Susquehanna Steam Electric Station



2021 Media Information Guide

Susquehanna Nuclear, LLC
(a division of Talen Energy)
769 Salem Blvd.
Berwick, Pa. 18603
www.susquehannanuclear.com

TALEN ENERGY

Introduction

Talen Energy™ has a responsibility to operate Susquehanna Steam Electric Station ("Susquehanna Station" or "Susquehanna") safely. Here, public health and safety take precedence over all other factors in decisions about plant operations.

This concern for safety is a key element in the Station's design, operating procedures and training programs for its nuclear professionals. Susquehanna Nuclear, LLC, ("Susquehanna Nuclear") a division of Talen Energy, has developed a detailed emergency response plan which is tested regularly with the cooperation of municipal, county, state and federal organizations.

Talen Energy firmly believes it is important for the public to be aware of issues and events that affect Susquehanna and the news media is an important partner in that strategy.

Susquehanna Nuclear developed this guide to help members of the media better understand key information about Susquehanna Station and its operations, so they can explain them to their audiences. This primer includes information on Susquehanna's history, design, operations and emergency plan, as well as basics about how nuclear energy is generated and facts on radiation and spent fuel storage.

In the event of a plant emergency, Susquehanna Nuclear representatives will engage with members of the media in accordance with its Emergency Plan. As situations warrant, they will conduct news briefings at one of its two Joint Information Centers - telephone numbers and travel directions are found within this guide on pages 6-7.

We hope you will take the time to review and retain this guide, and use it as a resource in your ongoing media coverage and potential emergency coverage of Susquehanna.

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Susquehanna Station – At a Glance

Ownership	Susquehanna Nuclear, LLC Allegheny Electric Cooperative, Inc.	90 percent 10 percent
Location	A 2,100-acre site in Salem Township, Luzerne County, Pa., about seven miles northeast of Berwick, and about 20 miles southwest of Wilkes-Barre, Pa.	
Generating Capacity	Two generating units capable of generating ~2,500 megawatts (enough to power ~2 million homes)	
Generators	Speed Voltage Cooling	1,800 revolutions per minute 24,000 volts Stator by water; rotor by hydrogen
Turbines	Type Steam Temperature Steam Pressure Steam Flow	Tandem compound, six-flow 540°F (282°C) 960 pounds per square inch (gauge) 16,600,000 pounds per hour
Turbine-Generators	Length	208 feet (63 meters)
Transformers	Capacity Voltage Step-Up Cooling	1,214,000 kilovolt-amperes Unit 1 – 230,000 volts Unit 2 – 500,000 volts Oil
Reactors	Type Coolant Moderator Core Coolant Flow Rate Feedwater Inlet Temperature Steam Outlet Temperature Coolant Pressure (inlet) Steam Capacity Heat Output	Boiling water, direct cycle Water Water 216,000 gallons per minute 400°F (204°C) 550°F (288°C) 1,075 pounds per square inch 16,600,000 pounds per hour 13,485,000,000 British thermal units per hour (3,952 megawatts-thermal)
Fuel Cores	*Pellets* Material Enrichment Total Weight, Uranium *Rods* Material Cladding Thickness Outside Diameter Length Number	 Uranium dioxide (UO_2) 0.71 to 4.95 percent about 135 metric tons per reactor Zircaloy – 2 0.024 inches 0.396 inches about 13.5 feet 69,524 per reactor

Control Rods	Material Neutron Absorber Blade Length Blade Width Number	Stainless steel Boron carbide and hafnium 14.4 feet (4.4 meters) 9.75 inches (24.77 centimeters) 185 per reactor
Pressure Vessels	Material Height Weight Inside Diameter Wall Thickness Design Temperature Design Pressure	Carbon steel lined with stainless steel 73.5 feet (22.4 meters) 750 tons 20.9 feet (6.4 meters) 4 to 9 inches (10 to 23 centimeters) 575°F (302.5°C) 1,250 pounds per square inch
Containment	Material Height Wall Thickness Lining Volume Design Pressure	Reinforced concrete with steel liner 161 feet (49.2 meters) above base slab 6.0 feet (1.83 meters) 0.25-inch (6.35 millimeters) steel 519,450 cubic feet 53 pounds per square inch
Condensers	Material Number of Tubes Tubing Length Condensing Surface Cooling Water Flow Cooling Range	Stainless steel tubing 81,500 616 miles (991 kilometers) 880,000 square feet 484,000 gallons per minute 37°F (21°C)
Water Supply	Water is replaced from the Susquehanna River. Combined with other water needs of the plant, this amounts to about 0.6% of the average river flow.	
Schedule	Application for Construction Permit issued by Atomic Energy Commission Commercial Operation	Permit received April 1, 1971 November 2, 1973 Unit 1 – June 8, 1983 Unit 2 – February 12, 1985
Employment	Permanent Personnel Outage Contract Workers	About 900 full-time employees Approximately 1,300-1,500 (~5 weeks/year in rotating shifts)
Construction Cost	$4.1 billion	

Joint Information Centers

Susquehanna Nuclear uses two media operations centers, depending on the situation, to keep the news media, elected officials and the public informed about incidents of widespread interest concerning Susquehanna Station. Company news bulletins will include the location and telephone number of the Joint Information Center in use at the time.

Susquehanna Energy Information Center

- Located at 634 Salem Blvd, Berwick, Pa.
- Used for localized events or small-scale emergencies at the plant.
- Phone number: 1-866-832-4474 (media inquiry line).
- Auditorium accommodates about 75 people for news briefings; reporter workspace is available.
- See directions on page 7.

East Mountain Business Center (EMBC)

- Located at 1190 E. Mountain Blvd., Plains, Pa. (enter Wilkes-Barre, Pa. for GPS mapping) in East Mountain Business Park.
- Used for any Station event attracting broader news media coverage.
- Phone number: 1-866-832-4474 (media inquiry line).
- EMBC Auditorium can accommodate up to 300 people for news briefings and has sufficient lighting for video, a satellite feed to receive signals from remote locations, and a direct sound feed.
- See directions on page 7.

General / What to Expect

- Reporters and camera crews arriving at the center must confirm their arrival with the receptionist and will receive badges for entry into the Media Workroom and Auditorium.
- A spokesperson will provide timely and relevant updates and answer questions during news briefings. A technical briefer also will be available to explain technical details about plant operations. Media relations support personnel are not authorized to provide interviews.
- During events, Susquehanna Nuclear's primary responsibility is the discovery and sharing of information regarding Station status. The Pennsylvania Emergency Management Agency (PEMA) will be responsible for releasing any information regarding public protective measures and actions residents are expected to take.
- News material will be distributed to the media as soon as it is produced. It also will be available on the Susquehanna Nuclear website http://www.susquehannanuclear.com .
- Within the EMBC Auditorium, audio splitters are available and connect directly to the sound system, eliminating the need for microphone trees. Television cable access is also available; however, telephone links for direct broadcast are not.

Directions to Susquehanna Energy Information Center

From Allentown, Philadelphia and south: Take Pa. Turnpike Northeast Extension (Interstate 476) to Exit 95. Drive west on Interstate 80 to Exit 256. Turn right from exit ramp onto State Route 93 North. Follow Route 93 to U.S. Route 11 — turn right at the first traffic light after crossing the Susquehanna River. Take Route 11 north; the Information Center is on the right, ¼ mile past the entrance to the Station.

From the Poconos, northern New Jersey, New York City and east: Take Interstate 80 west to Exit 256. Turn right from exit ramp onto State Route 93 North. Follow Route 93 to U.S. Route 11 — turn right at the first traffic light after crossing the Susquehanna River. Take Route 11 north; the Information Center is on the right, ¼ mile past the entrance to the Station.

From Harrisburg and southwest: Take Interstate 81 north to Exit 145 (West Hazleton). Turn left from exit ramp onto State Route 93 North. Follow Route 93 to U.S. Route 11 — turn right at the first traffic light after crossing the Susquehanna River. Take U.S. Route 11 north; the Information Center is on the right, ¼ mile past the entrance to the Station.

From Bloomsburg, Williamsport and west: Take Interstate 80 east to Exit 241B. Follow U.S. Route 11 north for about 10 miles. The Information Center is on the right, ¼ mile past the entrance to the Station.

From Scranton, upstate New York and north: Take Interstate 81 south to Exit 164, State Route 29. Go north on Route 29 to U.S. Route 11. Go south on Route 11 about 10 miles to the Information Center, which is on the left.

Directions to East Mountain Business Center

From the Susquehanna plant/Information Center: Take U.S. Route 11 north to State Route 29. Go south on Route 29 to Interstate 81. Go north on Interstate 81 to Exit 170A (Bear Creek). Go south on State Route 115 to East Mountain Boulevard and turn left.

