

4.3.19 Nuclear Incident

4.3.19.1 Location and Extent

Within the Commonwealth of Pennsylvania, there are five nuclear power generation stations. The Limerick Generation Station (LGS) and the Susquehanna Steam Electric Station (SSES) are both located outside the Lehigh Valley, but maintain a 50-mile ingestion exposure pathway that includes parts of the region. LGS is located in central Montgomery County, to the south of the Lehigh Valley, and SSES is located in Luzerne County to the northwest of the Lehigh Valley region. LGS maintains two Mark 2 reactors producing 2,345 MW of electricity while SSES maintains two Boiling Water direct cycle reactors producing 2,600 MW of electricity.

Within the Lehigh Valley, both Lehigh and Northampton Counties maintain the classification of Support County for both the LGS and SSES facilities. The Support County status is reserved for counties that fall within the 50-mile ingestion pathway of the nuclear facility. This classification brings along a variety of responsibilities including planning, training, exercise and facility support. Both Lehigh and Northampton Counties maintain nuclear planning annexes to their emergency operations plan (EOP), train regularly, and complete exercise programs set forth by state and federal entities. Lehigh County, in support of LGS, maintains two reception centers designed to provide residential population monitoring and decontamination. In addition to these two Lehigh County locations, the regional trauma center provides medical decontamination for the general public and emergency workers. These medical services require additional annual training and exercise programs.

4.3.19.2 Range of Magnitude

As per regulations, set forth by the Federal Emergency Management Agency (FEMA) and the Nuclear Regulatory Commission (NRC), all facilities are required to notify jurisdictional agencies of an incident or occurrence within the facility. The Pennsylvania Emergency Management Agency (PEMA), in coordination with the facility owners, has established the following notification levels that are based upon an internal trigger. The Emergency Alert Levels are as follows:

- Unusual Event
- Alert
- Site Area Emergency
- General Emergency

Definitions, as per the NRC, are provided below.

- **Unusual Event** - Under this category, events are in process or have occurred which indicate potential degradation in the level of safety of the plant. No release of radioactive material requiring offsite response or monitoring is expected unless further degradation occurs.
- **Alert** - If an alert is declared, events are in process or have occurred which involve an actual or potential substantial degradation in the level of safety of the plant. Any releases of radioactive material from the plant are expected to be limited to a small fraction of the Environmental Protection Agency (EPA) protective action guides (PAGs).
- **Site Area Emergency** - A site area emergency involves events in process or which have occurred that result in actual or likely major failures of plant functions needed for protection of the public. Any releases of radioactive material are not expected to exceed the EPA PAGs except near the site boundary.

- **General Emergency** - A general emergency involves actual or imminent substantial core damage or melting of reactor fuel with the potential for loss of containment integrity. Radioactive releases during a general emergency can reasonably be expected to exceed the EPA PAGs for more than the immediate site area (USNRC, 2012).

The southern and northern regions of the Lehigh Valley are closest in proximity to the LGS and SSES facilities, but fall well outside the prescribed 10-mile emergency planning zone (EPZ) or evacuation area for either facility. In the event of an incident within either of the locations, the Lehigh Valley would become a temporary staging location for the hundreds of thousands of residents seeking safety outside the 10-mile emergency planning zone. Additionally, jurisdictions found within the 50-mile ingestion exposure pathway could receive deposits of radioactive particles on crops, bodies of water and ground surfaces, rendering local agricultural harvest unusable for consumption by either humans or livestock.

4.3.19.3 Past Occurrence

While no fixed facility nuclear emergencies have occurred in the Lehigh Valley, Pennsylvania is home to the only recorded nuclear emergency in the U.S. In 1979, the Three Mile Island Nuclear Generating Station declared a General Emergency following an internal system failure. The repercussions from this event were swift, with sweeping changes of the NRC oversight to include FEMA for outside support. The growing nuclear power industry immediately reversed course with the number of facilities decreasing over the next decade. In addition, public confidence in the nuclear industry was greatly impacted.

While reports show conflicting information on the medical impact on the residential population following the disaster, fiscal data from the cleanup phase of this incident exceeded \$1 billion.

4.3.19.4 Future Occurrence

Within the United States, the low frequency of fixed facility nuclear incidents that elevate above the Alert Level proves the stability of the industry. Based upon the Risk Factor Methodology Probability Criteria, probability of an incident at the LGS or SSES facilities is classified as *unlikely*. In addition, Pennsylvania Power and Light (PPL), the parent company to LGS and SSES, continues to improve systems within the facility to provide additional safeguards to the jurisdictions that could be impacted by an incident, as outlined by Exelon in October 2011 (Exelon Generation, 2011).

