Chapter 16 Safety and Security

16.1 INTRODUCTION

This chapter discusses safety and security matters related to the operation of the Build Alternative. The microgrid is a specially, and specifically-designed electrical power generating station. The nature of the process of electrical generation involves some risk associated with the machinery and the electricity produced, but the design, scale, and physical location of the microgrid are important factors in assessing the degree of risk to safety and security of the on-site workforce and the public residing and working in the vicinity of the Project area. Although the microgrid would be designed to meet and exceed regulatory standards, and incorporate state-of-the-art cybersecurity protocols, the production of electricity involves the use of regulated materials, transmission of natural gas in an underground pipeline, and a new source of electromagnetic fields (EMFs) near substations and electrical lines. This chapter considers the facility's design in regard to the mitigation of potential hazards, and also provides an accident analysis that evaluates the potential for reasonably foreseeable accidents and intentional destructive acts, such as sabotage and terrorism, in accordance with DOE's 2002 guidance.

The proposed Project would also include a nanogrid, which would provide emergency power generation capacity for the southern portion of HBLR with the generators located on HBLR Headquarters on Caven Point Avenue in Jersey City. This will include two natural gas-fired reciprocating engines that would run two generators that would power the HBLR during emergency conditions when the commercial power grid is unavailable. The nanogrid would be located on the NJ TRANSIT-owned HBLR Headquarters facility, within its secure perimeter.

The proposed Project would improve safety and security in the region by providing a redundant and reliable power source for the electric rail lines operating between New Jersey and New York City job centers. Commuters would be able to rely on continued commuter and light rail services, in the event of widespread power outages, which could require evacuations of densely populated areas.

16.2 AFFECTED ENVIRONMENT

The Main Facility site (Preferred Alternative Project Component A), a part of the larger Koppers Koke Site, is a private property and is not accessible to the public. The current entrance to the Koppers Koke Site at Fish House Road is fenced and HCIA maintains a security booth there. It is important to note that the existing access passes under the Morris & Essex Line via a narrow tunnel with low clearance. This access does not safely accommodate large vehicles and bi-directional traffic. A second access road, free of clearance issues, is proposed at the west end of the Koppers Koke Site (to be constructed by HCIA).

As discussed earlier in Chapter 3, "Land Use, Zoning and Public Policy" the GLDD Company operates a dredged material processing facility at the North Dock of the site. Other active uses include Owens Corning operations at the South Dock (including a liquid material receiving station and pipeline), two PSE&G high-voltage electrical towers along the river, and a groundwater treatment building in the northeast portion of the site. The Owens Corning receiving station is regulated by the U.S. Coast Guard (USCG), and a transportation worker identification credential (TWIC) card is required for access. The Koppers Koke Site contains soil and groundwater contamination in excess of levels considered safe for public health. A Remedial Action Work Plan (RAWP) was prepared by Beazer East, Inc. and approved by NJDEP, and various elements are being implemented by the Peninsula Restoration Group to contain and remediate contaminants on the site.

Amtrak and NJ TRANSIT facilities are monitored by security personnel and surveillance equipment. Public access is not allowed on railroad property. Flag protection is provided for Amtrak staff working in the vicinity of the Northeast Corridor tracks. NJ TRANSIT maintains a rigorous security protocol, railroad training and flag man requirements, that would be applied to new construction for the proposed Project.

Electrical lines are prevalent throughout the study area. The existing rail alignment is electrified and consequently, there are EMFs directly associated with the rail line as it exists today. Previous studies along portions of Amtrak's Northeast Corridor measured electromagnetic fields up to 15 meters (49.5 feet) from electrified tracks to be an average of 2.0 milliGauss (mG), which is significantly lower than magnetic field strengths of common household appliances (for example, a dishwasher is 30 mG at one foot distance) (Caltrain 2014). There are no permanent dwellings within 15 meters of the tracks in the proposed Project area. Voltages along Preferred Alternative Project Component E to the Henderson Street Substation, and Preferred Alternative Project Component G along the HBLR would be less than the 138Kv Amtrak rail line. Voltages and magnetic fields are directly proportional. The surrounding communities are also served by overhead electric distribution lines providing power to the existing residential, commercial, and industrial facilities in the study area.

16.3 PROBABLE IMPACTS OF THE PROJECT ALTERNATIVES

16.3.1 No Action Alternative

Under the No Action Alternative, the proposed Project would not be constructed and NJ TRANSIT and Amtrak would continue to be served by the existing commercial grid. Without the proposed Project, commuter and intercity rail service in Amtrak's and NJ TRANSIT's core service territory would remain vulnerable to power outages. Improvements to safety and security in the region (i.e., providing reliable public transportation in the event that New Jersey and New York City job centers need to be evacuated during widespread outages of the commercial grid) would not be realized. Under the No Action Alternative, other planned and programmed transportation improvements for which commitment and financing have been identified would take place by 2021. These include projects in NJ TRANSIT's Resilience Program, Amtrak initiatives that will affect operations on the Northeast Corridor, and HCIA plans for warehousing development on portions of the Koppers Koke property.