From Allentown, Philadelphia and south: Take Pa. Turnpike North- east Extension (Interstate 476) to Exit 105 (Wilkes-Barre). Go north on State Route 115 to East Mountain Boulevard and turn right.

From Poconos, northern New Jersey, New York City and east:
Take Interstate 80 west to Pennsylvania Exit 277. Go north on Pa. Turnpike Northeast Extension (Interstate 476) to Exit 105 (Wilkes- Barre). Go north on State Route 115 to East Mountain Boulevard and turn right.

From Hazleton, Harrisburg, southwest: Take Interstate 81 north to Exit 170A (Bear Creek). Go south on State Route 115 to East Mountain Boulevard and turn left.

From Bloomsburg, Williamsport and west: Take Interstate 80 east to Interstate 81 Exit 260. Go north on Interstate 81 to Exit 170A (Bear Creek). Go south on State Route 115 to East Mountain Boulevard and turn left.

From Scranton, upstate New York and north: Take Interstate 81 south to Exit 170A (Bear Creek). Go south on State Route 115 to East Mountain Boulevard and turn left.

Susquehanna Station Background

Construction Timeline

1970

- PPL announces construction plans for the plant. Coal-fired plants provided most of PPL's generating capacity at that time. The site was chosen for its stable geology, available cooling water from the Susquehanna River, accessible power supply lines to other parts of PPL's service area and convenient highway and rail transportation.

1973

- U.S. Atomic Energy Commission issues construction permit and work begins in November. Bechtel Power Corp. was the primary contractor.
- More than 5,000 people work to design, build and test the plant.

1982

- Unit 1 receives operating license in July and generates its first electricity in November.

1983

- Unit 1 begins commercial service in June.

1984

- Unit 2 receives operating license in March and generates its first electricity in July.

1985

- Unit 2 begins commercial service in February.

General Plant Information

Location

- 2,100-acre site in Salem Township, Luzerne County, Pa.
- About seven miles northeast of Berwick, Pa.
- About 20 miles southwest of Wilkes-Barre, Pa.

Ownership

- Susquehanna Nuclear, LLC owns 90 percent of the plant and operates it. Allegheny Electric Cooperative, Inc. owns the remaining 10 percent.
- Susquehanna Nuclear, LLC is a subsidiary of Talen Energy, an independent power producer with plants throughout the United States.
- Talen Energy assumed ownership of Susquehanna when PPL spun off its generating assets in 2015, creating Talen.
- Allegheny Electric Cooperative, based in Harrisburg, provides power to member cooperatives in Pennsylvania and New Jersey. Allegheny purchased 10 percent of the Susquehanna plant in 1977. Susquehanna produces 60% of Allegheny's power.

Operation

- Susquehanna Station has two boiling water reactors made by General Electric Co.
- The splitting, or fissioning, of uranium (U^{235}) atoms heats water as it passes by the fuel in the reactor. The heated water turns to steam, which drives the turbine-generators to produce electricity.
- Each unit has a license limit of 3,952 megawatts thermal; the plant's full generation output is approximately 62.4 million kilowatt-hours each day.

Training

- Susquehanna Station has an on-site training center with staff who instruct personnel using a curriculum fully accredited by the National Academy for Nuclear Training.
- The Station's control room crews spend one week out of six training either in the classroom or on an advanced control room simulator.
- Licensed nuclear reactor operators are requalified every year. Maintenance and technical support personnel complete extensive training for certification in their specialties.

Employment

- During normal operation, about 900 full-time employees work at the plant in operations, maintenance, engineering and technical support positions.
- About 1,300-1,500 people join Susquehanna's full-time employees to support various phases of work that occur during refueling and maintenance outages. This number varies each year depending on scope of maintenance work for the outage. Each unit is shut down for refueling every 24 months, during which time about one-third of the uranium fuel in the reactor is replaced and other planned maintenance and inspection tasks are completed. Units can generate electricity continuously for 24 months without stopping to refuel.

Emergency Preparedness

Overview

Susquehanna Nuclear has a large emergency response network consisting of 27 municipalities, county and state governments, school districts, hospitals, fire companies, ambulance and emergency medical services, and federal agencies.

The U.S. Nuclear Regulatory Commission (NRC) has reviewed and approved Susquehanna Nuclear's emergency plan.

Susquehanna Nuclear is responsible for managing any problem at the Susquehanna Steam Electric Station and will immediately notify federal, state and local authorities per its plan and procedures. These officials will then notify/instruct the public as necessary. The level of response to an event depends on the potential threat to public health and safety. In any emergency at the plant, Susquehanna Nuclear has three objectives:

1. Take any necessary actions to end the emergency.
2. Activate the emergency plan to reduce any potential risk to public health and safety.
3. Keep stakeholders informed about events at the plant.

Emergency Classifications

The NRC has established four categories for nuclear power plant emergencies. A plant operations manager has 15 minutes to classify the event into one of these four categories (listed by level of severity):

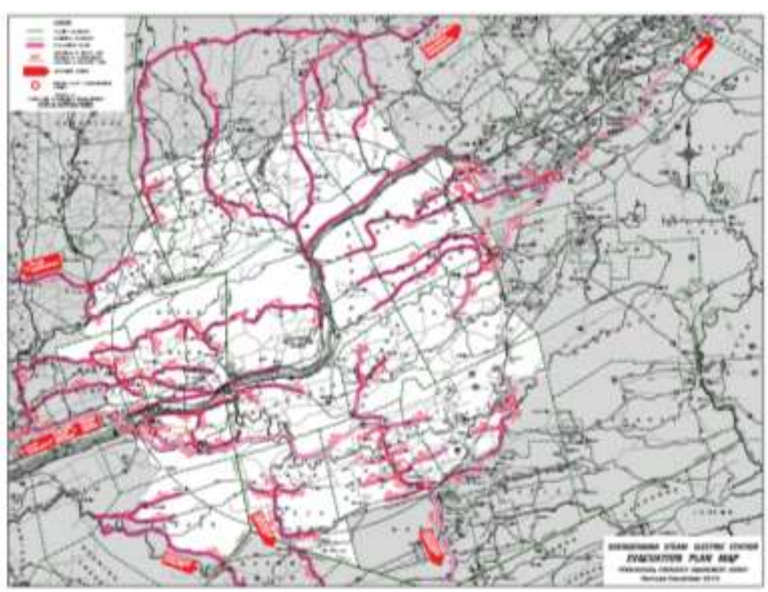
CLASSIFICATION	DESCRIPTION	EXAMPLES
UNUSUAL EVENT	• A minor problem has occurred at the plant that may indicate a potential degradation of the level or indicate a security threat to the facility. • No releases of radioactive material requiring offsite response or monitoring are expected unless further degradation of safety systems occurs.	1. A natural or other destructive event (i.e., tornado, earthquake, etc.) occurs that affects the station. 2. A fire lasting more than 15 minutes in an area where station safety equipment is located. 3. A loss of AC electrical power from all off-site electrical transmission lines for more than 15 minutes.
ALERT	• Events are in process or have occurred that involve an actual or potential substantial degradation of the level of safety of the plant or a security event that involves probable life-threatening risk to site personnel or damage to site equipment because of hostile action has occurred. • Any releases are expected to be limited to small fractions of the U.S. Environmental Protection Agency Protective Action Guideline exposure levels	1. A failure of the automatic system used to shut down the reactor where manual actions are not successful in shutting down the reactor. 2. A fire or explosion causing significant damage to permanent plant equipment and/or structures needed for operation

CLASSIFICATION	DESCRIPTION	EXAMPLES
SITE AREA EMERGENCY	• Events are in process or have occurred that involve: (a) actual or likely major failures of plant functions needed to protect the public, or; (b) hostile action that results in intentional damage or malicious acts: (1) toward site personnel or equipment that could lead to the likely failure of, or; (2) that prevent effective access to equipment needed to protect the public. • Radiation levels are not expected to be the U.S. Environmental Protection Agency Protective Action Guideline exposure levels at the site boundary.	1. Failure of the plant systems needed to cool the fuel or keep the reactor shut down. 2. A confirmed hostile action in an area containing vital plant structures. 3. Radiation doses projected to exceed 0.1 rem total body (i.e., approx. one-fourth the amount in a typical upper GI medical X-ray) at the site boundary.
GENERAL EMERGENCY	• Events are in process or have occurred that involve actual or imminent substantial core degradation or melting with potential for loss of containment integrity or hostile action that results in an actual loss of physical control of the facility. • Radioactive releases can be reasonably expected to exceed EPA Protective Action Guideline exposure levels offsite for more than the immediate site area. • Plant conditions may threaten public health and safety.	1. Radiation doses projected to exceed one rem total body (i.e., approx. four times the amount in a typical upper GI medical X-ray) at the site boundary. 2. All AC electrical power sources (on-site and off-site) are lost and recovery is not expected for a long period of time

Emergency Planning Zone

The 10-mile radius surrounding Susquehanna Steam Electric Station is considered the Emergency Planning Zone (EPZ). Communities within ten miles of the plant may be ordered to evacuate in a serious emergency and are included as part of the plant and community's emergency plan.