4.3.19.5 Vulnerability Assessment

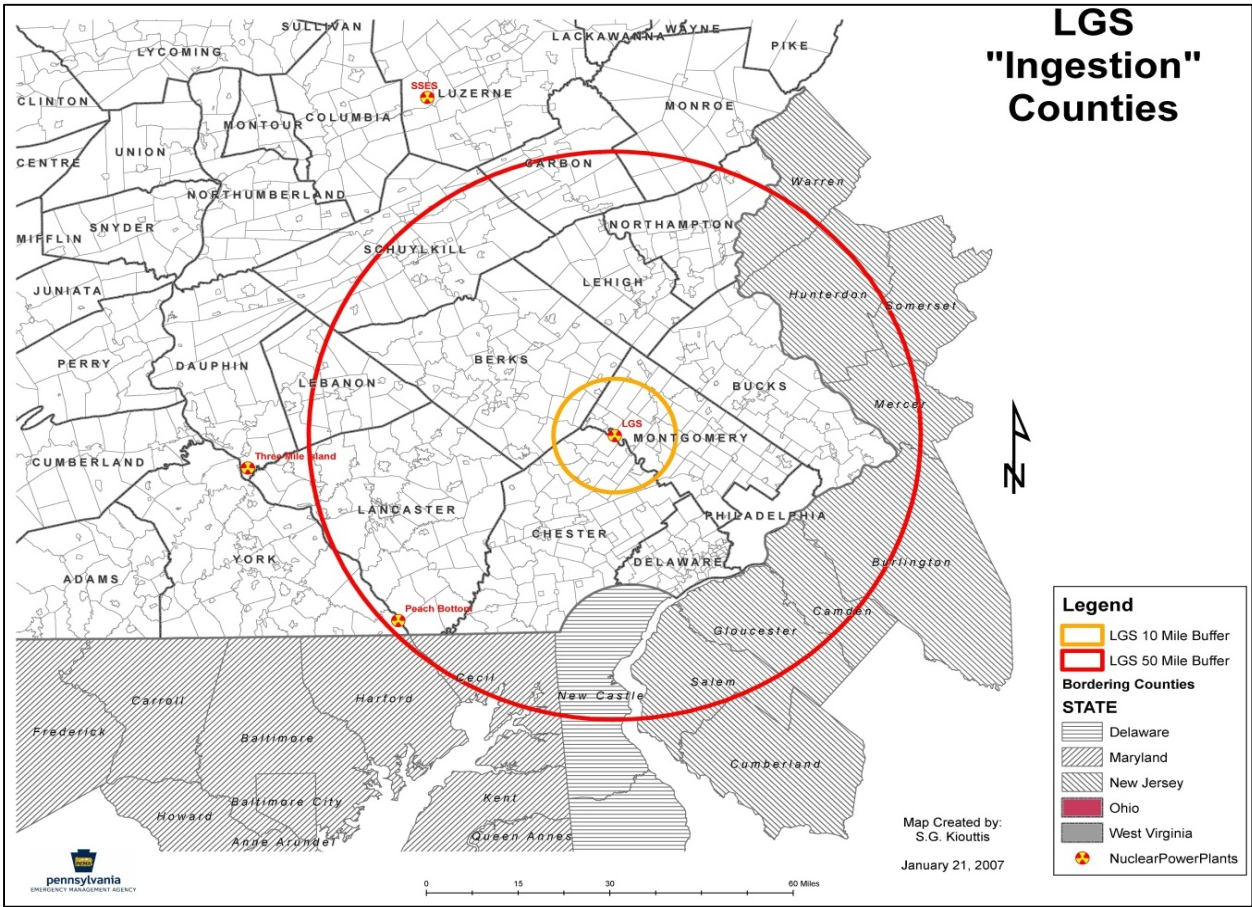
The effects from a radiological incident at a fixed facility will vary based upon the product being released (type of radiation), the quantity released, the current weather conditions, and the time of day. The priority following an incident at any of the facilities within the Commonwealth of Pennsylvania is the life and safety of all individuals within the area impacted. Secondary to health and safety will be the impact on critical infrastructure, environment, property and the economy.

