The standards and best practices contained in this document are required elements for new projects seeking State funding under the New Jersey Environmental Infrastructure Finance Program (NJEIFP). Further information on the NJEIFP can be found at the following link(s): https://www.njeit.org/ **and** http://www.nj.gov/dep/dwq/mface.htm

Auxiliary Power Guidance and Best Practices

This technical guidance document is intended to clarify the Department's existing requirements as they apply to the provision of auxiliary power for wastewater and drinking water systems. DEP is currently promulgating new rules that will incorporate best practices for auxiliary power to the extent that current rules do not directly address them.

The continued flow of power to the primary components of wastewater and drinking water facilities is essential to maintaining effective operation of the system and meeting the established service standard (see discussion of service standard below) and, therefore, protection of public health and the environment. The provision of reliable auxiliary power also makes the system more resilient to a variety of hazards. In order to meet the applicable standard(s), adequate auxiliary power must be provided to operate the system in the event of an interruption to the primary power source.


The Trentonian, Jack Schear/AP Photo

Opportunities and approaches to enhance auxiliary power capability and efficiency and integrate cleaner technologies that improve air quality are outlined below. These include service area-specific conditions that are best addressed on a system-by-system basis as well as viable alternative strategies (i.e. cooperative partnerships and sharing arrangements) that meet the intent of the auxiliary power regulations. Finally, minimizing response and recovery time during the loss of primary power is necessary to ensure effective operation of the system.

Although power failures can vary in duration from a matter of several minutes to multiple days, maintaining continuity of operations is required regardless of the duration of the outage. More routine power disruptions (e.g. due to a vehicle accident, electric grid equipment failures, or isolated, short-term weather events) are likely to occur without advanced warning, making preemptive action (e.g. obtaining additional fuel or equipment) impossible. Power outages of a longer duration, where the event is reasonably anticipated (i.e. forecast in advance), allow for proactive measures to be taken to ensure continued operations. Major power outages associated with the 2010 Nor'easter, Tropical Storm Irene, 2011 Derecho, Hurricane Sandy, and the Halloween 2012 Nor'easter, have lasted up to two weeks. Details of the extent and duration of power outages associated with Sandy are illustrated in Figure 1 below.

The energy associated impacts of these storms and others point to the immediate need to harden the energy infrastructure to be more resilient to future storms. Accordingly, the State of New Jersey, along with the federal government, utility service providers and others, is taking steps to enhance the distribution system infrastructure. But individual customers also need to evaluate their own energy sources and design a more resilient system that can operate during and after an emergency.

The essential elements for providing sufficient auxiliary power in compliance with the rules, as specified in greater detail below, consist of the following:

- Service Standard

- Selecting Auxiliary Power
- Locating Auxiliary Power Equipment
- Fuel Sources/Reserves
- Response Time
- Maintenance, Testing, and Record-keeping
- Additional Considerations –
  - Duration of Operation
  - Maintenance Needs
  - Air Quality\Advanced Technology Options
  - Redundant & Alternative Power Sources
  - Energy Utility Providers

