerable to the effects of tornadoes and windstorms are expected to increase.

#### Mitigation

Because tornadoes can strike anywhere in Clarion County, especially during the spring and summer months, it is imperative to have a good warning system and an informed public that knows what to do and where to go if a tornado strike is imminent.

To improve the warning time available, Clarion County also has direct communication capabilities with Pennsylvania Emergency Management Agency (PEMA) for information and warnings via the State 800 radio system, PaSTAR and the EMnet systems. PaStar connects the 911 dispatch center with PEMA's EOC, and up to date information can be relayed back and forth. EMnet is a satellite based messaging system. The EMnet System is the medium transporter for the Emergency Alert System (EAS) which can be utilized directly from the 911 dispatch center, to initiate emergency broadcasts of severe weather alerts issued by the National Weather service. EMnet and the EAS system can also be used for notifying the public to any Hazardous Material spills or other incidents. In 2009, 2011 and again in 2013, the National Weather Service conducted "Skywarn" weather observer classes in Clarion County. In 2014 National Weather Service also conducted an "Advance Skywarn" weather observer class. These spotters are very helpful in providing the NWS vital information, which in turn, helps to increase the warning times.

#### **f. Extreme temperatures (heat, cold)**

Extreme events, by definition, are rare. An extreme temperature is when the temperature drops or raises to a level which occurs less than 5% of the time.

#### History/Vulnerability

There is no history of this type of event in the last ten years affecting the county according to the National Weather Service.

The rural nature of most of the County could have a large impact.

#### Probability

While the probability for this type of event is low there is a chance that it could occur in the county.



### Mitigation

Maintain and increase ways for providing information to the public. Develop and maintain policies and procedures to assist the public during extreme temperatures (i.e. warming and cooling centers, utilities issues, etc.).

## **g. Lightning strikes**

Lightning strikes mostly occur during storms of late spring, summer and early fall. Each year, lightning is responsible for the deaths of a hundred or so people, injuries to several hundred more, and millions of dollars in property damage, in the United States. Many case histories show heart damage. Inflated lungs and brain damage have also been observed from lightning fatalities. Loss of consciousness, amnesia, paralysis and burns are reported by many who have survived. Deaths and injuries to livestock and other animals, thousands of forest and brush fires, as well as millions of dollars in damage to buildings, communications systems, power lines, and electrical systems are also the result of lightning.

### History/Vulnerability

According to the National Weather Service there are on average 1-2 lightning strikes per square mile/per year.

#### 2014

On June 18, 2014 a truck hauling Hazardous Materials was struck by lightning while driving along Interstate 80. No materials were spilled, driver had minor injuries and truck had major damage.

Clarion County Courthouse and Communication Center were each struck by lightning with damages to electric systems, safety systems, computer systems and radio equipment.

### Probability

Clarion County could expect approximately 600-1200 lightning strikes per year. However, there are only 7-14 reported lightning strikes per year.

### Mitigation

Because lightning strikes can occur anywhere in Clarion County, it is imperative to have a good warning system and inform the public on what to do if/when storms are imminent.

It is also important that safety devices be incorporated into structures that are high risk (radio towers, tall buildings, etc.).

## **h. Famine**

Famine is caused by a widespread shortage of food. This phenomenon is usually accompanied by regional malnutrition, starvation, epidemic, and increased mortality.

### History/Vulnerability

There is no history of famine in the county over the last ten years.

### Probability

Given the current status of food availability within the country the probability of famine is low.

### Mitigation

Maintain and enforce standards for growing and raising food.

## **i. Geomagnetic storm**

In solar-terrestrial terms, a worldwide disturbance of the earth's magnetic field, distinct from regular diurnal variations. A geomagnetic storm is a temporary disturbance of the Earth's magnetosphere caused by a disturbance in space weather.

### History/Vulnerability

There is no history of this type of event in the last ten years affecting the county according to the National Weather Service.

Worst case could cause total loss of all communication systems and utilities. All municipalities are at risk from these storms.

### Probability

While the probability for this type of event is low there is a chance that it could occur in the county. Over the past few years there has been an increase in solar flare activity.

### Mitigation

These types of storms affect communication systems and utilities. Monitor National Weather Service, Space Weather Prediction Center for geomagnetic storms. Maintain systems for backing up radio communication for both emergency services and public information. Evaluate all county radio towers and equipment locations to determine protection needs. Work with utility companies to protect equipment.

## **3. Biological Hazards**

### **a. Emerging diseases that humans or animals (plague, smallpox, anthrax, West Nile virus, foot and mouth disease, SARS, pandemic disease, mad cow disease)**

Federal and state agencies have the primary responsibility for identifying, monitoring and handling these types of events in the county.

### History/Vulnerability

Human Disease: Three pandemic influenza outbreaks transpired during the 20<sup>th</sup> century in 1918, 1957 and 1968. The population of the county would be vulnerable to a pandemic causing virus due to lack of immunity and limited vaccine stockpiles. There have not been any reported cases of naturally occurring small pox globally since the 1970's. Any small pox outbreak would be an act of terrorism. Plague is not endemic to Pennsylvania. SARS has not been reported in this area.

West Nile Virus has been found in mosquito in the county. There are no reported incidents involving humans.

In 2010 there was an outbreak of Pertussis and NORO Virus.

In 2009 there was a pandemic of the H1N1 virus.

White Powder Incidents have been on the decline. Clarion County has approximately 1 or 2 white powdery substance calls a year. All of the incidents to date have been nonhazardous materials.

### Probability

The probability of this type of event affecting the county is currently medium. The World Health Organization currently has placed its Pandemic warning system at phase 6. Leading infectious disease experts have concluded a pandemic is likely to occur.

Although the probability of Clarion County being the target of a direct Domestic Terrorist attack is greater than it being the direct target of an International Terrorist Attack, it should be equally prepared for both. It is hard to determine at this point what the actual probability of a terrorist attack occurring within the county is.

The probability of West Nile virus occurring in the county in mosquitoes is high and in humans is low.

### Mitigation

Continue pandemic influenza planning with key stakeholders. Continue to plan and train for terrorist attacks involving biological/chemical weapons. Work with federal and state agencies to provide information for responders, business/industry and the public.

For the threat of West Nile Virus (WNV), the Clarion County Conservation District (CCCD) implements a yearly mosquito based integrated pest management program (IPM). This program is funded through a PA DEP grant and is carried out by a County WNV technician with technical support from a DEP Vector Management Biologist.

The CCCD IPM program has several components:

#### 1. Public Education

Includes outreach to citizens regarding such topics as personal protection from adult mosquito bites, elimination of mosquito breeding sites around homes and property, WNV disease symptoms, etc. This component also includes outreach to inform citizens of the existence of the CCCD WNV program and a contact for mosquito complaints or concerns.

#### 2. Source Reduction

Eliminate mosquito breeding sites throughout Clarion County on either public or private property. This is typically accomplished through the elimination of standing water.

#### 3. Surveillance

Seasonal surveillance of both larval and adult mosquito populations throughout Clarion County including virus isolation testing on adult mosquito species known to

be potential carriers of WNV. Adult mosquito surveillance is accomplished through several trapping methods conducted in and around areas of documented mosquito production or in response to citizen complaints. Typically the CCCD utilizes at least 15 - 20 adult mosquito traps per week during the mosquito breeding season (April 1st - October 15th). Larval and adult mosquito surveillance locations can and do vary throughout a typical season with an ultimate goal of providing "coverage" in every municipality within Clarion County.

#### 4. Control

Conduct larval mosquito control of known mosquito breeding sites throughout the County. Biological larvicides are typically used for effective larval control. Adult mosquito control is conducted when collections surpass CCCD control matrix threshold numbers. The adult mosquito control threshold is variable and depends on such factors as seasonality, documented virus activity, species distribution, human populations, and ultimately weather conditions. Synthetic pyrethroids (Permethrin, Sumithrin, and Resmethrin) are used to control adult mosquitoes using either low volume (LV) backpack applied barrier applications, or ultra-low volume (ULV) truck mounted applications. Frequency of adult applications varies from year to year."

#### **b. Animal or insect infestation or damage**

Federal and state agencies have the primary responsibility for identifying, monitoring and handling these types of events in the county.

##### History/Vulnerability

We are vulnerable to this type of event. The following are either currently effecting or have affected Clarion County:

Insects and other Invertebrates: Japanese Beetles, Gypsy Moth, Emerald Ash Beetle, Ahemlock Woolly Adelgid and Siren Wood Wasp

Animal Pathogens: West Nile Virus and Chronic Wasting Disease

Fishes, Diseases, Invertebrates: Zebra Mussel and Round Gobe

##### Probability

The probability to this type of event is high.