EPZ residents receive information yearly that outlines emergency policies and procedures, and lists evacuation routes and temporary shelters in the event of an evacuation.



Public Alert Sirens

Susquehanna Nuclear maintains a network of 76 public alert sirens in the communities around the Station for use in the event of a plant emergency. Susquehanna Nuclear also provides the sirens for use by Luzerne County and Columbia County officials in any emergency - nuclear or non-nuclear.

- Luzerne County and Columbia County are called “risk” counties because they include areas within 10 miles of the plant where residents may be ordered to take action in a serious emergency.
- If an emergency requires public action, county officials will sound the sirens in a steady tone for three minutes. When area residents hear a steady siren tone, they should turn on a radio or television and tune to an Emergency Alert System station for official information and instructions. They are NOT a signal to evacuate.
- Some of the sirens are shared with local fire companies. When used for fire company purposes, the sirens sound in a varying tone and there is no need for action by area residents.
- In addition to sirens, police, firefighters and volunteers in some areas will drive around with mobile public-address systems. For people with special needs, volunteers will go door to door to provide help, information and instructions.

Local Emergency Alert System (EAS) Stations

The Emergency Alert System for Luzerne County and Columbia County includes 32 radio stations and four television stations.

Luzerne County				Columbia County	
AM	FM		Television	AM	FM
WILK 980	WBSX 97.9	WFUZ 92.1	WNEP 16	WHLM 930	WQSU 88.9
WAZL 1490	WRKC 88.5	WILK 103.1	WBRE 28	WKOK 1070	WQKX 94.1
WZMF 730	WKRZ 98.5	WMQX 102.3	WYLN 35	WBWX 1280	WPGM 96.7
WITK 1550	WRGN 88.1	WSJR 93.7	WYOU 22		WMMZ 103.5
WQFM 1240	WCLH 90.7	WSFX 89.1			WCFT 106.5
WKZN 1300	WMGS 92.9	WGGY 101.3			WILQ 105.1
WYCK 1340	WBHT 97.1	WWRR 104.9			WKSB 102.7
		WEZX 106.9			

Protective Actions

Roles and Responsibilities

If releases of radiation from the plant were at levels high enough to affect public health and safety, the governor of Pennsylvania is charged with making recommendations that people who live near the plant take protective action.

In Pennsylvania, only the governor has the authority to order protective actions depending on actual or expected plant conditions. The two forms of protective actions are sheltering in place and evacuation.

Sheltering in Place

- Stay indoors until official word is given through the Emergency Alert System that it is safe to go outside.
- Close all doors, windows and vents, and turn off fans and air conditioners that draw in air from outside.
- If coming in from outside, wash thoroughly, especially before eating.
- Keep pets inside and shelter farm animals, if possible
- Keep your radio or TV turned on and listen for emergency instructions
- Keep telephone lines open for emergency use
- Take steps to prepare for an evacuation, should orders change

Evacuation

- Orders generally apply to the people who live within the 10 mile EPZ.
- Leave the area and go to temporary shelter facilities outside the 10-mile EPZ.
- EPZ residents receive information annually that lists evacuation routes and temporary shelters for an evacuation.
- School children will be taken to host schools outside the 10-mile EPZ where their families may pick them up.
- Plans are in place to evacuate hospital and nursing home patients and others with special transportation needs.

Tips for the Public (as provided in annual mailing within 10-mile EPZ)

IF ASKED TO EVACUATE, IT IS SUGGESTED THAT AS POSSIBLE, RESIDENTS TAKE THE FOLLOWING ACTIONS PRIOR TO DEPARTING:	IT IS RECOMMENDED THAT INDIVIDUALS PLAN TO BE AWAY FOR AT LEAST THREE DAYS IF EVACUATED. SUGGESTED ITEMS TO TAKE INCLUDE:
• Close and lock all doors and windows • Shut off appliances and faucets • Close car windows and vents • Tune to an EAS station and follow instructions from officials • Go to reception centers identified in annual Emergency Planning brochure mailed to those within EPZ	• Cash/checkbook, ID, credit cards, keys, flashlight, portable radio, batteries and folding chairs • Extra clothing and footwear • Two blankets per person or sleeping bags and pillows • Medications, glasses, dentures and any dietary needs • Towels, toiletries and sanitary supplies • Baby formula, diapers and any other necessary baby items

TIPS FOR THOSE WHO ARE NOT AT HOME WHEN AN EVACUATION ORDER IS GIVEN INCLUDE:

- Take best available shelter
- Follow instructions given on EAS stations
- Stay inside until you are told it is safe to go out
- If you are in a vehicle, close windows and air vents and follow instructions

Radiological Information for Farmers

Special information is available to area farmers to help them care for animals during an emergency. Farmers living within the 10 mile EPZ have been advised to keep a supply of covered feed for use if needed.

Potassium Iodide (KI)

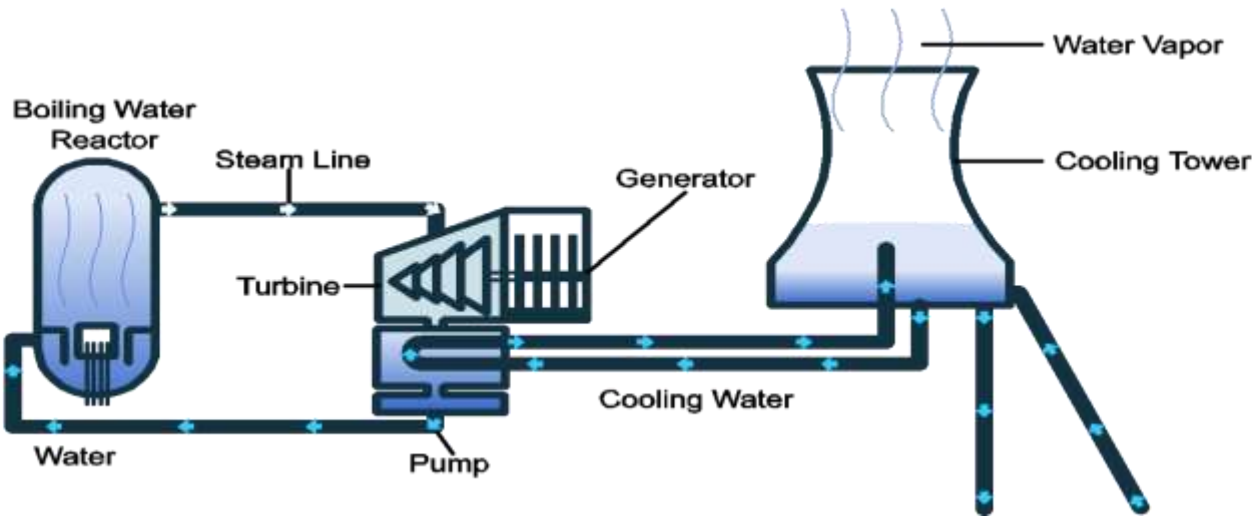
- During an evacuation, state officials may recommend the public take Potassium Iodide (KI) as an additional protective action. State and local officials will announce when the public should take KI in Emergency Alert System (EAS) messages. Residents living within the 10-mile EPZ may obtain KI or get more information by contacting the Pennsylvania Department of Health at 1-877-PA-HEALTH or www.health.pa.gov.
- KI offers a degree of cancer protection only to the thyroid gland and only in cases when the release contains radioactive iodine. If taken shortly before a radiological exposure, potassium iodide blocks the thyroid gland's ability to absorb radioactive iodine. Its use would be in addition to evacuation and/or shelter-in-place orders. Evacuation and shelter-in-place are primary modes of protection in a radiological emergency. The use of KI is entire voluntary.

How Electricity is Produced

Energy

- Susquehanna Station produces electricity by boiling water to create steam that turns a turbine-generator.
- Nuclear fuel does not burn like fossil fuels (coal, oil and natural gas) to produce electricity. Instead, heat produced by the energy released during nuclear fission, the process of splitting the nucleus of a uranium atom, causes water in the reactor to boil.
- At full power, each reactor makes about 16.6 million pounds of steam each hour.
- Steam passes through four turbines, each with hundreds of fan-like blades on rotating parts.
- Turbines turn a main generator at 1,800 revolutions per minute to produce electricity at 24,000 volts.
- Each unit has main transformers to increase the voltage to 230,000 volts on Unit 1 and to 500,000 volts on Unit 2 for transmission to customers.