Contamination of agriculture, livestock, and production can lead to the loss of commerce with other regions of the state, country and even the world. The loss of commerce could compound an already struggling Lehigh Valley economy. Recently, many countries halted the importing of products from Japan for fear of contamination following the tsunami-related nuclear incident at the Fukushima Power Plant. This loss in revenue compounded the loss the country and region were already feeling following the initial disaster.

Impacts within the affected area can include loss of utility service, contamination of local crops and livestock, loss of residential property due to measurable quantities of nuclear materials, and increased risk to health and well-being of individuals within the area.

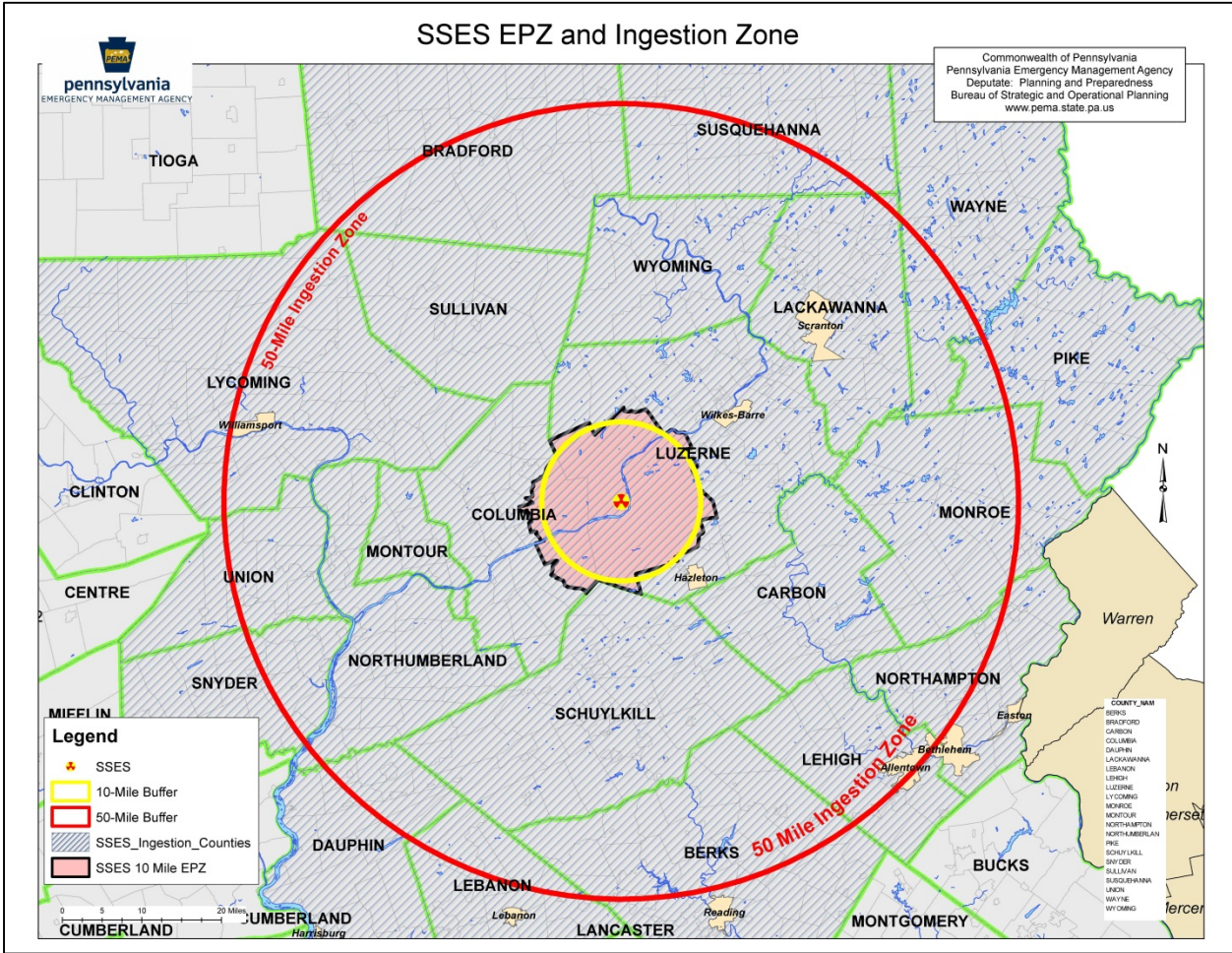
Figure 4.3.19-1 and Figure 4.3.19-2 provide visual representations of the jurisdictions that fall within the 10-mile EPZ and 50-mile ingestion zones. These jurisdictions, due to proximity to LGS and SSES, have the greatest vulnerability to an incident within the facility.