In the absence of the proposed Project, Amtrak has plans to completely replace and rebuild Substation No. 41. Amtrak is currently proceeding with reconstruction of certain elements of Substation No. 42, located east of the project area at the entrance to the North River Tunnels in Weehawken, NJ, including the installation of a new Control House. Under the No Action Alternative, NJ TRANSIT intends to acquire the 20-acre parcel (Preferred Alternative Project Component A) on the Koppers Koke property as well as the six-acre parcel (Preferred Alternative Project Component B) located south of the Morris & Essex Line (due to a property settlement, as described in Chapter 2, “Project Alternatives”). Under the No Action Alternative, NJ TRANSIT’s safety and security considerations would largely remain the same as they are today and the 20 acres that NJ TRANSIT is acquiring would likely be used for ancillary railroad purposes.

16.3.2 Build Alternative

The combined-cycle plant of the Main Facility would be located on the Koppers Koke Site (Preferred Alternative Project Component A) and would require a natural gas pipeline connection (Preferred Alternative Project Component B). The nanogrid (Preferred Alternative Project Component F) would require a smaller connection to the existing natural gas pipeline within the HBLR Headquarters facility. The Main Facility would include a steam turbine and a heat recovery steam generator (HRSG) boiler, and the active use of steam as a power source for electrical generation. As discussed below, these elements do not increase safety risks for the general public in the Project area but represent additional potential opportunity for accidents affecting workers at the Main Facility. Access to the new Kearny Substation would be restricted due to its location in Cedar Creek Marsh South between the Northeast Corridor and the Morris & Essex Line. Access to the emergency generators for the nanogrid would be restricted due to its location within the HBLR Headquarters facility perimeter.

An employee health and safety program would be implemented for the facility’s operations personnel. It would include regular employee education and training in safe working practices; communication of hazards in accordance with federal, state, and local standards; accident incident evaluations; administrative health and safety procedures; emergency response; fire protection and fire response; and reporting and recordkeeping of safety performance data. Operations personnel would be provided with written safety guidance similar to that used at other project proponent facilities. A first aid station containing basic first aid equipment would be established at several locations around the facility. First aid training would be required for operations personnel. Fences, gates, or barriers, coupled with the use of keying systems, access card systems, or security personnel at entry points, would restrict access to the Main Facility. Use of these physical obstructions and warning signage would effectively deter and delay intruders. Personnel identification and control measures such as photo IDs, visitor passes, and contractor IDs would help to quickly identify unauthorized persons within the facility. Existing security protocols would be followed for the nanogrid engines and generators located at the HBLR Headquarters. It would be contained in a secured fenced location within the facility and would be monitored using existing closed-circuit security cameras.

All operational systems would be designed to provide the safest working environment possible for all site personnel. Design provisions and health and safety policies would comply with Occupational Safety and Health Administration (OSHA) standards and consist of, but not be limited to, the following:

- Safe egress from all confined areas;
- Adequate ventilation of all enclosed work areas;

- Fire protection;
- Pressure relief of all pressurized equipment to a safe location;
- Isolation of all hazardous substances to a confined and restricted location;
- Separation of fuel storage from oxidizer storage; and
- Prohibition of smoking in the workplace.

It is anticipated that maintenance activity would be provided by specialist contractors, trained in the safe undertaking of tasks required to maintain and repair the turbines and electrical distribution system. Day to day facility maintenance workers would receive specific training on the appropriate procedures for equipment inspection and repairs and the limits of their responsibility regarding the systems under separate maintenance contracts. They also would receive first aid and emergency response training with periodic refresher sessions. Maintenance vehicles would carry fire suppression equipment and communications equipment to facilitate contacting back-up emergency response personnel.

In the event of an emergency, services may be provided by various entities, depending upon the nature of the situation (e.g., hazardous materials spill, injured personnel, fire). These entities may include the Town of Kearny Fire and Police Departments, City of Jersey City Fire and Police Departments, Hudson County, NJDEP, USEPA, USCG, and the NJ TRANSIT Police Department (NJTPD).

Hazardous Materials and Fuel Management

The Main Facility would be fueled by natural gas, which would be delivered by high pressure pipeline. The connection from the existing natural gas pipelines to the Main Facility would occur within the six-acre parcel (Preferred Alternative Project Component B) located south of the Morris & Essex Line, east of the Main Facility location. No natural gas would be stored at the Main Facility, and the flow of gas would be monitored by pressure and flow sensors. The natural gas supply to the plant would be automatically shut down by block valves in the event of a natural gas release. The gas pipeline between the connection and the Main Facility would be designed according to federal standards including the Pipeline Safety Act of 1992 and the Pipeline Safety Improvement Act of 2000. Safety specifications include minimum depth cover, pipe wall thickness, design pressures, material selection, and protection from internal, external and atmospheric corrosion.

Hazardous materials would be delivered to the Main Facility and stored in accordance with all applicable regulations and safety requirements. Regulated materials that are likely to be used in facility operations include: lubricants, aqueous ammonia, cleaning fluids and detergents, and water treatment chemicals for the water-cooling tower used in conjunction with a plant configuration that includes steam turbines. As described in Chapter 2, “Project Alternatives,” the Main Facility would include a closed loop system for driving the steam-turbine, which would be sourced from the municipal water supplier. Waste water from the cooling towers would be discharged to the sanitary sewer system, after cooling to permit-required temperatures.

Aqueous ammonia, used to control (reduce) the formation of criteria air pollutants, would be stored in two 25,000 gallon, double-walled steel tanks within the 20-acre parcel, near the loading bay. The tanks would be equipped with leak detection equipment. A spill containment facility (curbed area to contain small spills) would be constructed around the truck unloading station, and a curbed containment area large enough to contain spilled ammonia and deluge water would be constructed around the liquid ammonia storage tank. Safety Data Sheets for each onsite chemical would be kept onsite, and facility operator employees would be made aware of their location and content. A spill prevention control plan would be developed and put into effect at the start of operations.

Fire Emergencies

Systems for fire prevention, detection, and control would be installed throughout the building and yard areas as recommended by the National Fire Protection Association (NFPA) and insurance requirements (NFPA 2015). Facility personnel would receive basic fire suppression training to address small fires that could be controlled and/or extinguished with rack hoses and fire extinguishers. If a fire exceeds the resources available, assistance from the local fire department would be requested. To accommodate fire and other emergency services equipment, a secondary access road is necessary and would be developed on the west end of the site. This additional access is necessary because the existing Fish House Road culvert under the Morris & Essex Line does not provide sufficient clearance for large fire trucks and would restrict the bi-directional movement of emergency vehicles.

The proposed natural gas pipeline would be a specific source of potential fire or explosion during project operations. The first line of defense against a natural gas leak is the shutoff valves that can isolate a section of the gas line. Shutoff valves limit the amount of gas that can leak from any breach of the line. Shutoff values would be installed along the new gas pipeline connecting the Main Facility to the pipeline. A mercaptan (similar to odorant used for propane) is used in the existing natural gas line for leak detection because it has a very strong distinctive odor and makes a gas leak readily apparent. The gas would continue to be odorized and signage would be placed over the new pipeline to reduce the risk of pipeline rupture resulting from unauthorized excavation above or near the buried pipeline. Finally, operating and emergency plans would be prepared in accordance with state codes and regulations, and routine safety inspections would be conducted in accordance with state pipeline safety rules.

Public Health and Safety

Since the Main Facility and new Kearny Substation sites are located in an industrial zone, more than 0.7 miles from the nearest sensitive receptor, issues or concerns regarding public health and safety are limited to: the potential for adverse health impacts from EMF and stray voltage associated with the electrical lines and substations; safety issues associated with electric shock hazard; and the limited and unlikely potential for an incident to affect the use of the Morris & Essex commuter line, affecting the traveling public. The proposed NJ TRANSITGRID East Hoboken Substation is located within Jersey City’s redevelopment area but is adjacent to the Morris & Essex Line and the HBLR. Security fencing would be installed prior to construction of the substation and the substation property would remain secured once in operation. The HBLR nanogrid will be installed within the secured perimeter of NJ TRANSIT’s HBLR Headquarters on Caven

Point Ave in Jersey City. Potential health impacts related to changes in air quality are addressed in Chapter 6, “Air Quality,” and Chapter 17, “Construction Effects.”

Due to the proximity of the proposed monopoles in Kearny, NJ, to the Newark Liberty International Airport, consultation with the Federal Aviation Administration (FAA) was conducted regarding any potential impact to air traffic from the installation of monopoles. As discussed in Chapter 10, “Traffic and Transportation,” FAA requested that NJ TRANSIT complete FAA’s online Notice Criteria Tool prior to commencement of construction. The plans for the proposed monopoles will be reviewed by FAA’s Obstruction Evaluation process. Since the proposed monopole heights are shorter than other existing infrastructure in the project area, the proposed Project would not create any new obstacles nor have an impact on air traffic. Monopoles will be approved by and registered with FAA prior to construction and will include FAA designated lighting if required.

EMFs

EMFs are electric and magnetic (i.e., electromagnetic) fields. Electric fields describe forces that electric charges exert on other electric charges. Magnetic fields describe forces that a magnetic object or moving electric charge exerts on other magnetic materials and electric charges. EMFs occur throughout the electromagnetic spectrum; they occur naturally and they are generated by human activity. Naturally occurring EMFs include Earth’s magnetic field, static electricity, and lightning. EMFs also are created by the generation, transmission, and distribution of electricity; the use of everyday household electric appliances and communication systems; industrial processes; and scientific research (DOT 2012).

Over the past two decades some members of the scientific community and the public have expressed concern regarding human health effects from EMF during the transmission of electrical current from power plants. A six-year study led by the National Institute of Environmental Health Sciences of the National Institutes of Health and the DOE determined that the overall scientific evidence for human health risk from EMF exposure is weak. This study yielded no consistent pattern of biological effects from exposure to EMF from laboratory studies with animals or with cells. However, epidemiological studies (studies of disease incidence in human populations) had shown a fairly consistent pattern that associated potential EMF exposure with a small increased risk for leukemia in children and chronic lymphocytic leukemia in adults (IFC International 2014). Although a fair amount of uncertainty still exists about the EMF health effects issue, the following determinations have been established from the information:

- Any exposure-related health risk to an individual would likely be small;
- The types of exposures that are most biologically significant have not been established;
- Most health concerns relate to magnetic fields; and
- Measures employed for electromagnetic field reduction can affect line safety, reliability, efficiency, and maintainability, depending on the type and extent of such measures.

Although there are no federal regulations for magnetic fields, New Jersey has guidelines for EMFs associated with transmission lines. The "State Transmission Line Standards and Guidelines" has an Electric Field Edge right-of-way limit of 3 kilovolts per meter (kV/m[18]).

The electrical lines for the proposed Project would be designed to minimize EMFs and would emit EMFs at levels similar to, or lower than, other existing electrical lines. EMF strength depends on conductor capacity loads, voltage loads, and distance from source (i.e., from the electrical line). The strength of the field decreases rapidly with distance.

The electrical lines carrying the greatest loads would be from the Main Facility to Mason Substation (Preferred Alternative Project Component C) at 230kV and to the new Kearny Substation at 138kV (Project Component D). These electrical lines would be located entirely within the industrial area and would not result in an increase in EMFs at sensitive receptors. Preferred Alternative Project Component E would have a relatively low voltage of 27kV for the electrical line between the Main Facility site and the new NJ TRANSITGRID East Hoboken Substation. Preferred Alternative Project Component E in Jersey City would extend for 0.22 miles from the eastern portal of the Bergen Tunnel to the new NJ TRANSITGRID East Hoboken Substation above ground in areas of mixed use development with a voltage of 27kV. Where the electrical line departs the new NJ TRANSITGRID East Hoboken Substation, 13 kV electrical lines would connect to the Henderson Street Substation (0.28 miles). The electrical lines traveling along the HBLR right-of-way (Preferred Alternative Project Component G) would also have a relatively low voltage of 13.2kV, compared to other project components. See Table 16-1 below that summarizes the electrical line project components by length and voltage.

Table 16-1 Project Component Electrical Line Voltages

Project Component	Electrical Line Length (Miles)	Voltage (Kilovolts)
Project Component C	0.7	230
Project Component D	1.5	138
Project Component E	3.0	27
Project Component G	14.4	13.2

The strength of EMFs from equipment within the substations, such as transformers, reactors, and capacitor banks, decreases rapidly with increasing distance. Beyond the substation fence or wall, the EMF produced by the substation equipment is typically indistinguishable from background levels.

Due to the relatively low voltage of the Preferred Alternative Project Components E and G these will not adversely affect existing commercial uses or potential future uses. For the Preferred Alternative Project

[18] A volt per meter (V/m) is the standard unit of measure to determine the strength of the electric field. New Jersey's guidelines limit the electric field to 3kV/m (or 3,000V/m) at the edge of the electrical transmission's corridor right-of-way.

Component D, the strength of the EMF at 300 feet is minimal at 0.003kV/m (see Table 16-2), which is within the State Transmission Line Standards and Guidelines standard of 3kV/m at the edge of the right-of-way. EMF effects from 230 kV electrical lines for Project Component C, which has the highest voltage electrical line for the proposed Project, are detailed in Table 16-2 as referenced from the "Electric and Magnetic Fields Associated with the Use of Electric Fields." The EMF levels from lower-voltage electrical lines would be lower than those for the 230kV electrical lines.