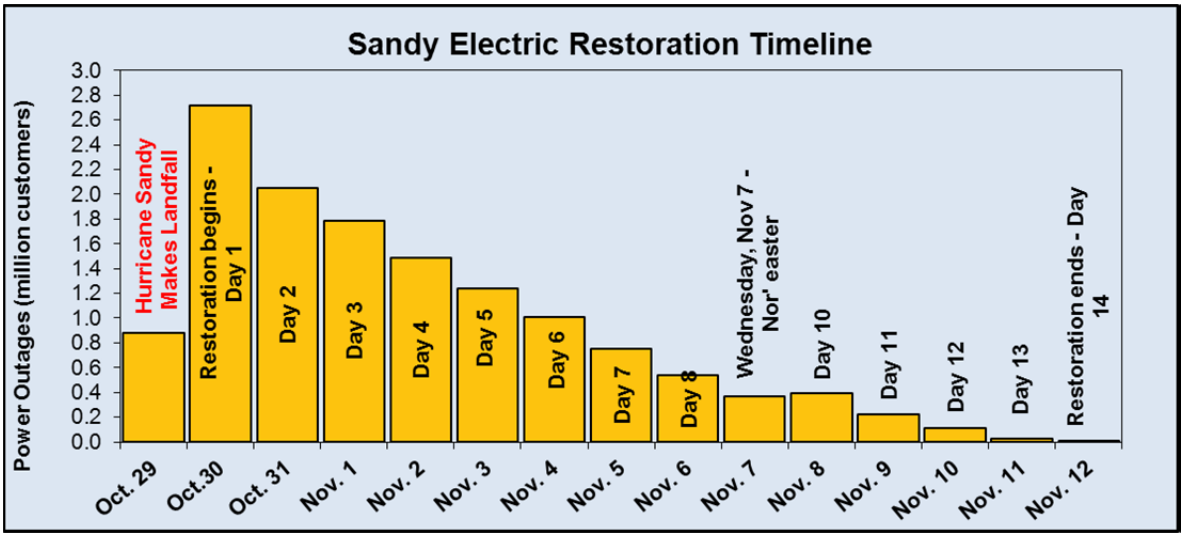

Figure 1

Service Standard – Maintaining Effective Operations

Auxiliary power-related requirements that govern both wastewater and drinking water systems are contained in the rule provisions applicable to the respective types of facilities. The rules establish a service standard that systems are expected to meet whether under primary or supplemental power.[1] The respective service standard requirements for wastewater and drinking water systems are outlined below:

WASTEWATER

The Water Pollution Control Act at N.J.S.A. 58:10A-6(a)(6), and the New Jersey Pollutant Discharge Elimination System (NJPDES) rules at N.J.A.C. 7:14A-6.12 and 23.13(h) establish a service standard that a wastewater system is expected to meet – that is, to maintain operations to ensure compliance with the facility's NJPDES permit at all times, including throughout the duration of a power failure. Therefore:

- All wastewater treatment systems must develop adequate Operation, Maintenance and Emergency procedures and other measures to supply auxiliary power to deliver, pump and

treat wastewater for the duration of a power outage without violating the terms and conditions of its permit.

Every system is expected to meet the service standard under a variety of conditions; however, in extreme cases where auxiliary power must be rationed, the systems must take steps to mitigate damage. Therefore, components that are deemed necessary to meet the service standard and protect human health must be prioritized. Such components may include main influent pumps, effluent pumps, sump pumps and disinfection equipment that are necessary to hydraulically pass wastewater through the treatment facility with primary treatment and disinfection prior to discharge of effluent into the environment. A wastewater system's Emergency Plan (EP) should identify priority components and provide detailed contingency plans for keeping these components powered.[2]

DRINKING WATER

Pursuant to N.J.S.A. 58:12A-4(c) of the Safe Drinking Water Act, the Department has established a regulatory program that provides for the delivery of potable water of adequate volume and pressure. In accordance with N.J.A.C. 7:10-11.6(i), drinking water systems must provide auxiliary power for source and treatment facilities that are primary components of the system and are necessary to continue effective operation of the system. Auxiliary power is also required for pump stations in pressure zones without storage. As with wastewater systems, it is expected that a system will be able to maintain effective operation to meet the service standard throughout a power outage.

- ***Effective operation*** – The Department defines effective operation as a system's ability to meet average daily demand while providing sufficient volume and pressure for fire protection[3], where applicable, while meeting drinking water quality standards.
- ***Minimum Pressure Requirements*** – N.J.A.C. 7:19-6.7(a), N.J.A.C. 7:10-11.10(d)1, and N.J.A.C. 7:10-12.37(b)) set forth requirements governing the maintenance of minimum water pressure. These rules require systems to "sustain minimum pressures of at least 20 pounds per square inch at street level, in all parts of the distribution network, under all required flow conditions." Consequently, auxiliary power sufficient to maintain minimum pressure shall be provided, continuously, including during a power outage.