Nuclear Plant



Cooling

- After steam gives up energy in the turbine-generator, it enters the condenser, an enclosed tank with more than 600 miles of stainless steel tubes.
- Nearly 484,000 gallons of cooling water flow through those tubes every minute.
- The tubes keep the steam, containing some radioactive gases, separate from the cooling water.
- The steam comes in contact with the tubes, cools and condenses back into water.
- This water is collected, purified by a series of filters that trap mineral particles suspended in the water (the condensate demineralizer system), heated and pumped back into the reactor to begin the cycle again.

Water

- As steam condenses, the temperature of the water used for cooling increases by about 30° F.
- After passing through the condenser, this nonradioactive cooling water is pumped to the cooling towers, where it trickles down over a series of baffles.
- As the water falls, it is cooled by evaporation.
- At full power, each cooling tower evaporates about 10,000 gallons per minute.
- Heat and water vapor rise from the cooling towers.
- Cooled water collects at the tower base and is pumped back to the condenser.
- Water from the Susquehanna River makes up for cooling water lost to evaporation.
- At full power, the plant uses about 20,000 gallons per minute from the river, 0.6 percent of the average river's flow annually.

Susquehanna Station Facilities

Reactor Buildings

- Two reinforced concrete and steel buildings, each about 200 feet tall, house the plant's nuclear reactors, as well as most of the equipment associated with plant emergency safety systems.
- Within each building, and surrounding each reactor, is a specially designed containment structure 160 feet tall with thick, steel-lined, reinforced concrete walls.

Turbine Building

- Two turbine-generators produce the electricity. They are located in a 125-foot-tall building adjacent to the reactor building.
- Each turbine-generator assembly is 208 feet long, weighs about 650 tons and is mounted on a reinforced concrete pedestal which is more than 50 feet tall.

Control Structure

- Between the reactor and turbine buildings, but separate from both, is the 134-foot-tall control structure.
- This building contains the control room for both units and plant computer equipment.
- It has its own ventilation system that allows operators to remain in the control room even in the unlikely event that other areas of the plant must be evacuated.

Cooling Towers

- The plant's two cooling towers are each 540 feet tall.
- Cooling water used in the plant flows down over a series of baffles, losing heat by evaporation as it falls.
- Water collects at the bottom of each tower for reuse in the plant.
- Carbon-free, non-radioactive water vapor rises from the towers.
- Cooling towers are not unique to nuclear plants; they are used at generating plants to conserve water and to limit thermal pollution from warm-water discharges to the river.

Auxiliary Buildings

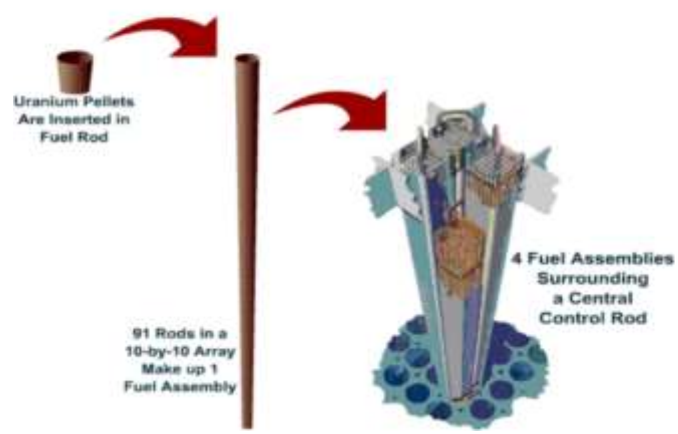
- **Services and Administration** — a four-story building that contains offices for plant management and other support employees.
- **South Building** — a three-story building that contains offices for plant management and other support employees.
- **South Gatehouse** — the only point of entry into the plant. All visitors, packages and vehicles must be checked by plant security at these access points. For additional security, the plant is surrounded by a double chain-link fence with intrusion detection systems at the fence line.
- **Diesel Generator Buildings** — house the plant's five diesel generators, which are backup power sources if the plant loses normal power supply.
- **Radwaste Building** — a reinforced concrete structure where the plant's low-level radioactive waste is processed. This building houses equipment that filters water for reuse in the plant.
- **Low-level Radioactive Waste Storage Building** — on-site facility designed for safe storage of up to 240,000 cubic feet of low-level radioactive waste.
- **Dry Spent Fuel Storage** — a modular dry fuel storage area used to store the plant's oldest spent fuel on an interim basis until the federal Department of Energy is ready to remove it. The Nuclear Regulatory Commission (NRC) allows spent fuel that is at least five years old to be stored in dry steel containers inside concrete modules. This modular system can be expanded as needed.

The Reactor

Vessels

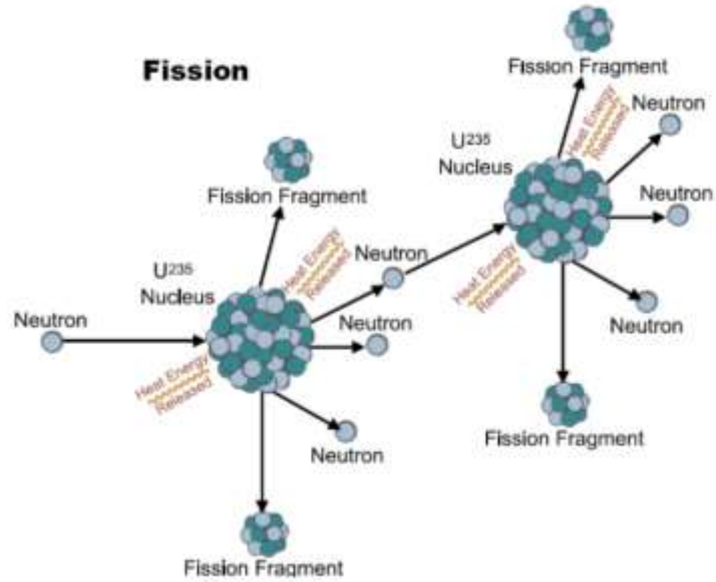
- Each Susquehanna Station reactor vessel is a 750-ton cylinder about 21 feet in diameter standing more than 73 feet tall.
- The walls are made of carbon steel lined with stainless steel and are four to nine inches thick.
- The reactor vessel contains about 130,000 gallons of water.
- The water serves three functions:
  1. It boils to become steam that drives the turbine-generator.
  2. It cools the reactor fuel to prevent overheating or melting.
  3. It moderates the reaction by slowing neutrons released in the fission process to make it more likely that those neutrons will split other atoms.
- Because of the importance of water to plant safety, Susquehanna has multiple backup safety systems, which can be operated manually or automatically, to keep the fuel covered with water.
- When the reactor is operating, water in the vessel is kept under pressure of about 1,000 pounds per square inch and at a temperature of 540°F.

Fuel - Susquehanna Station Statistics



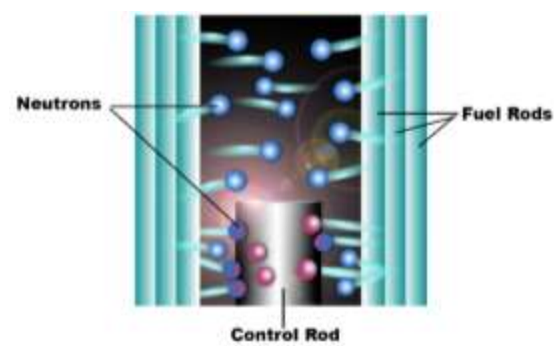
- Powering each reactor is about 135 metric tons of enriched uranium dioxide in the form of ceramic pellets.
- Each reactor is fueled by more than 30 million of these pellets, which are about the size of a standard pencil eraser.
- A single pellet can produce more energy than 1,000 pounds of coal or 100 gallons of gasoline.
- Fuel pellets are stacked 12-1/2 feet high inside rods that are about 13.5 feet long.
- The rods are made of a special zirconium metal alloy and are arranged in assemblies. This metal tubing surrounding the fuel also is called cladding.
- The majority of the plant's assemblies is made up of 91 rods, which are placed in a 10-by-10 array with a water channel in the center equal to a three-by-three array. As we transition for the future, new assemblies will accommodate a new fuel design. Each of these new assemblies will be made up of 112 rods, which are placed in an 11-by-11 array with a central water channel equal to a three-by-three array.
- Fuel assemblies also may be called fuel bundles.
- The reactor core contains 764 of these fuel assemblies.