Table 16-2 EMF Effects of 230kV Electrical Line

Distance from electrical line (feet)	0	50	100	200	300
Hz(60)-Electric Field (kV/m)	2	1.5	0.30	0.050	0.01
Hz(60)-Mean Magnetic Field (Tesla)	0.00000575	0.00000195	0.00000071	0.00000071	0.00000008

Preferred Alternative Project Components C, D, E, F and G are located in densely developed and industrial areas. The Mason Substation and Project Component D would both be operational at the same time. However, there would be no impact to human health in residential/commercial properties and the public as there is no public access in the area. The installation of electrical lines (both on monopoles and via underground duct banks) for Project Components C, D, and E (in Kearny), are proposed entirely within existing transportation rights-of-way, which already consist of existing electrical infrastructure and are surrounded by industrial and transportation areas. Preferred Alternative Project Component E in Jersey City travels next to the existing Hudson Generating Station and other industrial land uses before entering the Bergen Tunnels. Upon exiting the Bergen Tunnel, Project Component E travels through a heavily developed area of industrial, commercial, mixed use, and high-density residential land uses. Electrical lines installed on monopoles for this section of Project Component E would not have an adverse impact on the adjacent land uses since the electrical lines would be installed within existing rail rights-of-way.

Based on the New Jersey guidance and effects from transmission lines, a setback of 30 feet is suggested for Project Components E and G and a setback of at least 300 feet is suggested for Project Components C and D. For the installation of electrical lines, the preferred design is a combination of monopoles and underground duct banks. Levels of EMF from the proposed electrical lines would be low and would rapidly decrease with distance from the line. Where the electrical lines are installed in duct banks, EMF levels along the route would be indistinguishable from background levels. Based on the build alternative design and the existing development in the Project area, there would be no adverse effects to residential/ commercial properties or sensitive receptors.

Electric Shock Hazard

Power lines can cause electric shocks if they are not constructed to minimize the shock hazard. Tension would be maintained on all insulator assemblies to assure positive contact between insulators, thereby avoiding sparking. Also, high-voltage electrical lines can cause nearby ungrounded metal objects to become charged. Ground wires and counterpoise wires would be installed to provide lightning strike protection. The electrical lines would be designed and operated according to the National Electrical Safety Code.

16.4 ACCIDENT ANALYSIS

As defined by DOE's guidance, an accident is an unplanned event or sequence of events that results in undesirable consequences, and may be caused by equipment malfunction, human error, or natural phenomena. The purpose of including an accident analysis in a NEPA document is to inform the decision-makers and the public about the chances that reasonably foreseeable accidents associated with proposed actions and alternatives could occur, and about their potential adverse consequences on human health and the environment.

The DOE recommends a sliding scale of accident analysis related to the type, size, and location of the facility in question. A very large electrical generating plant serving a metropolitan area or a nuclear facility warrants a detailed quantitative accident scenario assessment involving statistical analysis of risk and potential secondary effects. Smaller facilities, such as the microgrid, are more appropriately analyzed qualitatively in a narrative that considers the different components of an accident scenario, the potential for direct and secondary effects of an accident, and mitigation for those effects. Similar to a large-scale analysis, the qualitative accident analysis includes consideration of the probability that the accident would occur and the severity of potential consequences, but these are expressed in qualitative or relative terms.

16.4.1 User Groups Considered

DOE guidance identifies three user groups when considering the potential impacts of an accident related to an energy facility:

- *Involved Workers*: employees located at the precise location where the accident occurred, and those involved in the activity that led to the accident;
- *Noninvolved Workers:* employees located within the facility, but not at the precise location of the accident; and
- *General Public:* residents, workers, and travelers within the potential area of impact for a facility.

The location and restricted access to the Main Facility, as discussed previously in this chapter and preceding chapters, limits the potential involvement of the general public in an accident scenario. The nearest residential development is nearly three quarters of a mile away from the Main Facility (Preferred Alternative Project Component A) and is separated from the Main Facility and the substations by highways and rivers. Other members of the public, including employees of other Koppers Koke Site facilities and transit commuters may be affected, but these impacts are largely anticipated to be inconveniences rather than safety hazards or risks. These situations are discussed below in the narrative for each accident type.

Consequently, the user groups most likely affected by an accident are the workers assigned to the Main Facility (Preferred Alternative Project Component A), the natural gas pipeline connection facility (Preferred Alternative Project Component B), new Kearny Substation (Preferred Alternative Project

Component D), the new NJ TRANSITGRID East Hoboken Substation (Preferred Alternative Project Component E) and the nanogrid (Preferred Alternative Project Component F), as these users would be in direct contact with the microgrid or substation systems. As described above, all direct hire staff and contract workers would be trained or hired as experts in their specific responsibilities as well as overall plant safety and emergency response. This preparedness and experience is an important factor in reducing the potential for human-error accidents and in effective accident mitigation and response.

16.4.2 Site Components and Accident Potential

The microgrid incorporates several mechanical systems that may be involved in an accident. All potential equipment configuration options involve natural gas-fired turbines, natural gas-fired black-start engines, generators, and air quality maintenance equipment that requires the use of ammonia. The combined-cycle microgrid also includes one steam turbine and heat recovery systems.