Selecting Auxiliary Power for Your System

In order to select appropriate modes of auxiliary power, systems must identify the infrastructure components within their system that are necessary to meet the service standard. The NJDEP considers all such infrastructure to be essential in terms of supplying auxiliary power. A system should consider whether these individual system components have been identified as part of its emergency response or asset management plans or vulnerability analysis. System managers must also determine the total power draw of all components that are necessary to maintain the service standard and select auxiliary power sufficient to meet those needs. Similarly, the reliability and integrity of in-plant power distribution should be evaluated in accordance with accepted industry standards.[4]

Each system is unique and, therefore, the measures taken to maintain the service standard during a power outage may vary. A variety and/or combination of strategies that meet the intent of and comply with the auxiliary power requirements may be employed, provided a system adequately demonstrates that the service standard can be met throughout the duration of an extended power outage.[5] At a minimum, the following must be considered when selecting auxiliary power to comply with the service standard:

WASTEWATER

Wastewater systems generally consist of the treatment facility, pumping stations, and the collection system.

Treatment Plants:

Wastewater treatment plants require large amounts of electricity for the operation of pumps and process equipment. For example, a wastewater treatment facility with an average daily flow of 20 MGD may require approximately one megawatt of power. Pursuant to N.J.A.C. 7:14A-23.13(h), auxiliary power must be provided for all treatment facilities.

Pumping Stations:

N.J.A.C. 7:14A-23.10(a)3 requires that raw sewage pumping stations be equipped with two power sources, one as a back-up to the primary source. Accordingly, auxiliary power for these components should be developed in consideration of flow through the pumping station, storage capacity in the collection system, the population served, and the potential for sewer backups and the area that could be impacted by releases of untreated wastewater from the pump station.

For wastewater pumping stations which convey relatively small wastewater flows (e.g. stations with pumps less than 10 HP), portable generators may be considered instead of on-site auxiliary power generation equipment. System components for which mobile generators are anticipated to be used in the event of a primary power interruption should be equipped with "quick connect" technology to facilitate the unhindered connection and disconnection of portable generators. Accordingly, authorized trained service personnel must be designated to physically make the connections required to the power generation equipment. Finally, consideration should be given to automating the operation of pump stations, where possible.

Collection Systems:

Individually owned pressurized sewer systems, and gravity sewer systems that flow to pumping stations could be affected by a power failure in a localized area. When there is an area-wide loss of power that affects pumping stations, flow may surcharge in the contributing gravity sewers, causing a backup of untreated sewage into residential, commercial and industrial properties. To avoid this, the owners of potentially impacted properties are advised to install check valves or back-flow preventers. In addition, wastewater treatment systems should conduct public outreach in areas where such potential for back-ups exist to inform homeowners with appropriate information. Within individually owned pressurized systems that include grinder and/or ejector pumps, individual battery-operated sewage pumps may be installed by a home owner or the local sewerage authority to ensure that wastewater is directed into the gravity portion of the collection system from the point of origin, thereby preventing back-ups. The ownership, operation, and maintenance of the system should be fully described in the service agreement between home owner and local sewerage authority.

DRINKING WATER

Primary Components

In order to adequately meet auxiliary power needs, a system must identify its primary components as well as pump stations within a pressure gradient where storage is not provided. While pump stations may be fairly easy to identify, the identification of other primary components, particularly those underground, may not be as clear. For auxiliary power purposes, all infrastructure that is necessary to maintain effective operation of the system is considered to be a *primary component.* Many systems

will have previously identified their primary components as part of its asset management and/or emergency response plan (ERP), or a vulnerability assessment conducted in accordance with the N.J.A.C. 7:19-11.2(a)7. These analyses should be used whenever possible to inform plans for the provision of auxiliary power.

Interconnections, Bulk water purchases & Sale Contractual Obligations

The interrelationship of systems (interconnections, water sale/purchase contracts, etc.) dictate that coordination between systems is essential to ensure that a "sending" system has sufficient sources, auxiliary power, and other contingencies in place to reliably provide water when its own system is interrupted, damaged, or otherwise compromised. In determining whether the auxiliary power requirements have been met, the NJDEP must evaluate the role and status of routine and emergency interconnections between water systems.[6,7]

Accordingly, the Department may allow flexibility in meeting the auxiliary power requirement if the receiving system can demonstrate, to the Department's satisfaction, that water in sufficient volume to meet average daily demand on a continual basis is available, under contract[8] from a sending system, in the event of a power failure affecting one or both systems. Such demonstration, however, must identify the reliability of the water supply from the sending system (i.e. show that the sender can reliably supply the volume of water) while meeting:

1. Its own average daily demand and supply fire protection under normal circumstances and in the event of a power outage or other unforeseen event; and
2. All existing routine contracts and/or emergency supplies to any other systems which intend to use those supplies in lieu of providing auxiliary power.