##### Mitigation

Continue monitoring by federal and state agencies.

## **B. TECHNOLOGICAL CAUSED HAZARDS**

### **1. Central computer, mainframe, software, or application (internal/external)**

Computer systems are used throughout the county by businesses, industries, emergency responders and residents.

##### History/Vulnerability

There have been computer viruses causing problems in some areas. There have been

many incidents across the United States and the world of hacking. There have been no reports of hacking in the county.

The rural nature of the county limits use of computers at residence and some municipalities because of lack of internet access. Approximately 70% of the county does not have hard wired systems and satellite systems are extremely expensive.

Clarion County Governments, Clarion University, public safety agencies, hospitals, extended care facilities, businesses, service industries and utilities all rely heavily on the internet for day to day operations.

#### Probability

The probability of this type of event is high.

#### Mitigation

Ensure security and virus programs are current. Implement and train computer users on save and best practices for keeping their computer systems save.

### **2. Ancillary support equipment**

The county has not identified any ancillary support equipment at this time. We will continue to research this type of event and address it in the next revision.

### **3. Telecommunications**

Telecommunications includes voice, video, and Internet communications services.

The county has many providers for each system. The main providers for wired telephone are Verizon, Sprint, Venus and Windstream. For wireless the main providers are Verizon, AT&T and Sprint. Video is provided by AT&T Broadband, Comcast and Sting Communications for wired service. Dish and Direct TV are the main satellite systems.

#### History/Vulnerability

In August 2003, a widespread power outage occurred and resulted in twelve municipalities within the northwestern section of Clarion County being without power for approximately twelve hours as a result of the blackout. The lack of power caused a loss of some telecommunication systems.

The rural nature of the county and lack of telecommunication systems infrastructure, we are vulnerability to these types of events.

2014: 9 reported major incidents of telephone outages

2013: 7 reported major incidents of telephone outages

2012: 8 reported major incidents of telephone outages

2011: 5 reported major incidents of telephone outages

#### Probability

The probability of these types of events is high.

#### Mitigation

Maintain emergency procedures at 9-1-1 center for this type of incident.

Work with telecommunication companies to identify and address possible incident

scenarios.

Ensure a redundant public information system and a redundant system for 9-1-1 calls.

Work with providers to ensure backup generators at switching stations.

#### **4. Energy/power/utility**

The electric suppliers for the county are West Penn Power, Central Electric, Penelec Electric and United Electric. The natural gas suppliers are Columbia Gas, Dominion Peoples, Equitable Gas, National Fuel, T.W. Phillips Gas and UGI Central Penn Gas.

##### History/Vulnerability

In August 2003, a widespread power outage occurred as a result of a disruption to the power grids in states to the north and east of Pennsylvania and then cascading into the Commonwealth. Early reports estimated the total number customer affected in Pennsylvania at over 100,000. Twelve municipalities within the northwestern section of Clarion County were without power for approximately twelve hours as a result of the blackout. Parts of several municipalities were without power for as long as 48 to 72 hours.

The rural nature of the county and lack of infrastructure causes us to be vulnerability to these types of events.

2014: 7 reported major incidents of power outages  
2013: 11 reported major incidents of power outages  
2012: 5 reported major incidents of power outages  
2011: 9 reported major incidents of power outages  
1 incident had power out to 4 municipalities

##### Probability

The probability of these types of events is medium. Most outages are caused by storms and accidents.

##### Mitigation

Work with energy companies to identify and address possible incident scenarios. Ensure good public information system.

### **C. Human Caused Events**

#### **1. Accidental**

##### **a. Hazardous Materials**

There are large amounts of chemicals, oils, radioactive materials, and other hazardous materials located in or transported through Clarion County daily.

##### History/Vulnerability

There have been highway spills from truck accidents in the past; however, the potential for accidents involving fuel oils, propane gas, radioactive medical supplies, gasoline and other toxic and dangerous liquids remains high.

The following are incidents totals in the county:

2014: there were 6 incidents  
2013: there were 5 incidents  
2012: there were 12 incidents  
2011: there were 13 incidents  
2010: there were 2 incidents

To date, there have been no Hazardous Materials releases from fixed facilities that would require notification under SARA Title III.

In 2004 Clarion County Law Enforcement Agencies started to experience incidents involving clandestine drug labs, and in 2006 a major Meth Lab bust was conducted involving several emergency response disciplines within Clarion County. All available training has labeled these incidents as being potentially a Hazardous Materials situation. Clarion County EMA, along with the Clarion County Sheriff's Department, will be taking that approach, and responders will be instructed to treat their response the same as a Hazardous Material incident.

Natural gas incidents involving leaks, accidents, and line ruptures are common. Transmission lines are old. The following are gas incidents totals in the county:

2014: there were 38 incidents  
2013: there were 34 incidents  
2012: there were 12 incidents  
2011: there were 42 incidents  
2010: there were 25 incidents

#### Probability

The probability of a hazardous material event is high.

The county has over 648 miles of State and Federal roads. The major transportation network in the county includes Interstate Route 80, US Route 322, and State Routes 28, 66, 68, and 208. All of these routes carry extremely heavy truck traffic and are a constant potential scene of a hazardous materials incident.

At the present time, Clarion County has twelve (12) reporting facilities and plans approved by the Local Emergency Planning Committee (LEPC).

Clandestine Drug Manufacturing Labs are in the county.

There are many oil/natural gas wells and pipelines throughout the county. There also is one underground natural gas storage facility. With the increase in deep gas drilling there is an increase in new pipelines within the county.

When the cost of gasoline and fuel oil increase some residents are making their own bio-fuel. This requires chemicals, different types of oils (cooking, vegetable, etc.) and other materials. To date these locations have been in rural areas. We had an incident in 2011 at a farm where the individual was making his own bio-fuel; there was a fire and spill of cooking oil.

Clarion County has one public airport serving general aviation. No commercial

flights occur to the airport.

### Mitigation

The Clarion County Local Emergency Planning Committee (LEPC) will be updating the Commodity Flow Analysis in 2015. This project will be completed by an independent agency.

The Clarion County LEPC has determined that a 0.3 mile vulnerability zone will be used for planning of these transportation concerns since it is unknown the chemical or quantities involved. This is consistent with guidance provided by the DOT Emergency Response Guidebook. No hazardous transportation statistics are available.

### Existing Response Capability for Hazardous Materials

#### Hazardous Materials Team

McCutcheon Enterprises Inc. of Apollo, PA is the current contracted Clarion County HazMat Response Team, Act 165 Certified.

In 2006, Clarion County Office of Emergency Services (OES) and the Clarion County LEPC developed the Special Hazards Responders of Clarion County Emergency Response Team (SHRCC). This team is currently comprised of volunteers from throughout the county and is trained to handle HazMat incidents at a defensive level. Even though this team will only be working as a defensive operations unit, they are trained to the HazMat Technician level. The primary purpose of this team will be early detection and confinement, until the contracted Act 165 HazMat Response Team arrives on scene.

#### Equipment/Supplies

Clarion County has a HazMat Response Trailer. This unit will give the SHRCC the capability of responding to an incident with containment material/equipment, personal protective equipment, detection/identification equipment, and communications. HazMat spill kits, personal protective equipment (Hazguard Suits), decontamination pools, and binoculars (for scene size up and hazard recognition); have been provided to each fire department in Clarion County. There is a sufficient amount of absorbent material for a moderate size (vehicle accident) hydrocarbon spill, but there is still a shortage of hazardous chemical absorbent and containment materials available in the county.

There are limited quantities of diking materials available within Clarion County. Penn DOT is the primary source of the material.

#### Personnel/Training

At the present time, most of the active fire and EMS providers in Clarion County are trained to the HazMat Recognition and Identification Awareness or HazMat Operations level.

Clarion County OES responds to HazMat incidents, when requested, and evaluates the situation to determine appropriate HazMat response (additional



equipment, manpower, or certified HazMat Team).

### Planning

There are currently twelve (12) SARA facility plans, all of which have been approved by the Clarion County Local Emergency Planning Committee. The annual review and update of these plans will be approved by the LEPC during the review of this Hazardous Materials Emergency Response Preparedness Assessment. All twelve plans have been submitted to the Pennsylvania Emergency Management Agency, Western Region Office.

### Exercises

Table-top exercises are conducted during the creation and review of each Off-Site Emergency Response Plan.

## **b. Explosion/fire**

Explosions with/without fire are rare in the county. These could be caused by gas leaks (natural or propane), wells (gas and oil), chemicals (i.e. drug labs) or explosive devices.

### History/Vulnerability

There have only been 7 incidents in the last five years, these were caused by natural gas leaks.

In 2014 there were 2 explosions

In 2013 there was 1 explosion

In 2012 there was 1 explosion

In 2011 there was 1 explosion

In 2010 there were 2 explosions

In March of 2006, there was a house explosion in Clarion Borough that was attributed to a natural gas leak. In October of 2004, there was a residence that exploded in Porter Township. This explosion was attributed to natural gas that possibly seeped into the basement. There was 1 fatality and 2 others injured in the incidents.

### Probability

The probability of these types of events is low, however; the county has had incidents involving all types of leaks, chemicals and explosives. The potential was there for these incidents to have escalated.

### Mitigation

Continue public and emergency responder education on awareness to these types of events.

## **c. Transportation accident**

A transportation accident is an incident involving highway, air or rail transport. A disaster may be defined as an accident resulting in death, serious injury, or extensive property loss or damage.

## History/ Vulnerability

### Highway Transportation Accidents

Clarion County has one interstate highway, producing heavy traffic flow. Traffic estimates on Interstate 80 are approximately 20,000 vehicles per day of which 9,000 are trucks with 465 of them are carrying placard hazardous materials. Numerous state routes provide intra-county and inter-county traffic flows. On January 7, 2015 there was a major accident on Interstate 80 westbound at mile marker 65. The accident involved 9 tractor trailer trucks and 10 other vehicles and occurred during whiteout snow conditions. This accident caused injuries to 24 people with 2 fatalities. Interstate 80 westbound was closed for over 12 hours causing congestion on alternate routes.

A summary of reportable traffic accidents for 2009 - 2013 follows:

<b>Year</b>	<b>Crashes</b>	<b>Fatalities</b>	<b>Injuries</b>
2013	498	12	351
2012	468	7	337
2011	462	7	239
2010	478	9	253
2009	485	7	389

The Pennsylvania Department of Transportation reports that the 5-year estimated traffic growth for Clarion County is 1.5 percent.

There are 27.9 miles of interstate highway, 620 miles of federal and state highways, and 659 miles of paved municipal and secondary roads in Clarion County.

The sections of highway within Clarion County where accidents are most likely to occur are:

Interstate 80

PA Rt. 68 (South Fifth Avenue), one-half mile West of Clarion

PA Rt. 66, one mile South of Clarion (Stone House Road)

Intersection of Exit 62 of I-80 and PA Rt. 68 due to massive traffic congestion

Intersection of Exit 64 of I-80 due to poor visibility

US Rt 322, one and one-half miles East of Clarion (Bull Barn Turn)

With highway accidents, there is an added vulnerability that stems from the age and upkeep of bridges throughout the Commonwealth. According to the Federal Highway Administration the following is information on bridges in Clarion County:

<b>Year</b>	<b>Total Bridges</b>	<b>Structurally Deficient</b>	<b>Functionally Obsolete</b>	<b>Deficient Bridges</b>
2012	208	38	12	50

### Air Transportation Accidents

Clarion County has one general aviation airport within its boundaries. However, because of the Clarion Omni, a major airway out of Greater Pittsburgh International Airport is directly over the county. This places approximately 50 commercial flights a day over the county.

According to the Clarion County Airport, the last reported aviation accident occurred on September 20, 2014, a Challenger LSA single engine aircraft crashed on takeoff. The pilot was severely injured and flown by MedeVac to hospital.

On January 16, 1995, a Cessna 310 aircraft with inoperative deicing system attempted an unscheduled landing at Clarion Airport with considerable ice on left wing. Aircraft landing gear collapsed and aircraft departed left side of runway. No fatalities were reported.

Since September 11, 2001, all airports have become more security conscience, and most general aviation airports have enacted some form of additional security. In addition, to emphasis on employee education on security, the following measures are in effect at the Clarion Airport:

- ❖ Hangar doors are kept locked though out the day, and only opened when aircrafts are to be removed
- ❖ Security signs installed with 800-GA SECURE phone number
- ❖ Regular drive-through patrols initiated by Pennsylvania State Police

The Clarion Airport has finalized an Airport Hazard Zoning Plan which addresses flight paths & height restrictions.

### Rail Transportation Accidents

There are no rail operations in Clarion County.

### Probability

Considering the transportation growth within the county, it can be assumed that transportation accidents may increase. Airplane accidents should remain minor.

### Mitigation -- Highway Transportation

In some areas of the county, the speed limits have been reduced from 55 mph to 45 mph or lower to limit the potential severity of accidents.

Penn DoT has also started safety projects on Route 36 and Interstate 80 with the placement of anti-skid material on the roadway. This will help with traction on these roadways.

By far, the most dangerous and frightening of highway accidents is an accident involving one or more school buses. Therefore, every municipal police and fire company should have a special plan of action ready to implement in the event of such an accident. School districts should also teach their students how to react in the event of a bus accident. Basic first aid should also be taught to every student.

#### Mitigation -- Air Transportation

As described earlier, the greatest vulnerability for an air accident is near the airport. Therefore, those fire and rescue squads in the area should be trained to respond to such a potential accident. Preparedness and training is the best tool in coping with any potential aviation accident.

#### **d. Building/structure collapse**

Collapse of structures can be caused by different events (i.e. explosion, strong winds, flooding, heavy snows, fires, structural problems, etc.).

#### History/Vulnerability

The county has seen different types of collapsed structures over the last ten years. Most were caused by fires with some from strong winds, heavy snows, flooding and explosions. (For specifics see history under other hazards.)

#### Probability

With the county vulnerable to both man and natural caused events collapses will occur.

#### Mitigation

Through the use of building and flood plan codes these events should decrease. Municipalities shall identify structures that are unsafe and require that they be repaired or demolished. Continue training for emergency responders to identify unsafe structures and conditions. Train and equip emergency personnel for response to structural collapses.

#### **e. Energy/power/utility failure**

Energy emergencies can include both fast developing fuel shortages, such as those caused by an oil embargo or a power or natural gas outage, and creeping shortages caused by rising costs of fuels and electricity.

In addition, a shortage of energy in one form (such as natural gas) can impact on and cause shortages in other fuels (propane), heating oil, and residual oil, which are substitutes for natural gas. These emergencies can threaten both our health and livelihoods. Nuclear power incidents are not considered here except as they may impact on supply of electricity.

There are between 113-199 miles of natural gas pipe lines throughout the county (U.S. Dept. of Transportation, Pipeline and Hazardous Materials Safety Administration). Companies currently with major lines in the county are Columbia Gas, Dominion Peoples, Dominion Transmission Inc., Equitable Gas, National Fuel, T.W. Phillips Gas & Oil and UGI. There are many small companies that have pipe lines in the county.

#### History/ Vulnerability

Reported utility outages in Clarion County, 2014 there were 30, 2013 there were 21, 2012 there were 25, 2011 there were 51 and 2010 there were 18. These were mainly due to severe weather or vehicle accidents. The largest of these incidents affected approximately 2,200 customers in 4 municipalities, 1000 customers in

East Brady Borough and Brady Township area and lasted about 24 hours. No sheltering was needed, however; Red Cross provided hot meals.

Low income or elderly households have required assistance meeting fuel or electric expenses during winter months.

Severe weather, freezing lines and downed power lines can cause energy shortages. Accidents may result in temporary localized power outages.

The worst case situation that could occur in the county would be an extended power or fuel outage during severe winter weather.

#### Probability

Temporary, localized outages occur several times a year, generally as a result of accidents or electrical storms. Gas leaks will continue to be an issue due to old pipelines. Countywide power or fuel outage is unlikely.

#### Mitigation

Residents and utility companies should maintain clearance of trees and shrubs around right-of-ways, lines, poles and transformers. Gas companies should replace old pipelines.

### **f. Fuel/resource shortage**

Fuel shortages can be both fast developing local shortages, those caused by an oil embargo, or creeping shortages caused by rising costs of fuels.

Fuel shortages can also be caused by localized imbalances in supply. Strikes, disasters and severe weather can disrupt fuel movements and cause local shortages.

#### History/Vulnerability

Over the last ten years there have been no wide spread fuel shortages. Some local stations have run out of fuel because of weather issues.

#### Probability

The United States receives most of its oil from foreign countries; this has affected fuel capacities before and may in the future.

#### Mitigation

Work with local distributors and dealers to maintain fuel capacities during disasters and ensure supplies for emergency personnel.

### **g. Air/water pollution, contamination**

Pollution is the introduction of contaminants into an environment that causes instability, disorder, harm or discomfort to the ecosystem. Contamination is the presence of hazardous materials or blood borne pathogens on locations, people, animals and equipment were it is not normally found.

### History/Vulnerability

There have been highway spills from truck accidents in the past; however, the potential for accidents involving fuel oils, propane gas, radioactive medical supplies, gasoline and other toxic and dangerous liquids remain high.

There have been transportation incidents in the county that have led to pollution and/or contamination:

- 2014 - 2 causing water pollution and 6 involving ground contamination
- 2013 - 1 causing water pollution and 5 involving ground contamination
- 2012 - 2 incident causing air pollution, 1 causing water pollution and 8 involving ground contamination
- 2011 - 4 incident causing air pollution and 12 involving ground contamination
- 2010 - 2 incident causing air pollution and 1 causing water pollution and 2 involving ground contamination

To date, there have been no Hazardous Materials releases from fixed facilities that would require notification under SARA Title III.

Since 2009 there have been 5 leaks from oil wells that caused ground contamination and 5 that caused water pollution, and 7 leaks from gas wells that caused air pollution.

### Probability

The probability of air/water pollution or a contamination event is high.

Clarion County is located in the Central Allegheny River Basin, as designated in the State Water Plan. This includes the Allegheny and Clarion Rivers including their many tributaries.

The county has over 648 miles of State and Federal roads. All of these routes carry extremely heavy truck traffic and are a constant potential scene of a hazardous materials incident.

At the present time, Clarion County has twelve (12) SARA reporting facilities and plans approved by the Local Emergency Planning Committee (LEPC).

There has been an increase in Clandestine Drug Manufacturing Labs in the county over the past couple of years.

There are many oil/natural gas wells and pipelines throughout the county.

Clarion County has one public airport serving general aviation. No commercial flights occur to the airport.

There is a great demand for extracting natural gas from the Marcellus Shale formation. This requires both vertical and horizontal drilling, combined with a process known as 'hydraulic fracturing.' These well sites of many hazards including chemicals, radioactive materials and explosives. After the well is drilled, drillers pump large amounts of water mixed with sand and other chemicals into the shale

formation under high pressure to fracture the shale around the well. The amount of water typically required for hydraulic fracturing ranges from about one million gallons for a vertical well to approximately five million gallons for a vertical well with a horizontal lateral. This used water creates issues in itself in that the water contains contaminants such as brine, radioactive materials and other chemicals.

### Mitigation

#### Hazardous Materials Team

McCutcheon Enterprises Inc. of Apollo, PA is the current contracted Clarion County HazMat Response Team, Act 165 Certified.

Clarion County Office of Emergency Services (OES) and the Clarion County LEPC developed the Special Hazards Responders of Clarion County Emergency Response Team (SHRCC). This team is currently comprised of volunteers from throughout the county and is trained to handle HazMat incidents at a defensive level. Even though this team will only be working as a defensive operations unit, they are trained to the HazMat Technician level. The primary purpose of this team will be early detection and confinement, until the contracted Act 165 HazMat Response Team arrives on scene.

#### Equipment/Supplies

Clarion County has a HazMat Response Trailer. This trailer will give the SHRCC the capability of responding to an incident with containment material/equipment, personal protective equipment, detection/identification equipment, and communications. HazMat spill kits, personal protective equipment (Hazguard Suits), Decontamination pools, and binoculars (for scene size up and hazard recognition); have been provided to each fire department in Clarion County. There is a sufficient amount of absorbent material for a moderate size (vehicle accident) hydrocarbon spill, but there is still a shortage of hazardous chemical absorbent and containment materials available in the county.

There are limited quantities of diking materials available within Clarion County. Penn DOT is the primary source of the material.

#### Personnel/Training

At the present time, most of the active fire and EMS providers in Clarion County are trained to the HazMat Recognition and Identification Awareness or HazMat Operations level.

Clarion County OES upon request; responds to HazMat incidents and evaluates the situation to determine appropriate HazMat response (additional equipment, manpower, or certified HazMat Team).

#### Planning

There are currently twelve (12) SARA facility plans, all of which have been approved by the Clarion County Local Emergency Planning Committee. The annual review and update of these plans will be certified by the LEPC during the review of this Hazardous Materials Emergency Response Preparedness Assessment. All twelve plans have been submitted to the Pennsylvania

### Exercises

Table-top exercises are conducted during the creation and review of each Off-Site Emergency Response Plan.

#### **h. Water control structure/dam/levee failure**

Any dam has the potential for creating a major disaster. Dam failures usually occur with little or no notice, wreaking havoc on an unsuspecting community. The worst dam failure in the nation occurred in Johnstown.

The National Dam Safety Program authorized the U.S. Corps of Engineers to undertake a national program of inspecting dams for the purpose of protecting human life and property. Dams covered under the program included all structures over 25 feet high impounding over 15 acre-feet of water. Structures less than six feet high were not included.

Dams in Pennsylvania have been classified by hazard potential as follows:

**Class 1 Dams** -- These are dams with potentially high hazard capabilities, should they fail. This would include dams which store a significant quantity of water located on either small streams or main stem rivers or dams higher than 10 feet located on the main stems. Most of these dams would have the potential of causing both life and property losses if they failed.

**Class 2 Dams** -- These are dams which have intermediate flood hazard potential if they fail. These dams store a sufficient quantity of water to cause property damage, but probably not loss of life in the event of failure.

**Class 3 Dams** -- These are dams which have low flood hazard potential if they fail. Most property losses, if any, would most likely occur in the reach just below the dam.

**Class 4 Dam** -- These are minor structures used to impound water for irrigation, water supply intakes, recreation, etc. The flood hazard potential is essentially nonexistent.

### History/Vulnerability

There is no record of a dam failure occurring in Clarion County.

Class 1 and Class 2 dams would pose the greatest threat to downstream properties, should they fail.

Only 1 dam in the county falls under these classifications:

Piney Dam - An Emergency Action Plan exists, and is annually updated.

There are 3 dams located outside the county, but would impact the county, that fall under these classifications:

East Branch Dam – Elk County

Kinzua Dam – Warren County



Tionesta Dam – Forest County

An Emergency Action Plan exists for all 3 dams, and updated annually.

There are no dams in Clarion County currently regarded as unsafe.

#### Probability

With continued maintenance of county dams, no failure should occur in the future.

#### Mitigation

Ways of preventing this type of disaster from happening mainly involve the enforcement of safety standards for dam construction and maintenance and the installation of an adequate warning system. The Army Corps of Engineers inspects all dams in the U.S. for the purpose of protecting lives and property. A Presidential Directive in 1978 accelerated the Corps efforts in Pennsylvania. The State of Pennsylvania has also passed a Dam Safety Act which requires state inspection and the rating, in categories, of each dam in the State from most hazardous to least hazardous (Category 1 to Category 3).

### **i. Financial issues, economic depression, inflation, financial system collapse**

The United States has had periods of economic depression, inflation and financial system collapse.

#### History/Vulnerability

Currently the United States is in a depression with the financial systems collapsing or ready to collapse. The county is vulnerable to these types of events.

#### Probability

The probability of these types of events is currently high.

#### Mitigation

The government is currently attempting to mitigate the issues. The county will be attempting to work with Clarion University to help study these types of events to determine other mitigation programs.

### **j. Communications system interruptions**

EMS, fire and law enforcement agencies are the primary groups using the county communication systems. There are other agencies (i.e. transportation providers, public works departments, school districts) that have their own systems. There are also communication systems between the county and the state agencies.

#### History/Vulnerability

Over the last 5 years there have been occasions when parts of the systems were interrupted. These events were caused by lightning strikes, construction incidents and carrier outages. Weather and human caused incidents will keep us vulnerable to interruptions.

2014: there were 4 reported major outages

2013: there were 2 reported major outages

2012: there were 4 reported major outages

2011: there was 1 reported major outage

2010: there were 3 reported major outages

#### Probability

There is always a potential for this event to occur, however; it is low.

#### Mitigation

Continue to develop redundant systems, upgrading communication sites and continue preventive maintenance programs.

### **k. Misinformation**

Misinformation is false or inaccurate information that is spread unintentionally.

#### History/Vulnerability

There is no history of this event over the last ten years affecting the county during an incident.

#### Probability

There is always a potential for this event to occur due to lack of correct information being provided and social media sites. The rural nature of the county cause issues with providing correct information in a timely manner.

#### Mitigation

Develop a good public information system and education the residents/visitors on that system. The county is currently working on systems to work with the broadcast media. These systems include but are not limited to social media sites, web sites, reverse telephone notification systems and outdoor public notification systems.

### **I. Oil & Gas Wells**

Pennsylvania was the first place in the world where a commercially successful well was drilled for oil production. This well was just west of Clarion County in Venango County. Natural gas wells followed. Pennsylvania is a significant producer of natural gas in the northeast United States.

Since the first commercial oil well was drilled in Pennsylvania in 1859, perhaps as many as 400,000 oil and gas wells have been drilled in the state.

#### **Current Wells**

Gas and Oil wells are still operational in the county. According to Pennsylvania DEP there are 4,213 oil and gas wells in Clarion County. Recent advances in drilling technology and rising natural gas prices have attracted new interest in the gas located in the Marcellus shale formation. The Marcellus Shale is a rock formation that underlies all of Clarion County at a depth of 5,000 to 8,000 feet.

#### History

Today's wells are drilled either horizontal or vertical. Most oil wells are horizontal and natural gas wells are either horizontal or vertical. Most shallow gas wells are all vertical and the Marcellus shale wells are vertical then horizontal.

With all of Clarion County having the Marcellus shale formation there has been an increase in this type of well drilling. This type of well drilling brings with it different hazards not seen with shallow well drilling.

There have been incidents involving wells these include the following:

Releases from well heads being struck

Gas migrating into water wells (None have been reported in Clarion County)

Gas migrating into structures (None have been reported in Clarion County)

Vulnerability

Extracting natural gas from the Marcellus Shale formation requires both vertical and horizontal drilling, combined with a process known as ‘hydraulic fracturing.’ To drill these wells requires 3-4 acres of land for roads and drilling pad. There is a large amount of employees, equipment, supplies and drilling rigs are much larger than standard well drilling rigs. These sites have many hazards including confine spaces, high angle drill rigs, chemicals, radioactive materials, explosives and high pressure equipment. After the well is drilled, cased and cemented to protect groundwater and the escape of natural gas and other fluids, drillers pump large amounts of water mixed with sand and other fluids into the shale formation under high pressure to fracture the shale around the well, which allows the natural gas to flow freely to the well bore. The amount of water typically required for hydraulic fracturing ranges from about one million gallons for a vertical well to approximately five million gallons for a vertical well with a horizontal lateral. This used water creates issues in itself in that the water contains contaminates such as brine, radioactive materials and other chemicals. Also, Clarion County has many deep underground coal mines that are not mapped. These can lead to issues in the well drilling process.

<b>Gas and Oil Wells</b>		
<b>Year</b>	<b>Permits</b>	<b>Drilled</b>
2014	11	5
2013	24	10
2012	51	28
2011	125	57
2010	144	56
<b>Unconventional Gas Wells</b>		
<b>Year</b>	<b>Permits</b>	<b>Drilled</b>
2014	5	0
2013	11	1
2012	22	4
2011	31	10
2010	10	2

Probability

The increase in drilling activities increases the potential for incidents. The occurrence of this event is medium, however; the potential for a large scale event is present.

### Mitigation

Obtain information on well location, access road location, address the locations and place in dispatch maps. Work with state agencies, companies and local officials/responders to identify and address possible incident scenarios. Coordinate with state agencies and gas companies to provide training for emergency response agencies. Ensure good public information system.

### **Orphaned/Abandon Wells**

Prior 1985 gas and oil wells were not registered in Pennsylvania, leaving many old wells were not properly plugged when abandoned.

### History/ Vulnerability

Since 1956 has the state been permitting new drilling, and not until 1985 were oil and gas operators required to register old wells.

An unplugged abandoned well can be a hazard to the health and safety of people living near it, or it can cause pollution. For example, a rusted-out casing in a gas well can let natural gas flow underground and accumulate in the basement of a nearby building, with explosive consequences. Occasionally, gas leaking from an old well contaminates nearby water well.

An old well might be a conduit for salt brine from deeper formations to pollute fresh ground water, or to discharge at the surface. In some cases, oil leaks from abandoned wells, polluting soil and water.

In the vicinity of a coal mine, an old well can be a conduit for explosive gas to enter the mine -- a serious mine safety problem. Where coal mining has occurred, an old well can allow acidic mine water to discharge at the surface.

In Clarion County there are approximately 193 orphaned wells, 44 abandon wells identified (as per DEP) and likely many more abandoned not yet identified.

### Probability

The frequency of incidents involving unplugged abandoned wells occurring in the county expects to remain low. However, considering the numerous orphaned/abandoned wells located within the county, explosions or pollution resulting from the wells cannot be ruled out.

### Mitigation

Because abandoned wells can cause many problems, the Oil and Gas Act of 1984 requires oil and gas well operators to plug non-producing wells.

Some gas wells are drilled to depths of 5,000 feet and deeper. Oil wells are usually shallower; many are less than 1,000 feet deep. Clarion County has Shallow oil as shallow as 550' but typically between 900' to 1200'. Generally, to properly plug a well, all of the pipe should be removed and the well bore cleaned out. Then the well bore must be filled with a non-porous material. In crucial portions of the well, such as coal seams, oil and gas formations and fresh groundwater aquifers, a cement plug is needed to seal off those zones from each other. The result will be a "plug" which prevents gas or liquids from entering or flowing in the well bore.

Cement is used only across formation bearing or having borne oil gas or water below the surface casing seat, and then a cement plug is set at the bottom of the surface casing seat. Then depending if coal or noncoal, the well is “topholed” with noncementing material if a noncoal well, or a vent is installed if a coal well.

In 1992 the legislature amended the Oil and Gas Act to allow certain oil or gas wells abandoned before April 1985 to be classified as "orphan" wells. That amendment also gave DEP the authority to plug orphan wells and created a modest means of funding this work. Landowners, leaseholders and oil and gas operators are thus relieved from the responsibility to plug orphan wells on their properties (if they received no "economic benefit" from the well after April 1979). DEP's Bureau of Oil and Gas Management runs the Orphan Well Program to locate and plug orphan wells.

The Orphan Well Plugging Fund is a separate account in the state treasury which provides money for the Orphan Well Program. The money in this fund comes from surcharges on permit application fees for new oil and gas wells. Taxpayers do not finance the Orphan Well Plugging Fund; the oil and gas industry does.

DEP contracted for the plugging of 18 orphan wells in Clarion County. The average plugging cost is \$10,600 per oil well and \$53,700 per gas well.

## **2. Intentional**

- a. **Terrorism (explosive, chemical, biological, radiological, nuclear, cyber)**  
The FBI defines terrorism as “the unlawful use of force against persons or property to intimidate or coerce a government, the civilian population, or any segment thereof, in furtherance of political or social objectives”.

Two types of terrorism identified by the FBI are Domestic Terrorism and International Terrorism.

Domestic terrorism involves group(s) or individual(s) whose terrorist activities: Involve acts dangerous to human life that violate federal or state laws; appear intended to intimidate or coerce a civilian population; to influence the policy of a government by intimidation or coercion; to affect the conduct of a government by mass destruction, assassination or kidnapping; occur primarily within the territorial jurisdiction of the U.S and are lacking foreign sponsorship.

International terrorism involves groups of individuals whose terrorist activities are foreign-based and/or directed by countries or groups outside the United States or whose activities transcend national boundaries. Examples would be the Al Qaeda and ISIS terrorist networks. These groups have been responsible for a number of attacks on US interests including the terrorist attacks of September 11, 2001.

Using the acronym ‘**B-NICE**’ we can describe 5 types of terrorist attacks.

- **Biological** – Most likely to occur and like a nuclear attack, can have the greatest impact. Especially to human life. Hardest to detect because the

symptoms don't show up right away and many individuals can become infected before they are detected.

#### 4 Types of Biological Agents and Common Examples:

- Bacteria – Anthrax and Cholera
  - Viruses – Small Pox and Ebola
  - Rickettsia – Q fever
  - Toxins – Botulism, SEB, and Ricin
- **Nuclear/Radiological** – Radiological dispersion is much more likely to occur than a nuclear incident. A nuclear incident can cause the most damage and have the greatest impact. Could be caused by a nuclear bomb attack or an attack on a nuclear facility.
  - **Incendiary** – Fire Bombs, Liquid Fuel Bombs (Air Craft), Chemical Reactions.
  - **Chemical** – Generally used by government agencies. Can be spread in the form of liquid, vapor, aerosol, solids and gases.

#### 5 Types of Chemical Agents:

- Riot Control Agents – Tear Gas or Pepper Spray. Affects the eyes and respiratory system.
  - Choking Agents – Phosgene or Chlorine. Affects the respiratory system.
  - Blood Agents – Hydrogen Cyanide. Affects the respiratory and circulatory systems.
  - Nerve Agents – Tabun, Sarin, Soman, and VX. Affects the nervous system
  - Blister Agents – Mustard Gas and Lewisite. Causes burns to the skin and internal organs.
- **Explosive** - Most common tool of terrorist. Weapons of choice; dynamite, pipe bombs and car/truck bombs.
  - **Cyber-Terrorism** - Another form of terrorism that has emerged recently is Cyber-Terrorism. Cyber-Terrorism is best described by altering the Federal Bureau of Investigation's Definition of terrorism, to include "using computing resources" as another method of intimidation.

Cyber-Terrorism can be anything from a "Virus"; to outside sources accessing data from any computer system via the internet; to disrupting any or all services provided to the public. Adding to the problem is that the public and private sectors are relatively ignorant of just how much their life depends on computers as well as the vulnerability of those computers.

In recent years, cyber terrorism has become a larger threat than in years past. Cyber terrorism can be defined as activities intended to damage or disrupt vital computer systems. These acts can range from taking control of a

host website to using networked resources to directly cause destruction and harm. Protection of databases and infrastructure appear to be the main goals at this point in time. Cyber terrorists can be difficult to identify because the internet provides a meeting place for individuals from various parts of the world. Individuals or groups planning a cyber-attack are not organized in a traditional manner, as they are able to effectively communicate over long distances without delay. One of the more prominent groups involved in large-scale hacking events recently is the group "Anonymous." They have been known to overtake websites, and alter the content that is presented to the public. The largest threat to institutions from cyber terrorism comes from any processes that are networked and controlled via computer. Any vulnerability that could allow access to sensitive data or processes should be addressed and any possible measures taken to harden those resources to attack.

#### History/Vulnerability

Prior to 9/11/2001, the threat of international terrorism was unheard of in the country, but that has all changed. Surrounding counties nearly became direct targets of an international terrorist attack when high-jacked Flight 93 flew over nearby counties and crashed in Somerset County.

A second wave of terror began a few weeks later when letters, tainted with anthrax, began showing up in Florida, New York, and Washington DC. This second wave of terror hit Clarion County also, with many calls of suspicious substances being found. Clarion County's contracted HazMat Response Team responded to these incidents, but found no legitimate threats. The following is a list of some of the occurrences that have been documented in Clarion County:

2001 White Powder Incidents: In October of 2001 Clarion County had a numerous amounts of white powdery substance calls. The contracted Clarion County HazMat Team responded to incidents in New Bethlehem and Rimersburg for cleanup of the packages. All of the incidents were noted to be a hoax.

Although terrorist will usually select their targets based on the impact that the event will make, the reality is that targets of terrorist can include anything, can target anyone and can occur anywhere.

In general, the following is list of potential targets that a terrorist may select:

- Government facilities including Military installations.
- Commercial facilities, particularly multinational or international firms.
- Communications Centers (9-1-1)
- Industrial facilities, particularly those storing large quantities of hazardous materials or those involved in military development.
- Abortion or Family Planning Clinics or any organization associated with a socially controversial issue.
- Utility facilities including power generation plants, dams and water treatment plants.
- Law enforcement facilities.

- Facilities housing important political or religious figures.
- Historical sites.
- Transportation infrastructure.
- High profile events attracting large amounts of people of VIPs.
- Educational facilities, especially colleges and universities.
- Storage fields

Cyber-Terrorism has come to national attention with events at major business across the United States. Everything from credit card/banking/personal information being stolen, the disruption of websites and the best know event at SONY. There has been Clarion County residents and businesses affected by these events. The vulnerability of Cyber-Terrorism can only be addressed by the users of every individual computer system.

#### Probability

Although the probability of Clarion County being the target of a direct Domestic Terrorist attack is greater than it being the direct target of an International Terrorist Attack, it should be equally prepared for both. It is hard to determine at this point what the actual probability of a terrorist attack occurring within the county is. However, it is safe to assume that it is much greater than it was before 09/11/2001.

Cyber-Terrorism will continue to impact the residents and businesses in Clarion County. This type of event remains a high probability.

#### Mitigation

Teaching Terrorism Awareness is the basic building block of any mitigation program. First responders (fire, EMS, and Law Enforcement) have been trained through Terrorism Awareness and Terrorism Operations courses that are available.

The public has received some Terrorism Awareness through the Citizens Emergency Response Teams (CERT) course. Recognizing the threat of terrorism, both Domestic and International, revisions have been made to the Emergency Operation Plan, this will enhance the response capabilities of county departments/agencies. Clarion County Office of Emergency Services is a member of the Northwest Central PA Emergency Response Group and has taken an active role in securing equipment and providing training, for the first responders of Clarion County.

Coordinate with State and Federal agencies to provide training for businesses on Cyber-Terrorism. Currently there are no foolproof ways to protect a computer system other than complete isolation (no outside connection).

#### **b. Sabotage**

Sabotage is the deliberate or intentional destruction of something (i.e. computer virus, tampering with communication equipment, etc.).

#### History/Vulnerability

There have been a few reported incidents in the last ten years. The county is



vulnerable is this type of event.

#### Probability

The occurrence of this event is medium, however; a person could create the potential for a large scale event.

#### Mitigation

It would be hard to predict all possible events. Evaluate possible targets and increase protection.

### **c. Civil disturbance, public unrest, mass hysteria, riot**

A civil disorder is any incident intended to disrupt community affairs, threatens the health and safety of the population, and may cause the destruction of property.

#### History/Vulnerability

Riots are generally not a current problem in Clarion County. Civil disorder and bomb threats on the other hand have been a source of problems in the past, and probably will continue to be problematic.

The following is a list of some of the occurrences that have been documented in Clarion County:

- 2014 Bomb threat at a high school and reported gun at an elementary school. Both incidents handled by local police and/or PSP.
- 2013 Armed man outside school building. Incident handled by local police, PSP and sheriff deputies.
- 2012 Armed male barricaded in a home. Incident handled by local police and PSP.
- 2011 Suspicious package found at Walmart. Incident handled by PSP with assistance from EMA.
- 2010 There was a civil protest in Clarion Borough when a group of residents protested the cutting down of trees along the roadway. The road was blocked and one protestor chained herself to a tree and a car. Incident was handled by Clarion Borough PD and the Clarion County Sheriff Deputies.

#### Probability

Civil disorder events may occur depending on current community or national issues (i.e. sport events, political problems, etc.). Bomb threats will continue to be problematic especially with schools.

#### Mitigation

Monitor current local conditions that may increase the potential for this type of event. Increase information exchange between all public safety agencies.

**d. Enemy attack, war**

In the last 100 years the county has never been attacked nor had a war fought within its boundaries.

**e. Insurrection**

Insurrection is an organized armed rebellion against an established government or civil authority.

History/Vulnerability

There have been no incidents in the last ten years. According to law enforcement officials there are some active antigovernment groups in the county.

Probability

There is a possibility of this type of event, however it is low.

Mitigation

Law enforcement agencies will monitor groups.

**f. Strike or labor dispute**

Labor strikes are generally not a current problem in Clarion County.

History/Vulnerability

Labor strikes such as those that occurred in the past are not likely to occur in the near future due to the decline of mining industries. There have been no strikes in the last ten years.

Probability

With active unions in Clarion County there is always a possibility for strikes.

Mitigation

Strikes will be handled on a case by case basis. Most will not require any action.

**g. Disinformation**

Disinformation is false or inaccurate information that is spread deliberately.

History/Vulnerability

There is no history of this type of event occurring in the county in the last ten years.

Probability

There is a low probability for this type of event.

Mitigation

Monitor information being provided and provide correct information. Develop a good public information system and educate the residents/visitors on that system. The county is currently working on systems to work with the broadcast media. These systems include but are not limited to web sites, reverse telephone notification systems and outdoor public notification systems.