These systems each represent potential points of failure leading to an accident, and in some instances, a failure of one system could result in the failure of additional systems, although this is unlikely. The microgrid would be newly constructed, not a retrofit of an existing facility or building. This approach provides benefits in terms of safety features and standards. All structures and components would be new and manufactured and installed to meet and exceed current safety requirements. Containment areas for regulated materials would be reinforced and designed with secondary containment features to prevent the spread of hazardous materials in the event of a leak or spill during delivery. The ammonia tanks would also be located on the grounds of the Main Facility, not the interior, next to the turbines. The natural gas turbines and exhaust systems, and heat recovery system for the steam turbine(s) would be designed, installed, and operated pursuant to manufacturer’s specifications. The pressurized natural gas pipeline would be fitted with emergency shut-offs to isolate the location of a leak or other damage and prevent a larger gas-related incident, and all potential community first responders would be provided critical systems information regarding the components and their location within the microgrid facility to assist in rapid emergency response. Consequently, the potential for a chain reaction incident, where, for example, a natural gas incident leads to the release of ammonia, is unlikely.

The systems and their potential for accident, mitigation, and user groups affected are summarized in Table 16-3.

Table 16-3 Potential Accidents and Mitigation

Element	Accident Risk	Mitigation	User Group Affected
Natural Gas Pipeline	• Fire/Explosion • Potential to affect other components through effects of fire	• Emergency Shut-off Valves • Properly Sized and Constructed Conduit • Worker Training	• Involved Workers • Non-involved Workers • General Public ○ Commuters ○ Community Responders
Natural Gas Turbines	• Fire/Explosion	• Emergency Shut-off Valves • Operation Within Specifications • Worker Training • Regular Maintenance	• Involved Workers • Non-involved Workers • General Public ○ Commuters ○ Community Responders
Air Quality System (Ammonia)	• Hazardous Material Leak ○ Air Quality ○ Water Contamination	• Modern and Reinforced Containment Tanks • Spill Prevention Dam • Location on Grounds, not Interior • Worker Training	• Involved Workers • Non-involved Workers • General Public ○ Commuters ○ Community Responders
Heat Recovery; Steam Turbine	• Explosion	• Operation within Specifications • Worker Training • Regular Maintenance	• Involved Workers
Natural Gas-Fired Spark-ignition Internal Combustion Engine and Generator	• Fire/Explosion	• Emergency Shut-off Valves • Operation within Specifications • Worker Training • Regular Maintenance	• Involved Workers • Non-involved Workers
Electrical lines	• Electrical Shock	• Worker Training	• Involved Workers

16.4.3 Potential Accident Scenarios

The preceding analysis describes how the design of the microgrid and worker training would mitigate the potential for accidents; however, to assume that no incidents would ever occur at the microgrid is unrealistic. The DOE guidance requires that a reasonable assessment of possible accidents be presented to the public to inform potentially affected groups of a reasonable worst-case scenario, its impacts, and mitigation.

Given the systems discussion above, accidents at the Main Facility are assumed to fall into four categories: fire, regulated materials release, mechanical failure, and personal injury. The DOE guidance recommends that sabotage or terrorism also be considered; however, given the size and relative low-profile of the Main Facility compared with other potential targets in the area, as well as its isolated location and relatively minimal impact on larger, critical public systems, it is unlikely that the facility would be the target of intentional sabotage or a terrorist attack. Additionally, an act of terrorism or sabotage at the Main Facility would be unlikely to result in an incident different from one of the four categories of accidents potentially occurring at the facility under normal circumstances, such as fire or hazardous materials release.

Fire

Fire represents the accident type with the greatest potential impacts on user groups within the proposed Project area. Fire would most likely be associated with pressurized natural gas and could affect both the six-acre parcel where the existing natural gas pipeline is tapped (Preferred Alternative Project Component B) and the Main Facility itself (Preferred Alternative Project Component A).

It is important to note that natural gas does not spontaneously combust. An ignition source, such as a spark or open flame is required; consequently, the first line of defense in preventing a fire from natural gas is the detection of leaks and prevention of damage to the pipeline and distribution system. Leak detection equipment, pressure gauges, and the use of mercaptan (an odorant) are all methods of identifying a gas leak before a fire can begin. All of these methods would be employed, and the pipeline's location between the six-acre parcel and the Main Facility would be marked and recorded in utility maps. These steps would help to prevent damage to the pipeline from construction equipment used during routine construction and maintenance activity within the Koppers Koke Site.

The potential for an accident involving the natural gas pipeline that would be installed is low due to its secure location and relatively short length. Almost half of all reported accidents involving natural gas pipelines are caused by damage from outside forces, primarily third-party excavation damage (DOT 2016). During the last 20 years (1996 – 2015), third-party excavation damage is responsible for approximately 30 percent of all reported incidents on natural gas pipelines. Other damage from outside forces, such as vehicles not involved in excavation and intentional damage, account for approximately 12 percent of reported incidents. Damage from natural forces, such as earth movement and temperature, account for 5 percent of reported incidents.