Available water storage

Water systems generally provide water storage at strategic locations to ensure a reliable supply to meet peak demands, maintain short-term supply in an emergency (prior to the switch to auxiliary power), and to provide fire protection. Unless a waiver[9] from strict compliance with the water storage requirements at N.J.A.C. 7:19-6.7 has been granted, water systems must provide a specified volume of storage to ensure water is available at adequate pressure throughout the distribution system. The storage requirements are applied on a system-wide basis and depend on a variety of factors, including the number of sources, interconnections with other systems, and the provision of auxiliary power. While a system may comply with the overall storage requirements prescribed in the rules, the Department recommends that each hydraulic gradient within the system (of which there could be several) should have a minimum of 12 hours of water storage at average daily demand. Twelve hours is likely to be sufficient to mobilize response personnel and obtain necessary equipment to respond to a relatively localized event. For a regional or statewide event, which is likely to have been forecast and anticipated, a system is expected to mobilize in advance and take preemptive measures to ensure continued effective system operations.

Fire Protection

The provision of water at sufficient volume and pressure for fire protection is dependent on the characteristics of the service area (e.g. service area population, type of structures within the service area, and their use). Therefore, rather than apply the maximum potential demand across all hydraulic gradients, the provision of fire flow should be based on the specific needs of the area being served (e.g. residential area vs. commercial or industrial areas).

The Department recognizes that alternate, non-potable water sources may be available for fire-fighting needs during a power outage; however, assurances must be made that all State and local fire codes continue to be met and local fire departments have the appropriate equipment to make use of alternative sources during the events that cause power outages (e.g. hurricane, flooding events). In such cases, documentation of non-standard fire flow protection should be coordinated with and approved by applicable local code officials, fire, police and other emergency management agencies.

Locating Auxiliary Power Equipment

Auxiliary power equipment cannot operate effectively if allowed to be inundated by flood waters, exposed to the elements, or otherwise left unsecured. In order to comply with the requirement to provide auxiliary power to continuously meet the service standard, auxiliary power equipment, including generators and electrical equipment, cannot be located within the flood hazard area, as defined in the FHACA rules (N.J.A.C. 7:13), or as may be prescribed in Federal and/or State Sandy relief funding criteria (see Flood Protection section below for more on this topic). If locating such equipment outside the flood hazard area is not feasible, it must be elevated or flood-proofed consistent with the rules. This equipment must also be protected from weather and unauthorized access to ensure its reliability and effectiveness.

Fuel Sources/Reserves

The availability of and access to auxiliary power fuel reserves is paramount to resiliency – therefore, provisions shall be made to ensure the service standard will be met in the event the primary power source(s) is interrupted. The Department recognizes that the stockpiling of large quantities of fuel for infrequent use may not be feasible for several reasons, including the degradation of some fuel types over time, the inherent risks and regulatory requirements associated with locating certain structures and storing fuel and other substances within the floodplain. Nevertheless, a system must have sufficient fuel to maintain effective operation for short-term power outages without supplement along with the capacity and capability to quickly act to continue operations should an outage become prolonged. Accordingly, systems must provide for auxiliary power fuel supplies:

- In the ordinary course of business, systems should store sufficient fuel within the vicinity of the auxiliary power equipment to maintain full operations for a minimum of 12 hours. This is in addition to any fuel that is stored for any other fuel needs (e.g. vehicles, equipment).
    - For facilities that could be surrounded by flood waters or otherwise isolated and therefore incapable of having fuel replenished immediately, the NJDEP recommends storage of additional fuel to maintain full operations for a period of 48 hours.
- In order to prepare for forecast events, a system should have the capacity to store sufficient fuel reserves to maintain effective operations continuously for 3 days.
- If an event continues beyond 3 days, or for forecast or anticipated events when energy utility providers warn customers that extended outages are likely, systems must be prepared to implement established emergency response protocols and have the means (e.g. vehicles, ample access, and fuel storage and replenishment contingencies such as cooperative agreements or partnerships, etc.) to maintain effective operation until primary power is restored.

Response Time

Minimizing response time to adverse conditions or events is essential to ensuring a system's continued operation and, thus, compliance with the appropriate service standard. In order to meet the service standard, auxiliary power must be capable of being engaged expeditiously in the event of a power interruption.[10] To do so, a system must consider the following with respect to the modes of auxiliary power employed:

- If feasible, install permanent "auto start" auxiliary power supplied with sufficient fuel for at least 12 hours of operation under full load as part of the ordinary course of doing business (also see section on Fuel Supplies/Reserves above).
    - This is particularly critical for drinking water systems whose service areas or portions thereof have less than 12 hours of storage, and/or
    - Any system whose facility components are remote or are at risk for limited or constrained access due to the emergency event.
- For facilities that do not have permanently installed auxiliary power, system-owned mobile generators must be available for use in sufficient quantity. The use of rental agreements, borrowed or cooperatively owned auxiliary power units is unacceptable for critical pumping or treatment components but can be utilized for powering other facilities or as backup to a permanently installed unit.
    - Installation of "quick-connect" connections should be completed and made ready as soon as practicable.
- Trained staff capable of operating auxiliary power equipment and/or overseeing a smooth switch-over should be placed on call prior to a predicted event. Mobile generator units should be connected and tested prior to a forecast event.

Maintenance, Testing & Record-keeping

Failing to properly maintain and exercise auxiliary equipment compromises the reliability of auxiliary power and, because such a failure may result in the inability to maintain effective system operations and meet the service standard, public health and safety is potentially and needlessly placed at risk. For this reason, N.J.A.C. 7:14A-23.13(h)2 requires regular testing and maintenance of auxiliary power equipment to ensure proper working order at all times. While the SDWA rules do not specify a testing protocol for auxiliary power equipment, routine testing for reliability purposes is deemed to be necessary to ensure that both the requirement to provide auxiliary power and the service standard are met. Similarly, the testing of auxiliary power is considered to be an essential component of the routine inspection and preventative maintenance provisions outlined in the Licensing of Water Supply and Wastewater Treatment System Operators rules, N.J.A.C. 7:10A.

To facilitate adequate maintenance and testing to ensure auxiliary power operates on demand, the following provisions should be followed, as applicable:

- Auxiliary power equipment should be maintained in accordance with the manufacturer's recommendations. Maintenance records should be kept on site. Such records may be required to establish disaster relief or hazard mitigation funding, or for insurance purposes.
- In addition to testing required by applicable NJDEP rules, auxiliary power equipment should be tested under expected loads regularly in accordance with the manufacturer recommendations, and under the maximum expected full demand load quarterly. Pursuant to N.J.A.C. 7:27-19.11, records of emergency generator testing shall be retained and made available to the Department upon request. Such records may also be required to establish disaster relief or hazard mitigation funding eligibility.

- Prior to a forecast event, it is recommended that systems test auxiliary power equipment under full load.

In addition to proper testing and maintenance, systems should compile a data sheet (e.g. U.S. Environmental Protection Agency's (USEPA) Emergency Generator Information Form available at: http://www.epa.gov/region1/eco/drinkwater/pdfs/WaterWastewaterSystemGeneratorPreparedness.pdf) for each critical facility component that requires auxiliary power. This form should be included in the system's ERP or EP, as appropriate, and be readily accessible in the event that a replacement generator is required.

Additional Considerations

Duration of Operation

A system must select auxiliary power based on its ability to continue essential system operations throughout the duration of an extended power outage. Accordingly, a system's auxiliary power must have sufficient "capacity" to meet the specified service standard for the duration of the power outage (capacity in this context is defined as adequately sized generators, sufficient fuel storage (or reliable access thereto), service parts (i.e. oil and oil filters for generators, or other key components) and qualified technicians to ensure viable operation). While the cost of installing auxiliary power can be significant, the additional cost of a unit(s) designed for extended operation may actually be cost-effective compared with the increased maintenance costs and the implications of failure of an over-worked unit.

