Article 10 Application

Number Three Wind Farm

Case 16-F-0328

Lewis County, New York

1001.23 Exhibit 23

Water Resources and Aquatic Ecology

Invenergy

Contents

Exhibit 23 Water Resources and Aquatic Ecology

23.a Groundwater

23.a.1 Hydrological Information

Exhibit 21, Section 21.l discusses Project Area geology, and Appendix 21.q maps the depth to bedrock in the Project Area. Appendix 23.a-1 maps depths to high groundwater in the Project Area.

The USGS maintains a groundwater monitoring site approximately 22 miles northeast of the Project Area in Harrisville where it has recorded data since 2002. Since recordings started, groundwater depths have varied between 25.9 feet and 19.7 feet below the soil surface. A second monitoring station in Felt Mills, approximately 11 miles north of the Project Area, has been maintained by the USGS since October 2008. At this site, groundwater levels have varied from 23.6 feet and 10.9 feet below the soil surface.[1]

23.a.2 Map of Groundwater Aquifers and Wells

Appendix 23.a-2 maps aquifers, wells, and groundwater flow directions in the Project Area. Well locations are based on DEC information obtained from well drillers since 2001 and other well locations on DEC's website.

Aquifers

In 2008, the Tug Hill Commission hired Bergmann Associates to generate a Groundwater Assessment and Recommendations Report which mapped the aquifers and geology of the area.[2] According to the Bergmann report, there are no confined aquifers in the Project Area, but the Black River Recent Alluvium unconfined aquifer, which DEC considers to be a principal aquifer, runs under portions of the Project Area. This supplies the drinking water to the wells noted above. According to the Bergmann report, the sediments of the Black River Recent Alluvium aquifer are in direct contact with the Black River and are hydraulically recharged by the Black River and nearby tributaries.

According to the DEC, no primary aquifers are present in the Project Area. The Tug Hill Aquifer, which the EPA designates as a sole source aquifer and the DEC designates as a principal aquifer, lies outside the Study Area to the west.

Private Wells

Most farms and residences in the Project Area depend on groundwater wells for their water supply. Based on interviews with residents, wells range from approximately 25 to 300 feet deep or more. A few residents still use older dug wells of ten feet or less in depth. These depths indicate two separate water sources being tapped. The shallow wells (less than approximately 40 feet) pull from the perched water table that is supplied from recent precipitation. The deeper wells penetrate through the impermeable layer, and tap into the unconfined aquifers.

[1] https://nwis.waterdata.usgs.gov

[2] Bergmann Associates, "Groundwater Assessment and Recommendations Report for the Black River Watershed," September 2008.

The wells mapped in Appendix 23.a-2 include private wells used for commercial businesses like restaurants and other businesses.

Wells for Municipal Drinking Water Systems

One municipal drinking water system exists in the Project Area: the Town of Lowville has a water storage tank located approximately 700 feet inside the Project Area boundary. The pipes serving it run to areas outside the Project Area. No residential supply lines are routed in the Project Area. The well for this system is located in the Town of Watson, approximately 2 miles east of the Project Area.

The nearest other municipal water systems to the Project Area are in the Village of Copenhagen and the Village of Castorland. The wells supplying the Castorland village system are located in the village itself. The wells supplying the Copenhagen system are located northeast of the village, in the Town of Denmark.

There are no formal wellhead protection zones or aquifer protection zones in the Study Area. Appendix 23.a-4 maps municipal water systems described above and assumed wellhead protection zones.

23.a.3 Potential Impacts to Drinking Water Supplies and Groundwater

Impacts from Construction Excavations

Project construction will involve localized but relatively shallow excavations for wind turbine foundations and buried cables. Due to their shallow and dispersed nature, and based on Invenergy's experience in other Upstate rural areas, NTW anticipates these excavations will not impact groundwater supplies for residences and farms or public drinking water sources.

Impacts from HDD Installations

HDD cable installations could possibly affect drinking water wells if they are performed close to a well. A wellhead protection study conducted for municipal wells in western New York recommended that a 500 feet radius be used to establish a wellhead protection area for a well drawing an average of 24,000 gallons per day for public water use.[3] NTW assumes that managing ground disturbances this distance from residential wells will minimize impacts to these wells. Appendix 23.a-3 maps the planned locations for HDD installations relative to year-round residences and commercial uses. Circles of 500 feet radius are drawn around all residences near planned HDDs.

NTW plans to install ECS under public roads at six locations that are 500 feet or less from a residence. These residences are located on Woodbattle Road, Cobb Road, Number Three Road, and SR 12 (3 locations). If NTW elects to install these ECS crossings by HDD, prior to starting the boring it will notify owners of the nearby houses and verify quality of water from any wells within 500 feet of the planned HDD installation.

[3] