

The Centralia Mine Fire

Frequently Asked Questions/Answers

A. Centralia Borough and Mining History Questions:

- 1) Q: When was Centralia Borough founded?
A: In 1811, a town known as "Bull's Head" was established at the same location as Centralia Borough. Centralia Borough was officially incorporated in 1862.
- 2) Q: How big is Centralia Borough?
A: Centralia Borough occupies approximately 155 acres.
- 3) Q: How many people lived in Centralia Borough before the start of the mine fire?
A: Approximately 1,100 to 1,200 people resided in Centralia Borough in 1962 before the mine fire started.
- 4) Q: How many people live in Centralia Borough today?
A: There were 5 property owners remaining in Centralia Borough as of January 2013.
- 5) Q: When did mining start in Centralia Borough?
A: Coal was first mined in the Centralia Borough area in 1842 and the Centralia Colliery (mining complex) was opened in 1862.
- 6) Q: Is Centralia still a town or Borough?
A: As of January 2012, Centralia Borough is still listed as a local unit for taxation purposes on the Commonwealth of PA Department of Community and Economic Development Web site ([Link to Centralia Borough Tax Information](#)).
- 7) Q: Where can I find photos of Centralia Borough before the fire started?
A: An internet search should reveal numerous web sites that contain photos of Centralia Borough before 1962.
- 8) Q: How can I locate former residents of Centralia Borough to talk to them about their experiences?
A: This is a privacy issue. The State does not provide such contact information.
- 9) Q: Does Centralia still have their own official U.S. Post Office and Zip Code.
A: No. After September 18, 2003, the Centralia Zip Code ceased to be active. The Borough residents get their mail through the U. S. Post Office in Ashland, PA.

B. Centralia Fire History:

- 1) Q: When did the fire start in Centralia Borough?
A: The Centralia Mine Fire was first reported on May 27, 1962, just prior to Memorial Day.
- 2) Q: Where did the Centralia Mine Fire start?
A: The Centralia Mine Fire was first detected in a surface mine pit just southeast of the Centralia Borough boundary near the eastern border of the Independent Order of Odd Fellows Cemetery. ([Link to Fire Location Map \(pdf\)](#))

3) Q: How did the Centralia Mine Fire start?

A: Because of the initial rapid and unexpected spread of the fire, there have been many plausible theories on how the Centralia Mine Fire got started. It has been most commonly reported that the Centralia Mine Fire first started in a municipal waste disposal area; it then spread to adjacent carbonaceous material and to nearby (underlying) underground coal mine workings. The most widely accepted ignition scenario is that the fire was intentionally set by Borough personnel. The fire may have been deliberately ignited to reduce the volume of trash, to reduce public health vectors and to reduce odors in preparation for visitors to the nearby cemetery before the Memorial Day Holiday. Some other theories concerning the fire's origin cite a mine explosion in the 1930s, the spontaneous combustion of trash and even vandalism as the cause of the initial flare-up.

4) Q: Can the Centralia Mine Fire be put out?

A: Most experts believe that with a very large and very expensive effort the Centralia Mine Fire could be excavated or otherwise extinguished. However, the cost for this type of project is currently beyond the capacity of Pennsylvania's AML Program to address.

5) Q: What was done to extinguish the Centralia Mine Fire immediately after it started?

A: The very first efforts to put-out the Centralia Mine Fire included an attempt to douse the fire with water and an attempt to smother the fire by covering it with clay (clay blanket).

6) Q: What else has been done to extinguish/control the Centralia Mine Fire?

A: Fire control or extinguishment projects included direct excavation, isolation trench excavation, flushing (filling) of the deep mine workings with non-combustible materials (sand, fly ash, finely crushed rock) and surface sealing with clay-like materials.

7) Q: How much money was spent on mine fire related activities in Centralia Borough?

A: By 1983, over \$7.0 million was spent on fire control projects and the emergency relocation of some of the residents. After 1983 and up to January of 2012, approximately \$41.6 million was spent on the relocation effort.