General Information



- The energy results from fission, the splitting of atoms into smaller parts. When atoms split, they give off energy in the form of heat.
- Uranium in nature consists primarily in two forms: U^{238}, which is the form of most uranium, and U^{235}.
- U^{235} readily reacts with neutrons — particles from the nucleus of an atom that have no electrical charge — and splits into two new atoms.
- As the uranium splits, it gives off other neutrons, which strike other U^{235} atoms, causing them to split. The continuous splitting of U^{235} atoms is called a chain reaction.
- The concentration of U^{235} in naturally occurring uranium is very low — less than one percent. For that reason, "light-water reactors" such as Susquehanna do not use raw uranium. Power plant fuel is enriched to increase its content of fissionable atoms to about five percent.
- Nuclear weapons fuel, by contrast, is enriched to contain more than 90 percent fissionable material.
- Low enrichment and reactor design make it impossible for nuclear power plant fuel to explode like a bomb.

Control Rods



Plant operators control the nuclear reaction by the use of rods that insert between the fuel assemblies in the reactor.

- These control rods are made of stainless steel and are filled with boron carbide and hafnium substances that absorb neutrons and prevent them from splitting other uranium atoms.
- Control rods are the same length as fuel rods.
- Each Susquehanna reactor has 185 control rods that insert from the bottom of the reactor.
- By withdrawing or inserting control rods, plant operators can speed up or slow down the nuclear reaction. As control rods are withdrawn from the reactor, the number of atoms splitting increases and the reaction speeds up. As control rods are inserted, the number of atoms splitting decreases and the reaction slows down
- A sequence exchange on control rods, or a rod pattern adjustment, is performed so that the fuel is evenly used.
- Operators can shut down the plant in seconds by fully inserting all the control rods at once.
- Under some conditions, control rods will insert automatically to shut down the plant. This type of rapid shutdown is called a "scram."

Water Circulation

Water circulation is important to the operation of the Susquehanna units. Water is recycled continuously through the system. It boils to steam in the reactor, then is changed back to water in the condenser to be pumped back into the reactor.

Recirculation of water within the reactor increases the efficiency of the steam-making process and allows plant operators to safely get the maximum amount of power from each generating unit.

Key components of the water circulation system include:

Feedwater System

- Three large pumps, each capable of moving 17,000 gallons a minute, supply water to the reactor vessel. Before the water enters the reactor, a series of heaters brings it to the proper temperature.
- All three feedwater pumps must be operating for a unit to run at full power; a unit can continue to operate with one or two feedwater pumps, but at reduced power levels.

Recirculation System

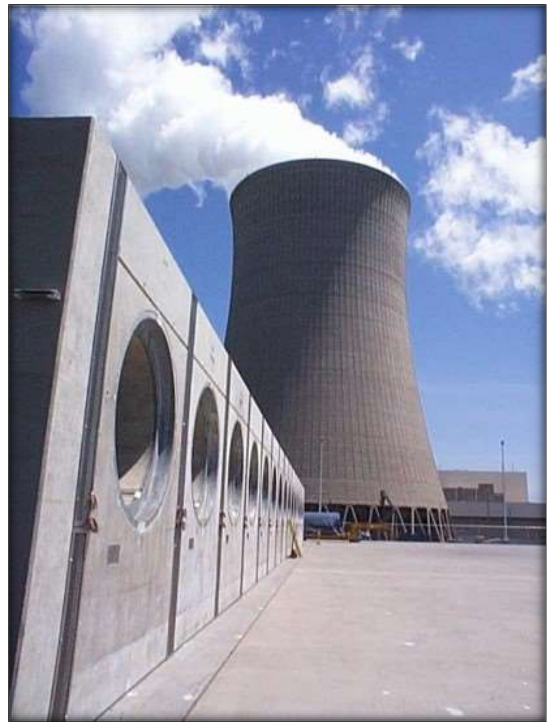
- Two pumps provide continuous recirculation of water within each reactor.
- Recirculation increases the flow of water through the reactor core, allowing the reactor to produce more steam; more steam means the generating unit can produce more electricity.
- This system draws water out of the reactor and forces it to flow back through the core.
- Each recirculation pump moves about 45,000 gallons of water per minute.

Spent Fuel

- Eventually, nuclear fuel loses enough of its energy that it must be replaced. Susquehanna Station schedules refueling outages for one of its units every 24 months in alternating years. During those outages, typically scheduled in the spring when demand for electricity is lowest, about one- third of the fuel is replaced.
- Fuel assemblies spend about four to six years in the reactor.
- Used fuel pellets in the assemblies being removed from the reactor contain radioactive byproducts of the fission process.
- The pellets are radioactive and will remain so for thousands of years.
- Susquehanna Station has facilities to store the used fuel safely until the Federal government develops a permanent disposal facility. The Department of Energy is responsible for disposal of nuclear power plant fuel.
- Water in the storage pools serves two purposes:
    1. It cools spent fuel that has recently been removed from the reactor which still produces heat.
    2. It provides an effective barrier that shields people from radiation.
- Over time, the amount of heat given off by spent fuel decreases.
- After five years, water is no longer needed for heat removal but continues to serve as an effective radiation barrier.
- Susquehanna Station’s spent fuel pools have cooling and cleanup systems to keep water temperature below 125°F and to filter impurities from the water.

Dry Spent Fuel Storage

Susquehanna Station’s modular dry fuel storage area is where the plant stores its oldest spent fuel on an interim basis until the federal Department of Energy is ready to remove it. The Nuclear Regulatory Commission allows spent fuel that is at least five years old to be stored in dry containers inside concrete modules. This modular system can be expanded as needed.



Susquehanna Station’s dry spent fuel storage pad fills a space equivalent to residential building lot. The casks currently store all spent fuel from the station’s nearly 40 years of operation.

Safety Systems

Defense in Depth

The design of Susquehanna, and all nuclear plants in the United States, is based on a “defense-in-depth” concept, which refers to the multiple layers of protection for public health and safety.

The station design features concrete and steel structures and redundant safety systems. At the center are three features called “barriers” designed to keep radiation within the plant and prevent or limit its release. Complementing the physical barriers are carefully developed work procedures and extensively trained personnel to ensure consistency and safety.

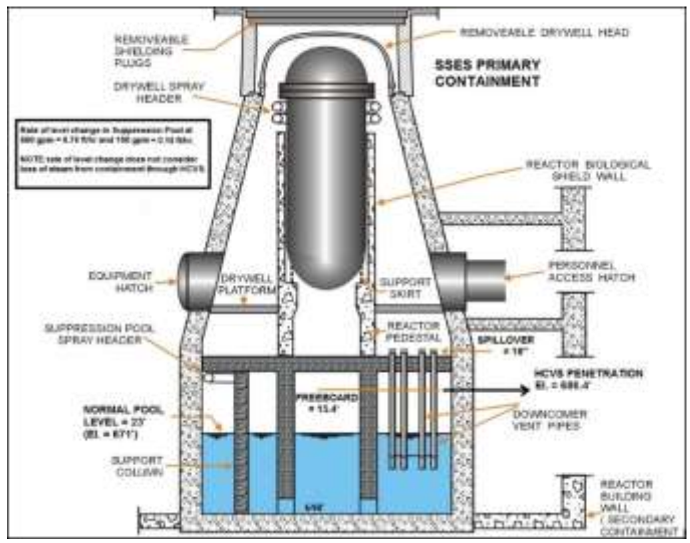
Primary Barriers

Fuel Cladding:
Fuel is formed into ceramic pellets that are then placed inside long tubes, called fuel cladding, made of a special metal alloy.

Reactor Cooling System:
The reactor vessel, which has steel walls four to nine inches thick, and its associated piping.

Primary Containment:
Surrounding the reactor and its associated piping is a 160-foot-tall structure with six-foot-thick, reinforced concrete walls lined with a quarter inch of steel. The walls have 120 miles of two-inch-thick steel reinforcing rods.

Cutaway of Susquehanna Unit 1 Containment Structure



Other Safety Features

- The primary containment is enclosed by the reactor building, often referred to as secondary containment. The reactor building’s air pressure is kept slightly lower than outside air pressure to protect against radioactive gases escaping the building. The building also has systems that filter out radioactive materials before they are released to the air.
- Where pipes, electrical conduits and air lines pass through the containment structure walls, leak-tight seals keep radioactive material from escaping.
- Pipes that pass through the containment structure walls typically have two sets of valves, one set inside containment and one set outside of it. Either set can seal off the release of radioactivity.
- The reactor itself is self-regulating; the nuclear reaction slows as the water surrounding it gets hotter.
- Water in the reactor removes heat and captures radioactive byproducts that may escape the fuel.
- The plant has multiple levels of safety systems, all of which can operate manually or automatically.