Maintenance Needs

Systems must proactively maintain its auxiliary power equipment to ensure it will function properly when needed. Accordingly, facility managers must consider the reliability of the auxiliary power source(s) and the need for maintenance/servicing of the equipment when selecting the most appropriate type for their system. Trained personnel or contractors must be available to operate, maintain, and service auxiliary power units, especially during an event in case of mechanical or other issues that may affect the continued functioning of standby power equipment.

Air Quality Considerations

State and Federal air quality regulations also influence the selection of auxiliary power equipment. The current inventory of emergency generators largely consists of older models with relatively high-emission diesel-burning engines. Generally, emergency generators require an operating permit from NJDEP's Bureau of Air Permits and have strict limitations on their use – restricted to actual emergencies, posted power outages, and limited testing allowances.

Auxiliary power sources must also comply with Federal and State air quality regulations -- of particular concern regarding operation of generators are emissions of nitrogen oxides (NOx), a precursor to ground-level ozone, and particulate matter (PM), a known carcinogen. Compliance with New Jersey's NOx RACT rule provisions[11] under N.J.A.C. 7:27-19, which are more stringent than the Federal standards[12], includes the following restrictions and allowances:

- Systems must obtain a permit authorization for emergency generators. However, since operation of emergency generators is strictly limited (see bullet below), a General Permit (GP), which is a less costly and more expedient option, is available online for qualifying emergency generators. (For more information on the GP, see

http://www.nj.gov/dep/aqpp/downloads/general/GP005.pdf, or call the General Permit Help Desk at (609) 633-2829).

- Except for minimal testing allowances (100 hours or less annually), emergency generators may only be operated during a blackout or proactive voltage reduction (i.e. brown-out) posted by PJM (the regional transmission organization that coordinates the movement of wholesale electricity in New Jersey).
- An emergency generator that operates exclusively during a qualified emergency period (e.g. PJM-posed blackout or brown-out) is exempt from the NOx RACT emission standards. Conversely, auxiliary power equipment operated at any other times must comply with the NOx RACT emission standards, which necessitate the operation of Tier 4 Final-compliant technology.[13,14]

USEPA's adoption of substantially reduced emission standards for stationary sources of diesel-powered motors (see discussion of Tier 4 emission standards below), including emergency and other power generators, have created a demand for cleaner burning engines or emission-reduction retrofits to existing engines. Replacing an older generator with a newer, more efficient model may lower operating costs and substantially reduces emissions of NOx and PM.

Advanced Technology Options

The use of cleaner, lower-emission auxiliary power equipment can result in additional regulatory benefits. For example, the use of generators with engines that comply with the NOx RACT emission standards is not restricted solely to emergency use. Generators that meet this standard may be used under the following conditions:

- For non-emergency power supply (including on-site back up); they may also be able to participate in incentive-based demand response programs.[15]
    - Systems that participate in demand response, however, are required to ensure that auxiliary power is always available in an emergency and that the primary function of auxiliary power equipment is the provision of supplemental power during an emergency or whenever primary power service is otherwise interrupted.
- Combustion devices with a generating capacity under 500 kilowatts (kW) that are verified to be insignificant sources of criteria pollutant emissions, and fuel cells that use methane meeting the exemption criteria of N.J.A.C. 7:27-8.2, are not required to obtain NJDEP air permits.

Given the potential benefits and air quality improvements, if not otherwise a requirement of Federal and/or State disaster relief or mitigation funding assistance, the NJDEP strongly encourages that damaged or outdated generators be replaced or retrofitted with the latest available technology (i.e. Highest EPA Tier Certification). For more information regarding specific air permit requirements for auxiliary power systems, visit http://www.nj.gov/dep/aqpp.

- USEPA offers guidance on generators and fuel selection options at http://www.epa.gov/region1/eco/drinkwater/pdfs/WaterWastewaterSystemGeneratorPreparedness.pdf.
- Other USEPA guidance on "Energy Efficiency in Water and Wastewater Facilities" guide, http://www.epa.gov/statelocalclimate/ documents/pdf/wastewater-guide.pdf.[16]

Redundant & Alternative Power Sources

When designing for auxiliary power using combustion devices such as spark ignition and gas turbine engines, it is strongly advised that systems incorporate redundant facilities as well as multiple

generators that can operate on different fuel sources. To further enhance resiliency, systems should consider the use of fuels such as natural gas from proximate pipelines, digester gas from anaerobic digestion systems, and landfill-generated gas from solid waste facilities. Hydrogen and natural gas, etc., can be used in fuel cells to provide both primary and auxiliary power.

The use of fuels such as landfill gas and digester gas in combustion engines, or converted into hydrogen for fuel cells, for power generation can qualify for financial incentives from the Renewable Energy Incentive Program (REIP) administered by NJBPU's Office of Clean Energy. With respect to natural gas, State funding may be available for fuel cells and combined heat and power (CHP) systems with individual capacity of 1MW or greater. Also, based on the nameplate capacity, hydroelectric systems are considered renewable energy devices and could qualify for funding. Additional information on these incentive programs can be obtained from the Office of Clean Energy at www.njcleanenergy.com.

Energy Utility Providers

Both temporary and permanent power supplies should be evaluated for short- and long-term power outages. A system should not rely solely on a single public utility system for its auxiliary power, such as a second electrical feed or natural gas supply, if those supplies are equally vulnerable to the same risk. Finally, system managers and the energy sector may need to develop cooperative agreements to fully attain supplemental power objectives. Specific examples of electrical supply options a system should actively pursue include:

- Eliminate reliance on duplicative, identical power sources for auxiliary power if redundant feeds are located adjacent to each other or originate from the same substation or primary transmission line, as both are likely to be equally impacted by the triggering event (e.g. hurricane, earthquake).
- Consider underground installation of existing overhead power lines in order to reduce the potential for damage adverse weather conditions.
- Consider integration of dual-transformer substations, duplicate primary feeders and other redundant components necessary to maintain the integrity of the in-plant power system.
- Install a Supervisory Controls and Data Acquisitions (SCADA) system to automate operation of treatment facilities.

REFERENCES AND RESOURCES:

The following references and resources, organized by subject area, as additional sources of information:

AUXILIARY POWER:

Design Criteria for Mechanical, Electric, and Fluid System and Component Reliability, USEPA, 1974. EPA 430-99-74-001.

Emergency Power Source Planning for Water and Wastewater by Fred J. Ellermeier, P.E., Donald R. Stevens, P.E. and Larry D. Pittman. AWWA. 2004.

Emergency Response and Preparedness, FlaWARN Best Management Practices for Water and Wastewater Systems, University of Florida Center for Training, Research and Education for Environmental Occupations. 2007.

Emergency Response Portal, U.S. Army Corps of Engineers (USACE) https:eportal.usace.army.mil/sites/ENGLink/EmergencyPower/default.aspx

Is your Water or Wastewater system prepared? What you need to know about Generators, EPA 901-F-09-027, available at: http://www.epa.gov/region1/eco/drinkwater/pdfs/WaterWastewaterSystemGeneratorPreparedness.pdf

New Jersey Water/Wastewater Response Network www.NJWARN.org

"Recommended Standards for Water Works – 2012 Edition" (commonly referred to as the Ten States Standards); report of the Ten States Standards Water Supply Committee of the Great Lakes – Upper Mississippi River Board of State and Provincial Public Health and Environmental Managers.

Endnotes

[1]Continually meeting the service standard is a requirement for both wastewater and drinking water systems under nearly all circumstances. However, in rare or extreme cases, deviations from the service standard – and thereby the capacity of operations – may be acceptable. For instance, when a state of emergency and accompanying mandatory evacuation is declared proactively, a system may decrease its level of service if ordered to do so by the governor or commissioner, or if deemed by system management to be in the best long-term interests of the system assets or to ensure public safety and protect human life and the environment.

[2]For additional guidance on the prioritization of critical treatment system components refer to: the U.S. Environmental Protection Agency's (USEPA) "Design Criteria for Mechanical, Electrical, and Fluid System and Component Reliability."

[3]As recommended for standby power in the Water Supply Committee of the Great Lakes--Upper Mississippi River Board of State and Provincial Public Health and Environmental Managers' report entitled, "Recommended Standards for Water Works – 2012 Edition" – (commonly referred to as the Ten States Standards), and in recognition of the need in a highly developed state to continuously provide reliable fire protection. To allow a lapse in the ability to fight fires could unacceptably jeopardize public health and safety.