In the unlikely event that the gas leak is not detected and a fire occurs, it is highly unlikely that the fire would directly affect user groups outside of the Main Facility. Microgrid workers would be trained in rapid emergency response. Should the incident be too large for the staff, emergency service providers from the adjacent communities (Kearny and Jersey City), would be called to assist. The presence of emergency vehicles within the Koppers Koke Site may affect mobility within the site for third parties, such as the workers at the Owens Corning facility, but given that the Main Facility would be a concrete structure and the source of the fire would be natural gas that can be shut off, it is unlikely that the fire itself would spread to adjacent structures.

As the NJ TRANSIT Morris & Essex Line runs immediately south of the Main Facility, separating it from the Owens Corning facility and other uses to the south, it is possible that NJ TRANSIT may temporarily suspend service on the Morris & Essex Line to help ensure emergency responder safety during an incident and to ensure the safety of commuters and rail service personnel. In this instance, commuting members of the public would be temporarily inconvenienced by the fire, but not harmed. Rail passes and tickets would be cross-honored on NJ TRANSIT buses or other rail lines should this occur.

It is highly unlikely that a fire within the Main Facility would result in the release of liquid or gaseous ammonia, as the ammonia storage tanks are located on the exterior, away from the turbines and gas distribution system and the gas shut-off fail safes would prevent the spread of a fire.

Release of Hazardous Materials

Hazardous materials stored on the site involve ammonia, and smaller quantities of industrial chemicals and cleaners used in the regular maintenance of the turbines and exhaust systems. As described previously under the discussion of fire accidents, it is unlikely that a widespread release of regulated materials would occur in association with a fire at the Main Facility. Human error during delivery and handling of regulated materials is therefore the most likely means by which regulated materials would escape containment.

The ammonia storage areas are designed with containment dams that can hold 110 percent of the stored volume of chemicals, effectively preventing the release of ammonia onto the site and into the Hackensack River. Spilled liquid ammonia readily vaporizes, which presents a serious health concern to workers at the location of a spill; however, proper training would ensure the appropriate worker response to address the spill. Large ammonia spills are treated with water, which would be readily available on the Main Facility site. It is unlikely that sufficient quantities of ammonia would spill and vaporize before emergency response actions occurred such that residential areas in Kearny or Jersey City would be affected by ammonia vapors. Two 10,000 gallon tanks would be used to store 19% aqueous ammonia. Aqueous ammonia is safer than gaseous ammonia and is composed of ammonia and water and, due to the diluted nature of the aqueous ammonia, it is safer than gaseous ammonia. Gaseous ammonia, which is a toxic gas, will not be used for the proposed Project. In addition, in the event of a worst-case scenario such as a historic rainfall event or a minor spill, the double-walled stainless-steel tanks are located within a secondary catch basin, which are designed to contain the entire volume of the tanks and allow for safe handing.

Mechanical Failure

The microgrid involves complex industrial equipment, including engines and turbines that use combustion of natural gas to generate electricity. Complex machinery may suffer a malfunction and result in an accident; however, there is no one mechanical element or system that is more likely than another to fail, particularly in a newly-constructed facility. Additionally, at the worst, it is assumed that a mechanical failure could lead to a fire or release of regulated materials, and as discussed previously, both of these potential accident types are mitigated by design features and systematic fail-safes incorporated as part of the Main Facility. Consequently, while mechanical failures may occur, they are unlikely, and their effect would be confined to on-site workers and those within the immediate vicinity.

Personal Injury

The Main Facility and the electrical distribution system it feeds represent complex industrial systems that are highly hazardous to individuals without proper training and experience. That said, these systems are no more dangerous or unusual than any other industrial application of technology, and similar to other industrial processes, the microgrid presents nearly no risk of harm to the general public provided they avoid the systems by adhering to posted safety signage and avoiding trespass on restricted locations, including the Main Facility site, substation locations, and railroad rights-of-way.

Workers at the Main Facility and electrical system personnel would be trained and equipped with personal protective equipment (PPE) and training appropriate to their specific task so as to conduct those activities safely. Accidents involving injury from interaction with machinery or electrical systems may still occur, but these incidents are expected to be isolated incidents confined primarily to the affected worker.

The accident analysis for the four categories are summarized in Table 16-4.