Figure 4.3.19-1. Jurisdictions within 50 Mile Ingestion Zone



Source: Exelon Corporation, LGS Emergency Preparedness Coordinator

Figure 4.3.19-2. SSES EPZ and Ingestion Zone



Source: Pennsylvania Emergency Management Agency

The following jurisdictions within Lehigh County are found within the 50-mile ingestion zone for the Limerick Generation Station:

- City of Allentown
- City of Bethlehem
- Alburtis Borough
- Emmaus Borough
- Catasauqua Borough
- Coopersburg Borough
- Coplay Borough
- Fountain Hill Borough
- Macungie Borough
- Slatington Borough
- Hanover Township
- Heidelberg Township
- Lower Macungie Township
- Lower Milford Township
- Lowhill Township
- Lynn Township
- North Whitehall Township
- Salisbury Township
- South Whitehall Township
- Upper Macungie Township
- Upper Milford Township
- Upper Saucon Township
- Washington Township
- Weisenberg Township
- Whitehall Township

The following jurisdictions within Northampton County are found within the 50-mile ingestion zone for the Limerick Generation Station:

- City of Bethlehem
- City of Easton
- Bangor Borough
- Bath Borough
- Chapman Borough
- East Bangor Borough
- Freemansburg Borough
- Glendon Borough
- Hellertown Borough
- Nazareth Borough
- North Catasauqua Borough
- Northampton Borough
- Pen Argyl Borough
- Roseto Borough
- Stockertown Borough
- Tatamy Borough
- Walnutport Borough
- West Easton Borough
- Wilson Borough
- Wind Gap Borough
- Allen Township
- Bethlehem Township
- Bushkill Township
- East Allen Township
- Forks Township
- Hanover Township
- Lehigh Township
- Lower Mount Bethel Township
- Lower Nazareth Township
- Lower Saucon Township
- Moore Township
- Palmer Township
- Plainfield Township
- Upper Nazareth Township
- Washington Township
- Williams Township

The following jurisdictions within Lehigh County are found within the 50-mile ingestion zone for the Susquehanna Steam Electric Station:

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| • Alburtis Borough | • Macungie Borough |
| • City of Allentown | • North Whitehall Township |
| • City of Bethlehem | • Salisbury Township |
| • Catasauqua Borough | • Slatington Borough |
| • Coplay Borough | • South Whitehall Township |
| • Hanover Township | • Upper Macungie Township |
| • Heidelberg Township | • Washington Township |
| • Lowhill Township | • Weisenberg Township |
| • Lower Macungie Township | • Whitehall Township |
| • Lynn Township | |

The following Jurisdictions within Northampton County are found within the 50-mile ingestion zone for the Susquehanna Steam Electric Station:

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|---------------------------|----------------------------|
| • Allen Township | • Moore Township |
| • Bath Borough | • Northampton Borough |
| • Bethlehem City | • North Catasauqua Borough |
| • Bushkill Township | • Nazareth Borough |
| • Chapman Borough | • Pen Argyl Borough |
| • East Allen Township | • Plainfield Township |
| • Hanover Township | • Upper Nazareth Township |
| • Lehigh Township | • Walnutport Borough |
| • Lower Nazareth Township | • Wind Gap Borough |

The above listed jurisdictions maintain numerous locations considered critical infrastructure. Within the Lehigh Valley, critical infrastructure can be found within Section 2 of this Plan Update.

In response to the vulnerability, both Lehigh County and Northampton County maintain a radiological emergency response plan. This plan is written in accordance with the regulations set forth by the NRC and PEMA. The plan addresses actions that are to be taken to mitigate and respond to a possible radiological release. In support of the radiological response plan, both Lehigh and Northampton Counties participate in a variety of exercises designed to validate the planning found within the county documents. These exercises run once every two years for support counties within the 10-mile EPZ, with an additional ingestion exercise run every five years for all counties within the 50-mile ingestion zone. In addition to these exercise programs, Lehigh County participates annually in the Medical Service Agreement (MS-1) radiological decontamination-training program.

The MS-1 program provides classroom and practical training to emergency medical services in areas of decontamination and patient handling. Additionally, the MS-1 designated hospitals receive two training sessions focusing in on proper patient management and levels of care. At the completion of these training programs each year, the staff at both the hospital and EMS agency is provided with the opportunity to validate plans, policies, and training levels through a full-scale exercise program. The exercise is federally evaluated once every seven years with the remaining six years being evaluated by PEMA.