## **h. Criminal activity (Vandalism, arson, theft, fraud, embezzlement, data theft)**

### History/Vulnerability

Criminal activity has always been a problem and will continue to be a problem. The county has only 3 municipal police departments covering 7 municipalities the other 24 municipalities are covered by Pennsylvania State Police (PSP). Clarion County does have a Sheriff and deputies, however; their primary duty is to support the court system with limited law enforcement activities. Of the 3 municipal police departments only 1 has an officer on the road 24 hours. The other 2 have PSP covering during off hours. These municipal police departments usually only have 1 officer on duty at a time. The County does have 9 part time detectives (they are also police officer or Sheriff Deputies). Clarion University has a police department that services the university.

### Available statics:

2013 Clarion County law enforcement had cleared 37 Vandalism, 4 Arson, 161 Theft and 27 Fraud offenses.

2012 Clarion County law enforcement had cleared 44 Vandalism, 3 Arson, 203 Theft and 7 Fraud offenses.

2011 Clarion County law enforcement had cleared 41 Vandalism, 2 Arson, 150 Theft and 24 Fraud offenses.

2010 Clarion County law enforcement had cleared 36 Vandalism, 1 Arson, 138 Theft and 24 Fraud offenses.

2009 Clarion County law enforcement had cleared 63 Vandalism, 4 Arson, 138 Theft and 34 Fraud offenses.

### Probability

Given the current economic issues and the status of law enforcement coverage in the county criminal activity will remain an issue.

### Mitigation

Law enforcement agencies will continue to provide public information and education programs as well as enforcement activities to help decrease incidents.

## **i. Electromagnetic pulse**

An electromagnetic pulse is produced by a nuclear explosion. Several major factors control the effectiveness of a nuclear EMP weapon. These are:

1. The altitude of the weapon when detonated;
2. The yield and construction details of the weapon;
3. The distance from the weapon when detonated;
4. Geographical depth or intervening geographical features;

5. The local strength of the earth's magnetic field.

Non-nuclear electromagnetic pulse is an electromagnetic pulse generated without use of nuclear weapons. This could be used to disrupt electronic systems.

History/Vulnerability

There is no history of the county being affected by EMP. The county is vulnerable to terrorism and this device could be used.

Probability

Typical modern scenarios seen in news accounts speculate about the use of nuclear weapons by rogue states or terrorists in an EMP attack. Details of such scenarios are always controversial. It is impossible to know what kinds of capabilities that terrorists might acquire, especially if they are aided by state sponsors with advanced capabilities.

Mitigation

Ensure protection of electronic equipment specifically those used for emergency notification and response.

**j. Physical or information security breach**

Security breaches in this plan will address critical facilities/infrastructures.

History/Vulnerability

There have been no reported incidents in the last ten years. The county has identified critical facilities/infrastructures in the county.

Probability

There is a low probability for this type of event.

Mitigation

Law enforcement agencies will monitor identified facilities/infrastructures.

**k. Workplace violence**

Violence in the work place has been on the increase across the country over the last few years.

History/Vulnerability

There have been no reported incidents in the last ten years. As long as there are businesses in the county we are vulnerable.

Probability

The probability of this type of event is low.

Mitigation

Law enforcement agencies should work with businesses to help them identify possible situations that might lead to violence.

## **I. Product defect or contamination**

The production process of goods and foods can lead to defects or contamination.

### History/Vulnerability

There have been no reported incidents of defected or contaminated products manufactured in the county. The county has been affected by products from other states and countries. In last incidents were in 2008 with peanuts and peanut butter being contaminated, as well as lead based paint on toys.

### Probability

These types of incidents will continue to occur. The probability is low for a major impact on the county.

### Mitigation

Work with state and federal agencies to identify and monitor incidents. Also provide accurate public information.

## **m. Harassment**

There are varies types of harassment, bullying, psychological, racial, sexual, stalking, mobbing and hazing.

### History/Vulnerability

There have been a few reported events that required legal action in the last ten years.

The school system has handled these types of incidents at their schools.

Public Safety Answering Points (9-1-1 Centers) are receiving calls from malicious actor(s) reporting fake emergency situations at a target's address, which triggers an emergency response. This is known as SWATting because the event usually requires the dispatch of a SWAT Team.

In recent years, doxing has become an issue. Doxing involves a malicious actor collecting and releasing a target's personal information, which may include the target's home address, telephone number, email address, social security number, date of birth and family information.

### Probability

The probability of this type of event occurring is high especially with the increased use of the internet and cell phones. Almost all of these events involve at least 2 people. However there could be events involving larger groups.

### Mitigation

Schools and law enforcement agencies should continue to provide public information and education programs as well as enforcement activities to help control incidents.

The Clarion County Sheriffs' Office provides a deputy to the Clarion-Limestone School District during school hours. This arrangement is to improve safety and

security at the school complex. The deputy interface each day with students, staff and visitors.

**Clarion County Schools should continue to participate or start participating in the following programs:**

The Pennsylvania Youth Survey is done every two years and taken voluntarily by students in 6, 8, 10 & 12th grades in participating school districts. Students take the survey on the condition of it being completely anonymous. The survey identifies issues facing students (some areas include drugs, alcohol and bullying). This information is then used to identify programs to help the students to deal with these issues.

The Clarion County Youth Council is a county wide program open to selected students from 8th-12th in all seven county school districts. Each school has a small group of students who attend each of the four meetings held during the school year. These students learn valuable problem solving skills as well as leadership and working together. Students use information provided to them at the meetings, through their administration or the PA Youth Survey to choose topics that are relevant to them and work towards bringing awareness or prevention to problem topics in their schools or communities. These topics range from creating recycling programs to drug and alcohol topics to safe driving and community fundraising such as Toys for Tots and breast cancer. Research has shown the students often listen quicker to their peers than to adults. Ultimately, this programs seeks to teach students the valuable of positive leadership and making a positive difference in their environment

The Promoting Alternative Thinking Strategies (PATHS) Curriculum is a program for educators and school staff designed to facilitate the development of self-control, positive self-esteem, emotional awareness and interpersonal problem solving skills. PATHS has been used, researched, and found effective with classrooms of students as a prevention program or with a specific target population such as special needs students as an intervention program. The purposes of the PATHS Curriculum are to enhance social and emotional competence and understanding in children, as well as develop a caring, prosocial context that facilitates educational processes in the classroom.

**n. Discrimination**

Discrimination involves treating someone less favorably because of their possession of an attribute (e.g., sex, age, race, religion, family status, national origin, military status, sexual orientation, disability, body size/shape), compared with someone without that attribute in the same circumstances.

History/Vulnerability

There have been no reported incidents in the last ten years that required legal action.

Probability

The probability of this type of event is medium.

### Mitigation

Continue to provide public information and education programs as well as enforcement activities to help control incidents.

## **IV. SUMMARY**

The hazards most likely to affect population and property within Clarion County are natural hazards, primarily flooding, winter storms and windstorms.

The most serious man-made hazard likely to occur in the county is a major hazardous materials spill, probably along Interstate-80.

Any hazard can affect lives and property, even if it occurs infrequently. Therefore, the Clarion County Office of Emergency Services must plan for any potential hazard, while giving priority to those most likely to occur and to have the most serious impact on the populace of Clarion County.

Responsibility for emergency management begins at the municipal level of government in Pennsylvania. However, as the scope of disaster or the level of resources required increases, the county and even state governments must be involved. It is important, therefore, that every level of government assess the hazards that threaten their communities so that appropriate response, precautions and preventive measures can minimize the effects of these events.

The Clarion County Office of Emergency Services is committed to the enhancement of emergency services and an effective and coordinated response capability based on a current assessment of the hazards that threaten Clarion County.