Table 16-4 Accident Analysis Summary

	Fire	**Hazmat Release**	**Mechanical Failure**	**Personal Injury**
Affected Populations	Involved Workers Non-Involved Workers General Public (Commuters)	Involved Workers Non-involved Workers General Public (Commuters)	Involved Workers	Involved Workers
Critical Systems/Features	Mechanical On-site Site Access	Mechanical On-site Site Access	Mechanical On-site	Low to none
Potential for Serious/Widespread Impacts	Moderate	Low	Low to None	Low to None
Likelihood of Occurrence	Unlikely	Unlikely	Less Likely	More Likely

Other Potential Accident Types

Flood

There is a low probability that the Main Facility site would flood since it has been elevated above the 100 and 500-year floodplain elevation. HCIA has prepared approximately 126 acres of the Koppers Koke property for development by significantly elevating the site above NJ TRANSIT's design flood elevation (DFE) criteria of 2.5 feet above BFE. The DFE for the Main Facility would be +13 feet NAVD88, which is +4 feet above the 100-year flood elevation and +2.5 feet above the more conservative DFE criteria of BFE+

2.5 feet based on the criticality of the infrastructure. All generating equipment would be on pedestals inside of the power plant facility building and therefore further protected and elevated.

Computer System Threats

In addition to physical security, the computers in the Main Facility would be protected against cyber threats (i.e., hackers attacking computer control systems and information). Access to control systems would be managed to protect critical assets and information as well as maintain the reliability of the electric infrastructure. This includes logical access (user password protection) to computers and networks and physical access to computer rooms. Policies and procedures would be established to manage authorization and authentication as well as monitor and record both logical and physical access. Firewalls and antivirus software would be installed and proactively maintained. Intrusion detection systems would be implemented and cyber risks regularly evaluated.

16.5 SAFETY AND SECURITY DURING ISLAND MODE OPERATIONS

Under normal operations, the Main Facility will operate parallel to the commercial electric grid. During this operational mode, the regional power grid would provide frequency stabilization to the power output from the Main Facility, to absorb fluctuations caused by starting and stopping locomotives as described in Chapter 2, “Project Alternatives.” During a commercial electric grid outage, due to extreme weather or other events, the Main Facility will automatically disconnect from the commercial grid and enter into island mode of operations, and the frequency fluctuations will be controlled internally, using rapidly responding governors to manage stable power output. During this operational mode, some emissions controls will be unavailable. When the commercial electric grid returns to service and stabilizes, in coordination with PSE&G operations, NJ TRANSIT would initiate connection back to the commercial grid. Once reconnected, the turbines would automatically be placed back into normal operations. This change in operational mode is automatic, and therefore would not present additional safety concerns or require additional staff during emergency operations.

The existing safety equipment at the site, including emergency cutoffs and fire suppression systems would remain operational. In case of an incident that cannot be controlled by on-site staff, local police and/or fire departments would be contacted. Since the plant is designed to be self-sufficient, no internet connection is necessary for operations of the proposed Project. Operational software would be installed on a local area network (LAN) behind a firewall. NJ TRANSIT Corporate software would be on a separate network from the operational network. The two networks would operate independently from each other. If the commercial telephone system is interrupted, fiber optic wiring between the Main Facility, the HBLR Headquarters, and Rail Operations Center can be used for communications.

Since the Main Facility, new substations and the emergency generators at HBLR Headquarters are designed to be self-sufficient, no additional staff would be required during island mode operations. However, the signals for the at-grade crossings of the HBLR would not be powered during a commercial power outage. These crossings would be blocked from road traffic or manned with police to direct traffic prior to startup of HBLR through operations during emergency conditions. Additional communication between NJ TRANSIT and Amtrak would also be required to coordinate rail traffic.

16.6 SUMMARY OF SIGNIFICANT ADVERSE IMPACTS AND MITIGATION MEASURES

NJ TRANSIT has an extensive safety and security program and takes every precaution to ensure the safety of the public and its workers. To further advance its safety and security goals, NJ TRANSIT established the Office of System Safety in May 2014. The Office of System Safety was formed to monitor, review, and evaluate safety measures, programs and incidents across the system, as well as overall safety statistics and the development of safety programs pertaining to NJ TRANSIT's operations and facilities. The NJTPD is the only transit policing agency in the country with statewide authority and jurisdiction. The NJTPD's mission is to maintain public order and safety while deterring and preventing terrorism and crime throughout the NJ TRANSIT system. The NJTPD Intelligence Unit, with support from others, completed a NJTPD Counterterrorism Risk Assessment, Countermeasure Analysis and Security Cost Benefit Analysis in FY2015. The information is being used as a strategic planning guide and tool to facilitate long-term police department decision-making and homeland security investment planning.

The proposed Project would improve safety and security in the region by providing reliable public transportation in the event that New Jersey and New York City job centers need to be evacuated during widespread outages of the commercial grid. No significant adverse impacts related to safety and security were identified for the Build Alternative. During island mode operations, additional personnel (local or NJ TRANSIT police) would be required at intersections for the HBLR and local road crossings to direct traffic. Safety and security features are incorporated into the project design.