Cooling Water Sources

When atoms split in a nuclear power reactor, they produce heat. Even when the reactor is shut down, the fuel continues to give off heat. Without water, the core would become hot enough to melt the fuel pellets.

Susquehanna has multiple safety systems to ensure that an adequate supply of water covers the fuel at all times. Water for these safety systems comes from a variety of sources:

Condensate Storage

- Two tanks, each with a capacity of 300,000 gallons, hold a reserve supply of reactor water for make-up needs during normal operation, refueling or emergencies.
- In each tank, 135,000 gallons is reserved specifically for emergency core cooling systems. These systems can use all of the water in the tanks if necessary.

Suppression Pool

- Located in the containment structure below the reactor, this pool is 23 feet deep and contains nearly one million gallons of water.
- It is a main water supply source for the plant's emergency core cooling systems.

Spray Pond

- This eight-acre, man-made pond located on plant property contains 25 million gallons of water for cooling during normal plant operations and emergencies.
- Water level in the pond is maintained by adding water from the Susquehanna River as needed.

Reactor Core Isolation Cooling (RCIC)

- This system provides make-up water to the reactor vessel when it is shut down, but still pressurized.

Emergency Core Cooling Systems (ECCS)

Susquehanna has a series of independent emergency core cooling systems to maintain water level in the reactor if normal plant cooling systems fail. The systems come on automatically if they sense a reactor water leak. Plant operators also may start them manually.

Some of the systems work when the reactor is at normal operating pressure. Other systems work when the pressure is low.

High Pressure Coolant Injection (HPCI)

- Can add about 5,000 gallons of water per minute.
- Gets the emergency water to the reactor through pipes that feed water to the reactor during normal operation.

Automatic Depressurization System (ADS)

- Uses six safety relief valves on the plant's main steam supply system to reduce pressure quickly inside the reactor.
- Allows low-pressure cooling systems to operate and flood the reactor.

Emergency Core Cooling Systems (continued)

Core Spray (CS)

- Low-pressure system that sprays water directly onto the fuel through nozzles located above the fuel.
- Core spray has two independent systems; each can spray about 6,000 gallons of water a minute.

Low Pressure Coolant Injection (LPCI)

- High-flow system that can pump 42,600 gallons of water a minute into the reactor using pipes that serve the recirculation system during normal operation.

Air Filtration System

Standby Gas Treatment (SBGT) is an air filtration system used to minimize the effect of airborne radiation releases during an emergency at Susquehanna Station. The system has several functions:

- Helps keep air pressure inside the reactor building slightly lower than outside air pressure to prevent an uncontrolled, unfiltered release of radioactive material.
- Removes 99.9 percent of the radioactive iodine through a series of activated charcoal bed filters.
- Removes 99.9 percent of the radioactive particulate matter through filters.
- Forces chemically inert radioactive gases through a long ventilation route before leaving the plant, during which time these gases lose much of their radioactivity.

Emissions from the SBGT system go through a vent on the reactor building roof. The vent is monitored continuously by sensitive radiation detection equipment.

Computers analyze monitor data and weather conditions to determine the size and direction of a release. That information helps public officials decide whether to recommend that people take protective action in the unlikely event of a nuclear emergency.

Power Supply Sources

Susquehanna has several independent power sources that supply electricity to plant systems.

Power Lines

- Plant safety systems get electricity from two independent power lines in PPL Electric Utilities' power supply system, which serve as backups to each other.
- The two lines feed separate power transformers.
- Either can provide enough power to meet plant needs.

Diesel Generators

- If both power supply lines fail, the Station has five diesel generators which serve as backups.
- Diesel generators power-up automatically to provide power within 10 seconds of power supply loss.
- The Station must have four generators available to operate when either unit is in service.
- The fifth serves as a spare to replace any of the others.
- Susquehanna Station keeps enough diesel fuel on site to run the generators for seven days.

Industrial Safety

Susquehanna has a rigorous Safety program with safety as a key element of its culture. Safety is the core focus in every action performed at Susquehanna – from pre-job briefs to detailed procedures, routine observations and post-job assessments. The use of procedures ensures consistent, safe and compliant action.

- Detailed work procedures are used for every job to ensure consistency in how things are done and to provide a proven set of safe work guidelines.
- Procedures are reviewed regularly and revised as needed.
- Work procedures are designed with safety as the first priority.

Personnel and Training

- Susquehanna Nuclear delivers training programs in 12 separate disciplines for plant employees.
- Training programs are fully accredited by the National Academy for Nuclear Training.
- Every control room employee trains one week out of six either in the classroom or on an advanced simulator.
- Licensed plant operators requalify for their licenses every year.
- Many maintenance and technical support employees receive certification in their areas of expertise.

Radiation

What Is It?

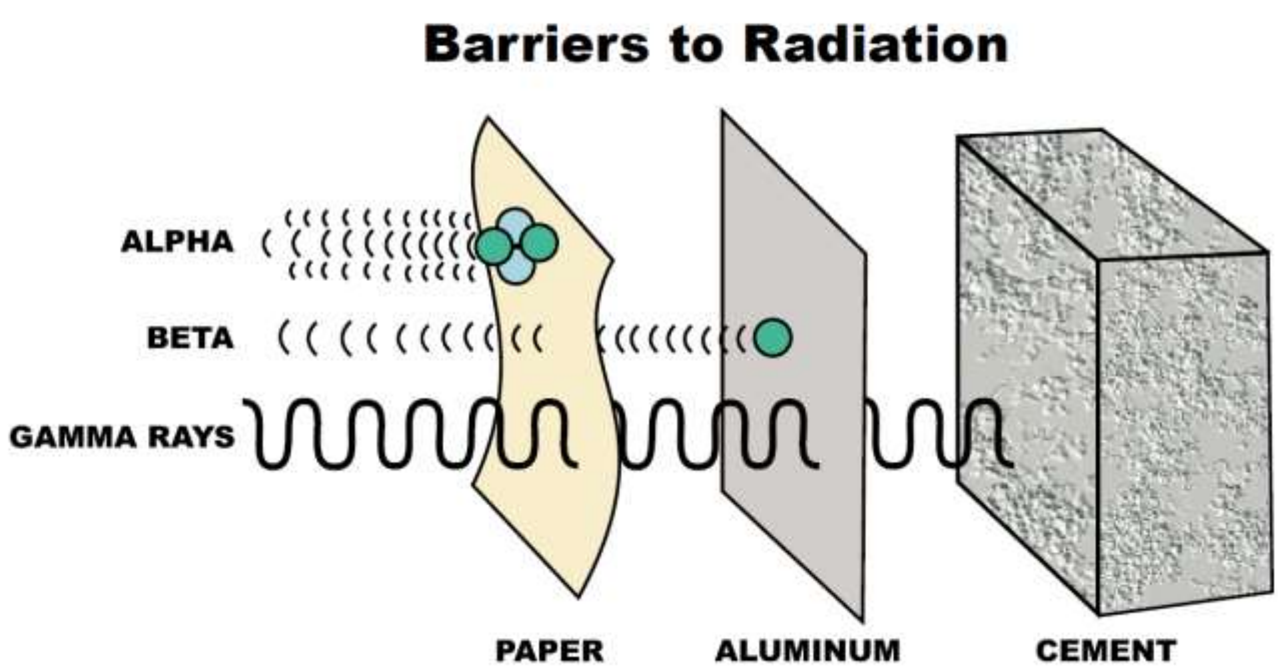
Radiation is energy in the form of particles or waves, such as light, heat, microwaves and radio waves. These “non-ionizing” forms of radiation do not have enough energy to change the structure of atoms. In nature, atoms of most elements are stable; they won’t change on their own.

Natural and man-made ionizing radiation, however, has enough energy to change the structure of atoms. Radioactive atoms are unstable. To reach a stable state, they give off their excess energy through a natural process known as “decay.”

The main types of radiation emitted as byproducts of nuclear power generation are:

- **Alpha particles** — The heaviest and least penetrating form of radiation, they can be stopped by a sheet of paper.
- **Beta particles** — Smaller and more penetrating, they can be stopped by a block of wood or thin sheet of metal.
- **Gamma rays** — The most penetrating form of radiation, it takes a dense material such as lead or several feet of concrete to stop these highly energetic waves.

Ionizing radiation may damage the cells of living things by changing the structure of their molecules. Exposure to very large amounts of radiation in a short period of time can cause immediate health problems.