8) Q: Who has the responsibility for extinguishing the Centralia Mine Fire?

A: No entity has been held liable for the fire, but the Commonwealth of Pennsylvania has the authority to use Title IV, Abandoned Mine Lands funding for mine fire control/extinguishment efforts. The cost for a project to completely extinguish the Centralia Mine Fire is currently beyond the capacity of Pennsylvania's AML Program to address.

9) Q: Does the State monitor the Centralia Mine Fire?

A: The State conducts visual surface monitoring of the Centralia Mine Fire on a monthly basis. Subsurface (borehole temperature) monitoring is conducted on a yearly basis and/or spot checked when necessary ([Link to Monitor Location Map \(pdf\)](#)) and ([Link to Monitor Temperature Readings \(pdf\)](#)). Gas monitoring is done

less frequently and only in response to special circumstances ([Link to Monitor Gas Readings \(pdf\)](#)).

10) Q: How many boreholes have been drilled into the ground in or around Centralia Borough?

A: There have been over 2,000 boreholes drilled into the Centralia Mine Fire area since 1966.

11).Q: Who drilled all of the boreholes in Centralia Borough?

A: Most of the boreholes were drilled in and around Centralia Borough by state and federal agencies to help locate, monitor and control the fire.

12).Q: Why can't the Centralia Mine Fire be flooded with water?

A: Flooding the entire Centralia Mine Fire with water is considered impractical, ineffective and potentially dangerous. Sealing the Centralia Mine Drainage Tunnel may raise the mine pool by approximately 230 feet; however, that level is not high enough to inundate the upper half of the burning coal zone. Raising the mine pool to an elevation that is high enough to flood the entire fire is not considered feasible due to the numerous seals and great size (height) of surface dams that would need to be constructed. Because the entire multiple-bed coal mine complex beneath Centralia Borough contains weakened coal barriers and roof supports, the risk of a catastrophic mine pool blow-out makes any rise in the mine pool level a very risky undertaking.

13) Q: Why can't the Centralia Mine Fire be excavated?

A: The Centralia Mine Fire could feasibly be excavated, but would require a very large and expensive project. The cost for a project to completely extinguish the Centralia Mine Fire is currently beyond the capacity of Pennsylvania's AML Program to address.

14) Q: Who owns the Fire in Centralia Borough?

A: Due to the nature of abandoned coal bed fires like the Centralia Mine Fire, nobody really owns the "Fire". Private and Public entities may own the surface and/or minerals (coal) within the Centralia Mine Fire impact area, but nobody is being held liable for the fire.

15) Q: How much of the coal beneath Centralia Borough did the mine fire burn?

A: The mine fire has been burning the remaining coal beneath Centralia Borough for over 50 years in the Buck Mountain coal bed and possibly several other overlying coal beds (Buck Mountain Leader, Seven-Foot and Skidmore), but the exact amount of coal lost to the fire has not been determined and would be a difficult value to accurately calculate.

16) Q: How long can the Centralia Mine Fire burn?

A: If left uncontrolled, it is estimated that the Centralia Mine Fire could burn for over 100 years.

17) Q: How big can the Centralia Mine Fire get?

A: Originally the Centralia Mine Fire was predicted to be capable of burning beneath 3,700 acres. This area included all coal above the mine pools ([Link to Centralia Fire Potential Spread Map \(pdf\)](#)). Active surface mining has and will continue to reduce the potential burn area.

18) Q: How hot is the Centralia Mine Fire?

A: A review of monitor borehole temperature records from the 1970's and 1980's indicates that many readings of +1,000 degrees Fahrenheit were recorded in the Centralia Fire area. The highest recorded temperature from that data set was +1,350 degrees Fahrenheit. During that same time period, at several locations where the fire was close to the surface, ground surface temperatures were measured at +900 degrees Fahrenheit.

19) Q How hot can the Centralia Mine Fire get?

A: Any coal mine fire can get as hot as the fuel (coal) can burn. This value is dependent on the amount of air (oxygen) present.

20) Q: How big is the Centralia Fire now?

A: The Centralia Mine Fire has expanded beyond the Centralia Borough boundaries and by January of 2012 has involved approximately 400 surface acres ([Link to Centralia Fire Location Map \(pdf\)](#)). Due to the patchy or spotty nature of coal bed fires, not all 400 acres is currently burning nor will it necessarily be burnt in the future.

21) Q: How fast has the Centralia Mine Fire moved?

A: The Centralia Mine Fire has typically moved forward in a highly variable or uneven fashion. Over the last 50 years, rapid advances forward have been followed by periods where no advance has been noted for months.

22) Q: Why does the Centralia Mine Fire burn in such an uneven pattern?

A: The uneven burn advance and rate of the Centralia Mine Fire is controlled by many factors. A few of these factors include; local geology (structure, stratigraphy and surface topography), specific mining pattern, localized presence of mine level wooden timbers and lagging for support, mine level ventilation patterns, collapsed areas (rooms headings) and barriers constructed by fire control projects.

23) Q: How many feet-per-year does the Centralia Mine Fire advance?

A: Over the past 50 years the average advance of the Centralia Mine Fire has been approximately 50-75 feet-per-year, depending on the particular fire front (direction) measured.

24) Q. What controls the Centralia Fire burn pattern and fronts?

A: The geologic structure (folding into anticlines and synclines), the surface topography and the subsurface mine passageways control and help to define the burning fronts (prongs) of the Centralia Mine Fire.

25) Q: Why is Route 61 closed in a section between Ashland Borough and Centralia Borough?

A: The fire consumed or weakened coal pillars left in the mine as roof support directly beneath Route 61. This caused surface subsidence and the highway became unsafe to travel. Repairs had been made to the road, but in 1993 the Pennsylvania Department of Transportation decided to close the damaged portion of Route 61 (approximately 4,000 feet) and utilize a smaller local roadway as a by-pass for all transportation through that area.

26) Q: Will the fire burn beneath the cemeteries in or near Centralia Borough?

A: No. Most of the ground underlying the cemeteries in Centralia is barren (not underlain by coal) or physically isolated from the coal by excavation projects. The proximity of the fire does present the appearance of heat along a corner of one cemetery, but the ground at that location is not on fire.

27) Q: How much coal does the Centralia Mine Fire burn (daily, monthly, yearly, to-date, overall)?

A: The rates of burning vary widely at the Centralia Mine Fire, so these quantities have not been determined and are very difficult to accurately calculate or quantify.

28) Q: Can the Centralia Mine Fire be smothered?

A: It would be very difficult to build and maintain an air-tight seal around (surface and subsurface) the Centralia Mine Fire area for the extended length of time (possibly decades) required to smother the fire.

29) Q: Who maintains the roads in or through Centralia Borough?

A: The State, County and surrounding township authorities maintain the traveled roadways as per their jurisdiction.

30) Q: Who maintains the utilities in Centralia Borough?

A: The utility owners or companies (water, electricity, etc.) are responsible for maintaining their installations in Centralia Borough.

31) Q: Is the fire going to burn-out and cool-off in some spots in Centralia Borough?

A: Temperatures will cool down in areas of Centralia Borough where all the fuel has been consumed as long as those areas are not subject to reignition or continual heating by the chimney effect related to the venting of hot gases.

32) Q: Are the burnt-out and cooled-off areas of Centralia Borough still dangerous?

A: In Centralia Borough, burnt out areas can still vent toxic gases (chimney effect) and may also be prone to sudden subsidence. As the ground shifts due to mine level collapse, freshly exposed coal in the roof and remaining support pillars can reignite resulting in additional burning and toxic gas production.

33) Q: What is the Centralia Drainage Tunnel?

A: The Centralia Drainage Tunnel is a tunnel that was constructed to drain the mine pool (standing water) out of the mine at an engineered elevation (+/- 1,000 feet above mean sea level) so that coal could be more economically mined without pumping large quantities of water to the surface. The Centralia Mine Drainage Tunnel discharges approximately 2,300 gallons per minute on average (3.3 million gallons per day).