## V. **REFERENCES**

### **Federal**

Federal Emergency Management Agency  
Federal Bureau of Investigation  
Federal Highway Administration  
Department of Homeland Security  
Federal Aviation Administration  
United States Department of Agriculture  
United States Food and Drug Administration  
United States Geological Society  
United States Department of Transportation, Pipeline and Hazardous Materials Safety Administration

### **State**

Pennsylvania Emergency Management Agency  
Pennsylvania Department of Commerce  
Pennsylvania Department of Environmental Protection  
Pennsylvania Department of Transportation  
Pennsylvania State Police – Clarion  
Pennsylvania State Police - Marienville  
Pennsylvania State Police - Hershey  
Pennsylvania Department of Health  
Pennsylvania Department of Conservation and Natural Resources  
Bureau of Forestry  
Pennsylvania Game Commission  
Pennsylvania Fish and Boat Commission  
Public Utility Commission, Bureau of Safety and Compliance, Harrisburg, Pennsylvania

### **County**

Clarion County Assistance Office, Energy Assistance Program, Clarion, Pennsylvania  
Clarion County District Attorney Office  
Clarion County Planning & Development Department  
Clarion County Airport, Shippenville, Pennsylvania  
Clarion County Local Emergency Planning Committee  
Clarion County Hazard Mitigation Plan  
Clarion County Emergency Operations Plan  
Clarion County Severe Weather Plan  
Clarion County Comprehensive Plan  
Clarion County Schools

### **Other**

National Oceanic & Atmospheric Administration (NOAA)  
National Weather Service (NWS)  
Electric Companies  
Natural Gas Companies  
Telecommunication Companies  
Pipeline Companies



**Table 1**  
**Flood History for Clarion County**

Date	Flood Type	Comments/Type of Declaration
July, 2014	Flash Flood	Flash flooding in East Brady and Rimersburg Boroughs, Madison and Porter Townships
June, 2014	Flash Flood	Flash flooding Sligo area from heavy rain.
July, 2013	Flash Flood	Flash flooding in Farmington Township and Shippenville Borough from heavy rain.
June, 2013	Flash Flood	Flash flooding in Red Bank Township from heavy rain.
March, 2011	Flash Flood	Flash flooding in Farmington Township from snow melt and rains.
July, 2010	Flash Flood	Flash flooding in Clarion Borough from heavy rains.
Yearly	Ice Jam	Especially along the Allegheny River between Parker and East Brady, Clarion River from Route 36 bridge to the Allegheny River and Redbank Creek upstream of the dam in New Bethlehem.
Yearly	General / Flash Flood	Late spring, early summer flooding, especially along the Redbank Creek and Allegheny River.

**TABLE 2**  
**Major Winter Storms**

<b>Date</b>	<b>Type</b>	<b>Declaration</b>
2/4/2014	Winter Storm	None
11/23/2013	Heavy Snow	None
1/28/2013	Ice Storm	None
12/26/2012	Heavy Snow	None
2011	No Major Storms	None
2/9/2010	Winter Storm	None
2/22/2010	Heavy Snow	None

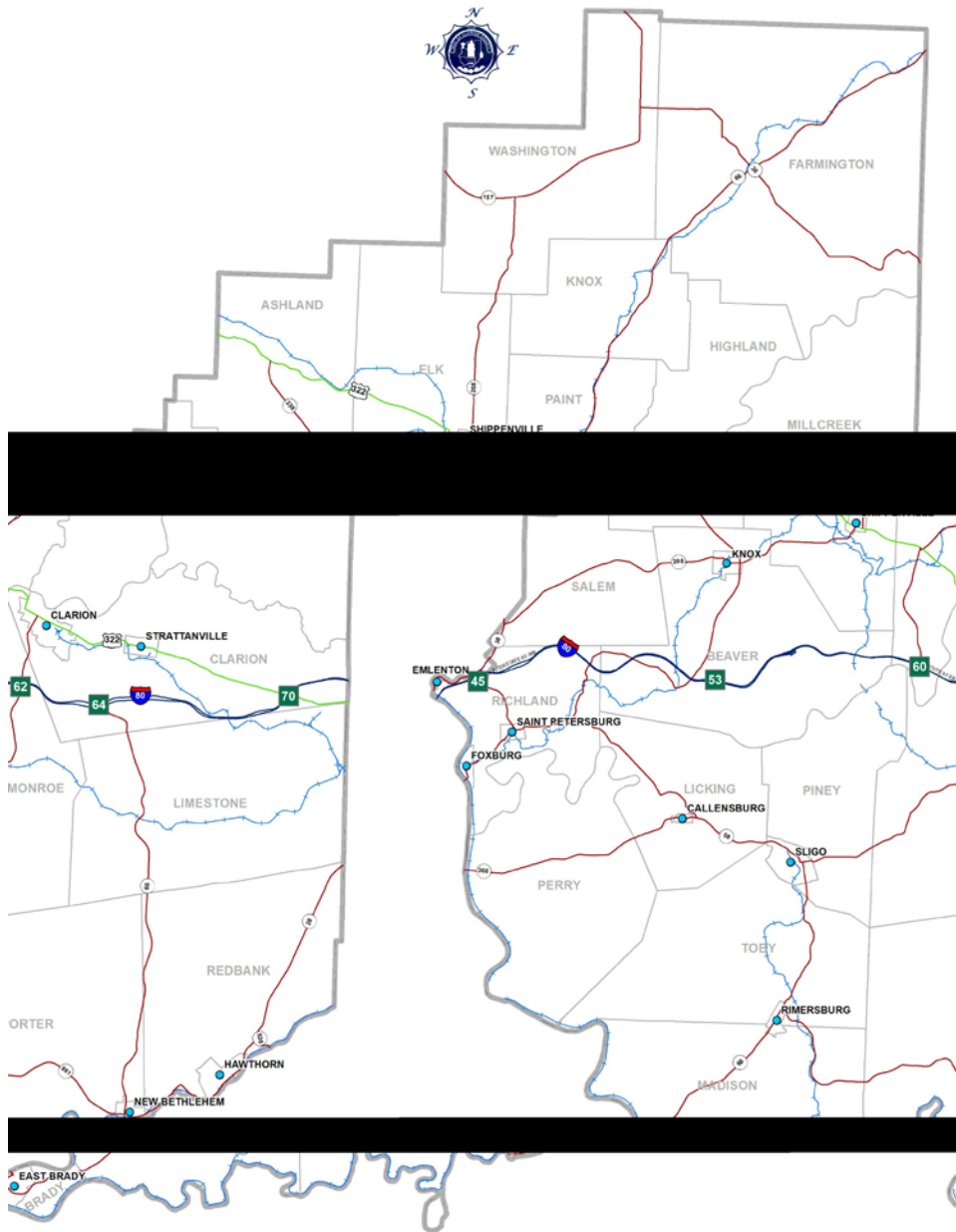
**TABLE 3  
Tornadoes and Windstorms**

<b>Date</b>	<b>Type</b>	<b>Comments/Type of Declaration</b>
July 27, 2014	Windstorm	Trees down, power outages and some property damage. Damages \$25,000
July 7, 2014	Windstorm	Trees down, power outages and some property damage. Damages \$5,000
June 24, 2014	Windstorm	Trees down, power outages and some property damage. Damages \$5,000
June 18, 2014	Tornado EF 0	Trees down, power outages and some property damage. Damages \$25,000
June 18, 2014	Windstorm	Trees down, power outages and some property damage. Damages \$10,000
June 17, 2014	Windstorm	Trees down, power outages and some property damage. Damages \$20,000
Aug. 31, 2013	Windstorm	Trees down, power outages and some property damage. Damages \$1,000
July 17, 2013	Windstorm	Trees down, power outages and some property damage. Damages \$25,000
July 10, 2013	Windstorm	Trees down, power outages and some property damage. Damages \$40,000
May 10, 2013	Windstorm	Trees down, power outages and some property damage. Damages \$72,000
April 10, 2013	Windstorm	Trees down, power outages and some property damage. Damages \$10,000
July 26, 2012	Windstorm	Trees down, power outages and some property damage. Damages \$50,000
July 7, 2012	Windstorm	Trees down, power outages and some property damage. Damages \$50,000
May 27, 2012	Windstorm	Trees down, power outages and some property damage. Damages \$15,000
May 25, 2011	Windstorm	Trees down and power outages. Damages \$3,000
July 28, 2010	Windstorm	Trees down, power outages and some property damage. Damages \$25,000
June 6, 2010	Windstorm	Trees down and some power outages
May 31, 2010	Windstorm	Trees down, power outages and some property damage. Damages \$50,000

Table 4

# Clarion County, Pennsylvania

## Major Traffic Routes



### NOTES . . .

1. PA Route 66 joins with I-80 from Exit 60 to Exit 64.
2. PA Route 68 terminates at the intersection with US Route 322.
3. PA Route 66 joins PA Route 28 through part of downtown New Bethlehem. However, the roads separate again before heading south.
4. Exit 64 is "Clarion University" exit, which becomes Greenville Ave. in Clarion.
5. Exit 62 is "Clarion" exit, which becomes Fifth Avenue in Clarion.