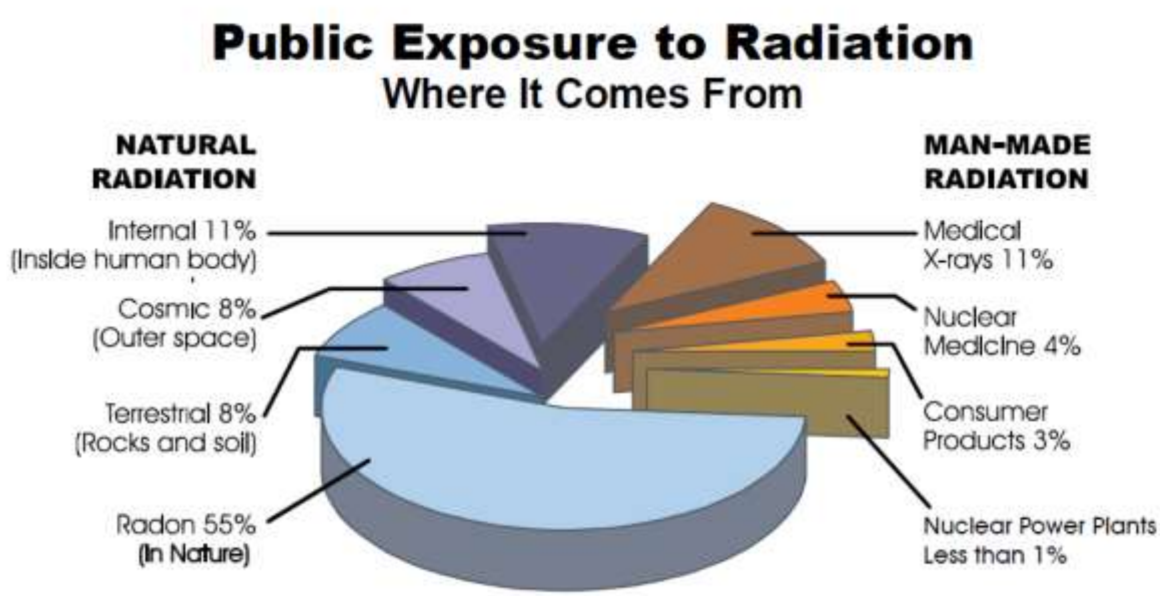


Source: A Basic Guide to Nuclear Power, Edison Electric Institute

Exposure

Radiation is a natural part of the environment. It is in the air we breathe, the water we drink and the food we eat. The human body is naturally radioactive.

- Exposure to radiation is measured in units called millirem. The government sets radiological protection standards based on millirem received over a specified period of time.
- People living in the United States are exposed to an average of about 360 millirem a year. Natural sources account for about 82 percent of the total annual exposure.
- About 200 millirem of exposure is due to naturally occurring radon gas in the air that seeps up from the ground.
- Other natural sources of radiation exposure are the human body, rocks and soil, and cosmic radiation from outer space.
- Man-made radiation sources account for about 18 percent of a person's total annual exposure (about 60 millirem) and come from diagnostic X-rays and other medical procedures.
- During normal operations, the Susquehanna plant releases minute quantities of radiation to the air through filtered ventilation systems and occasionally into the Susquehanna River. These releases are carefully controlled and are monitored continuously to stay well below the strict federal limits.
- Extensive field monitoring has shown essentially no effect on the environment from normal Susquehanna operations.
- The maximum amount of radiation a plant area resident receives is less than one-tenth of one millirem a year; most people are exposed to lesser amounts. One-tenth of one millirem is 100 times less than the 10 millirem a person would receive from a single dental X-ray.
- Federal regulations limit the exposure for nuclear power plant workers to 5,000 millirem a year.
- The onset of symptoms associated with radiation sickness begins at a single dose of about 100,000 millirem.
- A single dose of 400,000 millirem or more would be fatal within 30 days to 50 percent of the people exposed.



Source: *Understanding Radiation*, Nuclear Energy Institute

Contamination

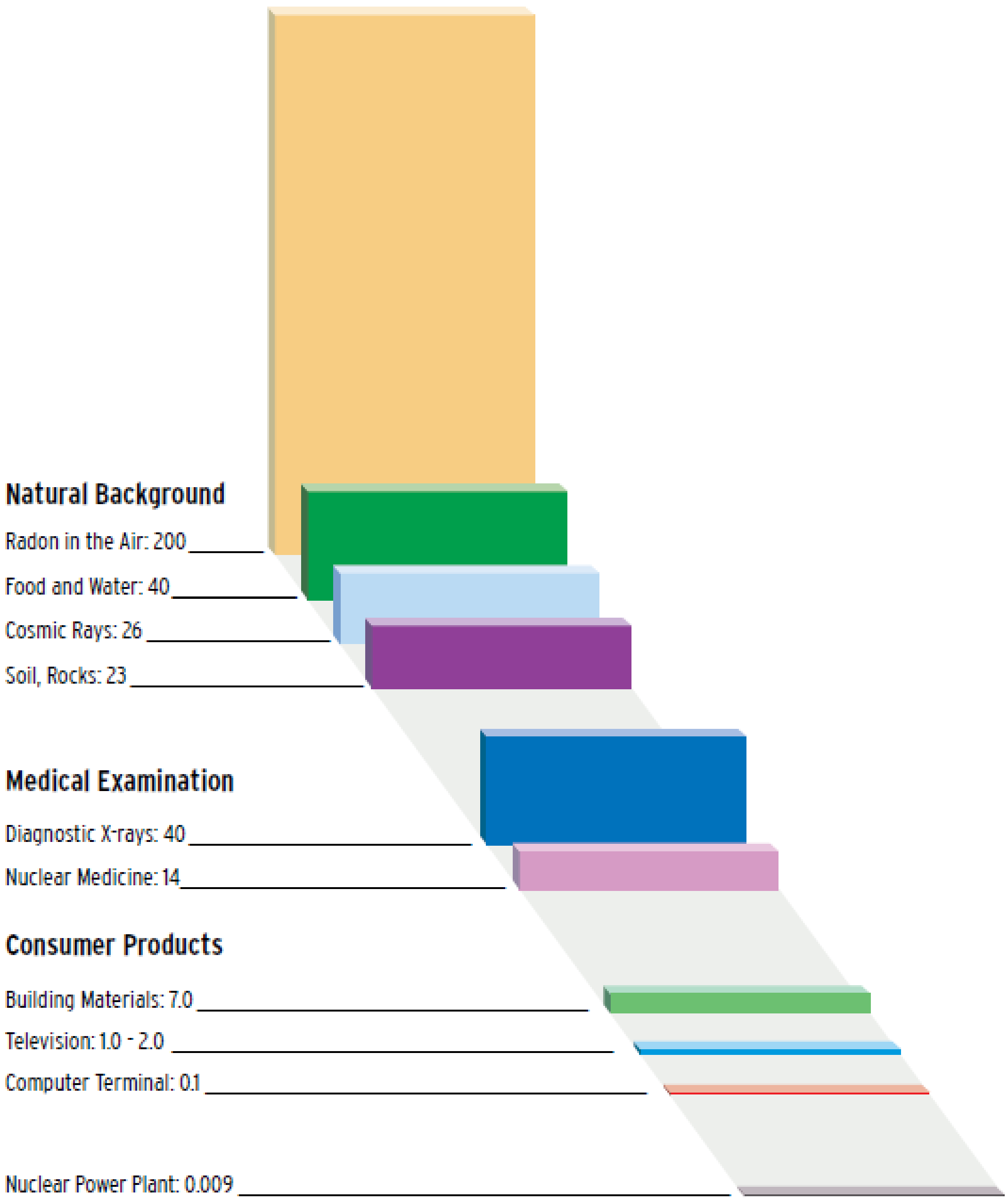
- Contamination occurs when radioactive material is deposited on nonradioactive surfaces. Inside a nuclear power plant, tools, filters and other plant components routinely become contaminated through contact with radioactive materials.
- Plant workers wear special protective clothing and equipment to protect against contamination.
- Access controls are in place at the plant where there are radiological hazards.
- Despite these measures, radioactive material may get on plant workers' clothing or skin. Monitors located throughout the plant detect radioactive contamination; employees pass through them when entering or leaving various work areas and when leaving the plant.
- Radioactive contamination usually is removed from clothing or skin by washing with soap and water at the plant.
- If an injured plant worker is contaminated and needs immediate medical treatment, nearby Berwick Hospital has facilities to prevent the spread of radioactive material while hospital staff treat the injured worker.