- 34) Q: Why can't someone use the heat from the burning coal at the Centralia Mine Fire for some good purpose?
A: Use of the Centralia Mine Fire heat has been proposed; however, coal ownership, economic factors and environmental issues would need to be considered. Thus far, this type of use for the fire's heat has not been feasible.
- 35) Q: Can the Centralia Mine Fire spread to the surface brush and cause a forest fire?
A: The threat of a surface brush or forest fire is a continuing concern for the surface around any mine fire including the Centralia Mine Fire.
- 36) Q: Can the Centralia Mine Fire burn under any other nearby towns?
A: Residents of the nearby villages of Byrnesville and Germantown were relocated, but the Centralia Mine Fire is restricted by natural and man-made barriers. No additional towns are believed threatened by the coal bed fire.
- 37) Q: What are the steel pipes that stick-up from the ground in Centralia Borough for?
A: Most of the visible steel pipes in the streets or properties in Centralia Borough were used for monitoring subsurface temperatures and gases. A few of the pipes were used as chimneys in an attempt to direct the venting of mine fire gases to areas away from the residential structures.
- 38) Q: Can the Centralia Mine Fire heat be used to generate electricity?
A: A consistent, reliable and long-term source of heat is needed to justify the initial economic investment involved in the construction of an electric power generation plant. To date, researchers investigating the possibility of using the Centralia Mine Fire for generation of electricity have concluded that it is too unpredictable to supply the required consistent, reliable and long-term heat source.
- 39) Q: Is the fire in Centralia Borough currently burning directly beneath the smoking cracks and steaming vent holes?
A: Not necessarily. Hot gases rise and escape the fire zone through many different pathways in Centralia Borough.
- 40) Q: Who owns the burning area (surface and minerals) outside of Centralia Borough?
A: Outside of Centralia Borough most of the property is privately owned.
- 41) Q: Can the Centralia Mine Fire burn westward and eventually reach the Borough of Mount Carmel?
A: No. There has been a lot of surface mining of the coal beds between Centralia and Mount Carmel Boroughs. Also, the available deep mine maps for the area west of Centralia ([Link to Mine Maps West of Centralia \(pdf\)](#)) and related cross sections ([Link to Logan Colliery Cross Section \(pdf\)](#)) indicate that the coal was too thin and impure to have been extensively deep mined and that the few headings that continue toward Mount Carmel are flooded with water (mine pool). This lack of documented mining and water-filled nature of the critical western corridor make the fire's eventual spread to Mount Carmel highly unlikely.

C. Other Related Coal Mine Fire Questions:

- 1) Q: Can another coal bed fire start and become just like the Centralia Mine Fire?
A: Areas directly underlain by carbonaceous materials and deep mined coal are susceptible to ignition from surface burning.
- 2) Q: How does a mine fire get air/oxygen to continue burning?
A: A mine fire can get air or oxygen from interconnected underground mine workings and cracks in the overburden rock/soil leading to the surface. 3)
- 3) Q: How hot can Anthracite coal burn?
A: Open burning (open flaming) of Anthracite coal begins at about 750 degrees Fahrenheit. With enough forced air, Anthracite coal can burn up to 3,957 degrees Fahrenheit. With pure oxygen it is reported that Anthracite coal can burn up to 5,255 degrees Fahrenheit.
- 4) Q: What is flushing (hydraulic, pneumatic)?
A: Flushing is a technical term used for filling mine rooms and passageways with granular inert materials (mixed and delivered with water or conveyed by air) usually remotely through surface boreholes.
- 5) Q: How hot does Anthracite coal need to get before it burns?
A: Laboratory testing studies have indicated that the self-heating potential or acceleration potential of Anthracite coal begins to increase at temperatures above 250 degrees Fahrenheit. For open flame type burning, Buck Mountain Anthracite coal is reported to require a temperature of around 750 degrees Fahrenheit.
- 6) Q: How many other fires like the Centralia Mine Fire are there in Pennsylvania?
A: There are about 38 known actively burning coal mine fires in Pennsylvania ([Link to PA Fire Location Map \(pdf\)](#)) and ([Link to PA Fire Location Table \(pdf\)](#)). About a third of these coal mine fires are in the Anthracite Coal fields, the remainder of the coal fires are in the Bituminous coal fields.
- 7) Q: How many coal mine fires are there in the US?
A: The Federal Abandoned Mine Lands Inventory System (AMLIS) lists 241 coal mine fires in the US.
- 8) Q: How many coal mine fires are there World-wide?
A: It is estimated that there may be several thousand coal mine fires worldwide.
- 9) Q: Are there any coal mine fires in Pennsylvania that are older, bigger or hotter than the Centralia Mine Fire?
A: There are coal mine fires in Pennsylvania that have been burning longer than the Centralia Mine Fire and there are coal mine fires in Pennsylvania that may be as big or bigger than the Centralia Mine Fire. The temperature of any coal mine fire is dependent on the amount of oxygen available to feed the fire, so there may also be coal mine fires in Pennsylvania that have temporarily burnt at higher temperatures than that of the Centralia Mine Fire.
- 10) Q: What is being done to prevent or extinguish other coal mine fires?

A: World-wide, the effort ranges from simple monitoring of the coal mine fires to doing everything possible to extinguish the coal mine fires, depending on the location (county).

11) Q: How much oxygen does a coal mine fire need to keep burning?

A: A coal mine fire can "smolder" with as little as 1-2% oxygen.

D. Centralia Coal Mining and Other Related Coal Mining Questions:

1) Q: What kind of coal was mined in Centralia Borough?

A: Anthracite coal (also known as hard coal or stone coal) was mined beneath Centralia Borough.

2) Q: What kind of mining took place in Centralia Borough?

A: Both subsurface (breast and pillar or room and pillar type ([Link to Example Mine Map \(pdf\)](#)) and surface (strip) mining was conducted in Centralia Borough.

3) Q: Was there active mining in Centralia Borough when the fire started in 1962?

A: Most of the large scale mining operations in and around Centralia Borough had ceased before the fire started, but the Commonwealth of PA reportedly ordered the closing of 23 active mines due to the hazard created by mine fire gases migrating throughout the interconnected deep mine workings.

4) Q: Why did mining stop in Centralia Borough?

A: Most of the economically recoverable coal beneath Centralia Borough had been removed by 1962. After the Centralia Mine Fire started it became too hazardous to continue any mining due to the fire related toxic gases.

5) Q: Could deep mining be started again in Centralia Borough?

A: The continued burning and spread of the deep mine fire makes access to the coal in Centralia Borough too dangerous for underground mining.

6) Q: How many veins of coal are in Centralia Borough?

A: There are 10 named and mined coal beds (veins) beneath the Borough of Centralia ([Link to Centralia Coal Stratigraphic Column \(pdf\)](#)).

7) Q: How much coal was there beneath Centralia Borough before mining first began.

A: It has been estimated that there was approximately 25 million tons of coal in-place before mining first began in Centralia Borough.

8) Q: How much coal was taken out of the ground in Centralia Borough?

A: Mine maps for the Centralia Borough area indicate that approximately 50-70% of the coal has been removed in each mined coal bed. Some coal was left as roof support and some coal was left as an unrecoverable resource ([Link to Centralia Mine Maps](#)).

9) Q: How much coal remains in the ground in Centralia Borough?

A: Mine maps indicate that between 30-50% of the coal beneath Centralia Borough remains in each mined bed. Much of this coal may not be economically recoverable and the fire has burned or degraded a significant amount of coal.

10) Q: What is the remaining coal worth in Centralia Borough?

A: The current market value of the remaining coal in Centralia Borough has not been calculated due to the uncertainties involved in estimating the mining and processing costs of the remaining unburnt resource.

11) Q: What is Anthracite coal worth?