[4]Institute of Electronics and Electrical Engineers IEEE standard 493 – "Recommended Practice for the design of Reliable Industrial and Commercial Power Systems".

[5]While the service standard must always be the goal and the Department expects all systems to have the necessary equipment, technicians and fuel to meet that goal, it is also understood that there may be emergency circumstances that prevent a system from strictly complying with the standard. Accordingly,

systems must establish contingency plans for circumstances where the continued function of certain system components is prioritized. In such a prioritization scheme, public health and safety are paramount.

[6]N.J.A.C. 7:19-6.8 and 6.9 govern interconnections between PCWSs. In addition to other related requirements, water systems that serve a population over 10,000 persons must conduct annual flow tests (witnessed by representatives of both interconnected systems) on all interconnections six inches or more in diameter and submit a report to the Department at the end of each calendar year. The Department encourages all systems, regardless of the population served and the size of the interconnection, to maintain the piping, valves, meters and other appurtenances on its side of the system at the point of connection and to regularly test the interconnection to ensure it will be fully operational when needed.

[7]NJAC 7:10A–1.12(e)1 requires each licensed operator of a Public Water Distribution System (W class) to, at a minimum, exercise all major system valves for emergency interconnections annually.

[8]Pursuant to N.J.A.C. 7:19-6.9(g).

[9]If a system demonstrates that service will not be disrupted during extend periods of stress, the NJDEP may modify the minimum finished water storage requirements at N.J.A.C. 7:10-11.11 and N.J.A.C. 7:19-6.7(b). Accordingly, a storage waiver may be granted for very small water systems (i.e. 500 service connections or less), provided the system has 100% source back-up (i.e. two wells or two interconnections, or combination thereof and on-site auxiliary power capable of supplying annual average daily demand), or a system bulk purchases 100% of its water through two or more interconnections (or bulk purchases but has less than <100 connections).

[10]Some drinking water systems may have sufficient storage in place to maintain the service standard for a limited period, whereby an immediate switch to auxiliary power may not be necessary.

[11]These rules establish requirements and procedures concerning the control and prohibition of air pollution by oxides of nitrogen (NOx). The general purpose is to require the owner or operator of certain stationary source operations to use reasonably available control technology (RACT) to prevent or control NOx emissions. USEPA defines RACT to mean the lowest emission limitation that a particular source is capable of meeting by the application of air pollution control technology which is reasonably available considering technological and economic feasibility.

[12]USEPA considers the entire State of New Jersey as a non-attainment area for ground level ozone, and the State is required to implement a plan to reduce NOx and volatile organic compounds (VOCs), which are precursors to ozone. Accordingly, the NJDEP enforces more stringent emission standards for these pollutants.

[13]The USEPA adopted Tier 4-Interim (Tier 4i) emission standards that apply, among other things, to new diesel engines used in power generation. It is assumed that most current emergency-use generators owned/operated by New Jersey utilities do not comply with these latest standards. Similarly, newly manufactured Tier 4i generator sets will likely not comply with New Jersey NOx RACT standards without proper modification (e.g. retrofitted with catalytic treatment equipment). However, such generators – along with older Tier products (e.g. Tiers 2 and 3 technologies) may be operated outside of NOx RACT-defined emergencies if properly equipped with enhanced emission reduction retrofits.

[14]The Tier 4 regulation will result in diesel engine exhaust emissions that are significantly lower than previous Tiers. USEPA estimates that Tier 4 Final products (effective 2015) will produce approximately 90% less NOx and particulate matter (PM) compared to Tier 1 products.

[15]"Demand response (also known as load response) involves end-use customers reducing their use of electricity in response to power grid needs, economic signals from a competitive wholesale market or special retail rates." Source: http://www.pjm.com\markets-and-operations\demand-response.aspx.

[16]"Energy Efficiency in Water and Wastewater Facilities: A Guide to Developing and Implementing Greenhouse Gas Reduction Programs", Local Government Climate and Energy Strategy Guides, 2013.