Measuring and Detecting Radiation

- The quantity of radioactive material is measured via the number of atoms decaying per second.
- It is possible to detect a single atom decaying.
- The unit of measure for radioactive material is the Curie. One Curie is equivalent to 37 billion atoms decaying per second (the rate of radioactive decay for one gram of radium).
- Susquehanna has a series of monitors inside and outside to detect and measure any radiation released. The state government also maintains radiation monitors in areas around the plant.
- Susquehanna Nuclear, LLC conducts extensive environmental monitoring around the plant, collecting about 850 samples a year at 35 locations. Additionally, direct radiation from plant operations is measured at 58 locations and is evaluated quarterly.
- Outside laboratories analyze the environmental samples (air, water, river sediment, vegetation, soil, fish and milk) for radiation.
- In the event of a plant emergency, mobile teams of trained people would measure and track radioactive material releases and identify contaminated areas inside and outside the plant.
- The information they provide would supplement stationary monitors and help determine whether the public needs to take protective action, such as sheltering or evacuation.

Typical Radiation Exposure

Millirem Annually per Individual
Average per Activity



Source: *Understanding Radiation*, Nuclear Energy Institute

Glossary

Alert
The second lowest of the four emergency classifications established by the Nuclear Regulatory Commission for nuclear power plants.

An alert means events are in progress or have occurred that have substantially reduced or could substantially reduce plant safety. Any radioactive releases are expected to be below Environmental Protection Agency guidelines for protection of the public. No action by the general public is required.

alpha particles
The heaviest and least penetrating form of ionizing radiation. They can be stopped by clothing or a sheet of paper.

atom
The basic building block of elements. Atoms consist of a nucleus, orbited by particles with a negative electrical charge (electrons). Within the nucleus are particles that have a positive electrical charge (protons) and particles that have no electrical charge (neutrons).

background radiation
Radiation that occurs naturally in the environment, such as radon gas from the ground, cosmic rays from space and radioactive elements in the human body.

beta particles
Small, high-energy particles of ionizing radiation. They have enough energy to penetrate skin deeply enough to damage tissue, but can be stopped by a block of wood or thin sheet of metal.

cladding
Metal tubing, made from a special alloy, which surrounds uranium fuel pellets.

condensate demineralizer
A large filter vessel used to remove impurities from water before it is returned to the reactor. Each unit at Susquehanna has seven available.

condenser
A plant system that draws steam from the turbine and, by forcing it to pass over a series of tubes filled with water, cools the steam to water for reuse in the reactor.

containment
Physical barriers to prevent or limit the release of radiation in the event of a serious accident. Primary containment is a massive steel- reinforced concrete structure. Secondary containment has steel- reinforced concrete walls and air pressure lower than outside air pressure to prevent air leaks.

contamination
Radioactive material deposited on a non-radioactive surface.

control rods
Stainless steel rods, shaped like the letter “x,” filled with a material (boron carbide and hafnium) that absorbs neutrons. These rods are inserted between the fuel assemblies to control or stop the nuclear reaction.

core
The area inside the reactor vessel where the fuel is located and where the fission process takes place. Also refers to the fuel itself.

curie
Unit used to measure the amount of radioactivity in a substance.

decay
The process by which an atom gives off energy, in the form of radioactive particles or waves, in order to reach a stable state.

defense in depth
Concept used in the design of nuclear power plants to improve safety. It uses multiple protective barriers and multiple backup systems to prevent or limit the release of radiation.

Emergency Alert System (EAS)
Radio and television stations used by county emergency management officials to broadcast official information and instructions during an emergency.

Emergency Planning Zone (EPZ)
The geographic area within 10 miles of Susquehanna Station that includes 27 municipalities in parts of Luzerne and Columbia counties. About 71,000 people live in this area.

enrichment
The process by which the concentration of fissionable atoms in raw uranium is increased to about four percent from less than one percent so it can be used as power plant fuel.

fission
The splitting of atoms into smaller parts, which results in a release of energy.

fuel assembly
An arrangement of rods containing uranium fuel. Susquehanna fuel assemblies have 91 rods in a 10-by-10 array, with a central water channel equal to a 3-by-3 array. Each reactor contains 764 fuel assemblies.

fuel bundle
See "fuel assembly."

fuel rod
A 13.5-foot-long tube, made of a special metal alloy, that is used to hold uranium fuel pellets.

gamma rays
Waves of ionizing radiation energetic enough to pass through a human body. It takes dense material, such as lead or several feet of concrete, to stop gamma rays.

General Emergency
The highest of four emergency classifications established by the Nuclear Regulatory Commission. A general emergency means events are imminent, are in progress or have occurred involving substantial damage to the reactor core and failures to plant safety systems that are needed for public protection. Radiation releases are expected to exceed Environmental Protection Agency guidelines for protection of the public beyond plant property. The public would be asked to tune into an Emergency Alert System radio or television station for official information and instructions.

half-life
The time it takes for a radioactive substance to lose half of its radioactivity through decay. Each radioactive substance has a unique half-life.

low-level radioactive waste
Material that becomes contaminated through use and contact with radioactive materials. At Susquehanna this includes filter materials, protective clothing, tools, rags and other solid wastes.

millirem
The unit used to measure exposure to radiation.

moderator
The substance used to slow neutrons released in the fission process to make them more likely to split other atoms.

neutrons
Particles within the nucleus of an atom that have no electrical charge. In a nuclear power reactor, they sustain the reaction by splitting fissionable uranium atoms.

radiation
Electromagnetic energy in the form of particles or waves. In a nuclear power plant, the particles or waves are emitted by unstable atoms undergoing decay.

reactor
The large metal vessel where atoms are split to create the heat needed to boil water and produce steam that turns a turbine to generate electricity.

risk counties
Counties that have residents who live within 10 miles of the power plant and who may be asked to take protective action in the event of an emergency at the plant. The risk counties for Susquehanna are Luzerne and Columbia.

SCRAM
The rapid shutdown of a nuclear power reactor by the insertion of all control rods into the core to stop fission. Control rods can insert automatically or at the direction of plant operators.

Site Area Emergency
The second highest of the four emergency classifications established by the Nuclear Regulatory Commission for nuclear power plants. A site area emergency means events are in progress or have occurred that have affected or are likely to affect major plant safety systems. Any radioactive releases are not expected to exceed Environmental Protection Agency guidelines for protection of the public beyond plant property. No action by the general public is required.

spent fuel
Fuel that can no longer produce enough energy to support full-power operation of the plant. It is radioactive and requires special handling for safety.

spray pond
An eight-acre, 25-million-gallon, man-made pond on Susquehanna plant property that serves as a source of cooling water for normal plant operations and emergencies. It holds enough water to meet all plant cooling needs for a minimum of 30 days.

suppression pool
A source of nearly one million gallons of water for emergency cooling systems in the Susquehanna plant. There is a pool located beneath each reactor.

transformer
A device used to increase or decrease the voltage of electricity.

Unusual Event
The lowest of the four emergency classifications established by the Nuclear Regulatory Commission for nuclear power plants. An unusual event means a minor problem is in progress or has occurred that could reduce plant safety. No releases of radioactive material requiring on-site response or monitoring are expected. No action by the general public is required.

uranium
The element used to fuel a nuclear power reactor. Uranium in nature consists mainly of two isotopes, U^{235} and U^{238}. The U^{235} atom readily reacts with neutrons and splits into new atoms.

Other Sources of Information

U.S. Nuclear Regulatory Commission
Office of Public Affairs
Washington, D.C. 20555
301-415-8200
www.nrc.gov

U.S. Nuclear Regulatory Commission Region 1
2100 Renaissance Blvd., Suite 100
King of Prussia, Pa. 19406-2713
610-337-5000
www.nrc.gov/about-nrc/locations/region1.html

Federal Emergency Management Agency
Region 3 Office
615 Chestnut St. #6
Philadelphia, Pa. 19106 -4404
215-931-5500
https://www.fema.gov/region-iii-dc-de-md-pa-va-wv

Pennsylvania Emergency Management Agency
1310 Elmerton Avenue
Harrisburg, Pa. 17110-9364
717-651-2001
www.pema.state.pa.us

Pennsylvania Department of Environmental Protection
Bureau of Radiation Protection
P.O. Box 8469
Harrisburg, Pa. 17105-8469
717-787-2480
https://www.dep.pa.gov/business/radiationprotection/Pages/default.aspx

Luzerne County Emergency Management Agency
185 Water St.
Wilkes-Barre, Pa. 18702
570-820-4400
https://www.luzernecounty.org/191/Emergency-Management

Columbia County Emergency Management Agency
26 West First Street
Bloomsburg, Pa. 17815
570-389-5720
http://ema.columbiapa.org/

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1201 F St., Suite 1100
Washington, DC 20004-1218
202-739-8000
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