A: In 2012 Anthracite coal sold for approximately \$150-\$350 a ton processed and delivered, depending on the quality and quantity purchased for each standardized coal grade (processed grain size).

12) Q: What is Anthracite coal?

A: Anthracite is a type or class of coal, ranked by its fixed carbon content (between 92% and 98%). The higher fixed carbon content of Anthracite coal is due to low-grade metamorphism that occurred during the Appalachian Mountain building process.

13) Q: What is Anthracite coal used for?

A: Anthracite coal is commonly used for home heating, power generation and metallurgical purposes. There are numerous other minor uses for Anthracite coal.

14) Q: Are there mine maps for the mines beneath the Centralia area and can the public access these maps?

A: Mine maps do exist for much of the mining beneath Centralia Borough and the entire fire area ([Link to Centralia Mine Maps](#)).

15) Q: Is the mine beneath Centralia Borough wide-open?

A: Many of the rooms and subsurface passageways in the mine workings beneath Centralia Borough have collapsed. This is most evident in areas where depressions and sink-holes have formed.

16) Q: Is it true as stated in several articles written about the Centralia Mine Fire that 42 million tons (New York Times, July 2002) or 84 million tons (Harper's Magazine, February 2004) of coal remaining in the Mammoth Coal Vein beneath Centralia Borough?

A: Very unlikely. Estimates of the remaining recoverable coal in the Mammoth Coal Vein beneath Centralia Borough range wildly depending on the source. It has been estimated that there was only approximately 25 million tons of coal in-place (including all minable coal beds) before mining first began in Centralia Borough. After extensive mining and burning, the remaining coal would be a small fraction of that original estimate.

17) Q: How much is the coal beneath Centralia Borough worth?

A: The value of remaining recoverable coal has not been quantified. Estimates of the remaining in-place coal beneath Centralia Borough can be made, but the net value of that coal after mining and processing has not been made or publically reported by any reputable entity.

E. Centralia Property Ownership and Relocation Questions:

- 1) Q: Why did the people need to leave Centralia Borough?
A: The residents of Centralia Borough were removed in order to protect their health and safety from the mine fire hazards. Of particular concern is the hazard to human health and safety created by the production of toxic combustion related gases. The pathways influencing gas migration and infiltration, along ground fractures, and possibly into residential structures from the underlying mine workings cannot be consistently predicted or controlled. A second concern is the increased risk posed by accelerated surface subsidence as the fire consumes the remaining coal pillars in the mine that were left for structural support.
- 2) Q: Who owns the property in Centralia Borough?
A: The Commonwealth of PA and other private entities own the surface in and around Centralia Borough. The Commonwealth of PA only owns the parcels purchased for the relocation effort. Once the Commonwealth of PA purchased the parcels and relocated the residents, the unoccupied structures were demolished.
- 3) Q: Who owns the coal in Centralia Borough?
A: The Borough of Centralia claims ownership of some if not all of the coal within the Borough boundaries. Outside of the Borough, other private entities own the minerals (coal). The Commonwealth of PA did not purchase mineral rights as part of the relocation effort.
- 4) Q: How much was spent on relocating the residents of Centralia Borough?
A: Prior to 1983 approximately \$1.6 million was spent on relocation of endangered residents. After 1983 and by 2012, \$41.6 million was spent in Centralia Borough and the entire fire impact zone on the final relocation effort.
- 5) Q: How much did the state pay for the individual residential structures in Centralia Borough?
A: The State valued individual residential structures in Centralia Borough on a square footage basis related to comparable values in nearby communities. The State spent an average of approximately \$52,000 per household in the relocation of Centralia Borough residents.
- 6) Q: Why did the People leave Centralia Borough even if there was no fire near their house?
A: People left Centralia Borough due to the risk of infiltration of toxic gases into basements. The toxic gases may migrate through rock tunnels connecting the various coal beds and through ground fractures to every part of the Borough that is undermined. A secondary risk is the potential for accelerated subsidence due to the fire's consumption of mine level support pillars. Some residents also feared that their property was severely devalued due to the proximal location of the mine fire and therefore welcomed the relocation effort.
- 7) Q: What did the state do with the houses/properties that they bought and condemned in Centralia Borough?

A: The state contracted to have the condemned structures in Centralia Borough demolished and removed.

8) Q: Did the State buy all of the surface area in Centralia Borough?

A: No. The State did not purchase vacant lots in the Borough of Centralia or elsewhere in the fire impact area.

9) Q: What is planned for the future of Centralia concerning the fire and the Borough?

A: As of January 2012, there are no State initiated plans for the future of the fire or the surface above the fire in Centralia Borough.

10) Q: When the Centralia Mine Fire cools down, can the people come back and rebuild?

A: Probably not. In Centralia Borough, the threat of toxic gases and accelerated subsidence will likely remain for an extended period of time.

11) Q: Will the State take the residential streets and roads out of Centralia Borough?

A: There are currently no plans to remove the residential streets in Centralia Borough.

12) Q: Can people buy property and build in Centralia Borough?

A: No.

13) Q: If the last of the remaining people won't leave Centralia Borough, what will the State do?

A: After all legal appeals have been addressed by the court system and if the Commonwealth of PA's legal position is upheld, then the remaining residents must leave Centralia Borough. If the Residents refuse to leave, the Commonwealth of PA will have the legal right to force eviction if that is the chosen option.

14) Q: When did the citizens of Centralia begin to relocate due to the fire?

A: In 1980 the U.S Office of Surface Mining relocated 7 families and in 1981 an additional 27 residences were purchased and the families relocated. In December of 1983, the U.S Congress appropriated \$42 million for the relocation of all of the fire impacted residents. This major relocation effort began in 1984 and continues today.

F. Centralia Mine Fire Environmental Questions:

1) Q: What are the main environmental impacts of the Centralia Mine Fire?

A: Air pollution and greenhouse gas emissions, vegetation die-off (possible brush fires) and unnaturally heated ground are all environmental impacts associated with the Centralia Mine Fire.

2) Q: Does the Centralia Fire contribute to greenhouse gases?

A: Carbon Dioxide (CO₂) is a greenhouse gas produced by all coal mine fires. The total quantity of CO₂ gas released by the Centralia Mine Fire is very difficult to accurately measure.

3) Q: Is it true that the Centralia Mine Fire has created rare minerals in the soils around smoking surface cracks?

A: Researchers have found unique, rare and exotic mineral compositions from sites where venting volcanic gases are present. The venting of gases above coal mine fires could allow for similar opportunities for unique, rare and exotic minerals to form.

- 4) Q: Are there rare and unique forms of life around the surface vents in Centralia Borough?

A: Researchers have found unique rare and exotic forms of life from sites where venting volcanic gases are present. The venting of gases above coal mine fires could allow for similar opportunities for unique, rare and exotic forms of life to exist.

- 5) Q: Is the water coming out of the Centralia Mine poisonous?

A: The outflow of water from the Centralia Mine Pool is typical of low pH (3.5), high iron and high sulfur acid mine drainage discharges that can be observed elsewhere in the coal mining regions. Acid Mine Drainage (AMD) is usually not potable (safe for human consumption) and may also be toxic to many forms of aquatic life.

- 6) Q: Are there rare fire related minerals in the water (mine pool) of the Centralia Colliery?

A: Researchers have found unique, rare and exotic minerals from sites where hydrothermal water exits volcanic areas. The water exiting a coal mine fire could allow for similar opportunities for unique, rare and exotic minerals to form.

G. Centralia Mine Fire Safety and Coal Fire Air Quality Questions:

- 1) Q: What are the hazards associated with an abandoned coal mine fire?

A: The burning of coal creates toxic combustion related gases, ground subsidence, excess heat and an increased surface fire risk. Colorless, odorless toxic gases can migrate from the burning mine level to the surface and into the basements of residential structures through ground fractures creating an extreme health hazard. Coal pillars left in the mine for roof support can be degraded and consumed by the fire, thus causing sudden and accelerated surface subsidence or collapse damaging roadways and residential structures. The heat produced from the burning coal creates an inhospitable environment for existing fauna and flora on the surface. And fire exhaust vents, chimneys or ground cracks can be hot enough to ignite surface vegetation and create brush and forest fires.

- 2) Q: Is it safe to visit Centralia Borough?

A: Visitation is not recommended due to the many hazards associated with abandoned mine sites and coal mine fires in particular. The State supports a program called "Stay Out - Stay Alive". This program was initiated to warn the public of the many hazards associated with abandoned mine sites ([Link to Stay Out Stay Alive Program](#)).

- 3) Q: Is the air safe to breath in Centralia Borough?

- A: Air quality studies completed in 2008 indicate that the ambient outside air in Centralia Borough meets all clean air standards ([Link to Centralia \(Gas\) Mercury Study \(pdf\)](#)).
- 4) Q: What gases are emitted by the Centralia Mine Fire at dangerous or toxic levels?
A: Many gases, including Carbon Monoxide (CO), Carbon Dioxide (CO₂), Sulfur Dioxide (SO₂), Hydrogen Sulfide (H₂S) and Methane (CH₄) have been detected in the monitor boreholes, surface vents and residential structures in Centralia Borough.
- 5) Q: What is Carbon Monoxide (CO)?
A: Carbon Monoxide (CO) is a colorless, odorless toxic gas created by the incomplete combustion of carbon bearing fuels.
- 6) Q: What levels of Carbon Monoxide (CO) are dangerous to breathe?
A: The US Occupational Health and Safety Administration sets an upper limit of 50 parts per million of Carbon Monoxide (CO) for a daily exposure in the workplace.
- 7) Q: What is Carbon Dioxide (CO₂)?
A: Carbon Dioxide (CO₂) is a colorless toxic gas that is created by the decomposition and combustion of carbon bearing fuels.
- 8) Q: What levels of Carbon Dioxide (CO₂) are dangerous to breathe?
A: Carbon Dioxide (CO₂) can displace oxygen in the air creating a low oxygen hazardous environment, the US Occupational Health and Safety Administration has set upper limit of 1.0%.
- 9) Q: What are Sulfur Dioxide (SO₂) and Hydrogen Sulfide (H₂S)?
A: Sulfur Dioxide (SO₂) and Hydrogen Sulfide (H₂S) are colorless, strongly pungent gases created by the combustion of sulfur bearing compounds in fuels.
- 10) Q: What levels of Sulfur gases are dangerous to breathe?
A: The US Occupational Health and Safety Administration has set upper limits of 5 and 20 parts per million, respectively, for Sulfur Dioxide (SO₂) and Hydrogen Sulfide (H₂S) gases in the workplace (8 hour exposure).
- 11) Q: What is Methane (CH₄)?
A: Methane (CH₄, also known as natural gas), is a colorless, odorless, lighter than air gas created by the decomposition of organic material.
- 12) Q: What levels of Methane (CH₄) are dangerous to breathe?
A: Methane (CH₄) is not considered toxic but can displace oxygen in the air creating a low oxygen hazardous environment. Methane also becomes explosive in concentrations between 5-15% when combined with ambient Oxygen concentrations.
- 13) Q: Is there explosive Methane gas (CH₄) in the Centralia mine?
A: Methane gas (CH₄) has been detected in some of the boreholes that were monitored in Centralia Borough. There may be pockets of Methane gas (CH₄) trapped within unventilated areas of any abandoned coal mine workings.
- 14) Q: Are there any other possible explosive gases related to the Centralia Mine Fire?

A: Explosive Hydrogen gas (H₂), produced by a high temperature burning process may be present in any coal mine fire.

15) Q: Can I get directions to Centralia Borough and tour the site?

A: The State does not provide directions to or recommend the touring of hazardous abandoned mine sites including the mine fire in Centralia Borough ([Link to Stay Out Stay Alive Program](#)).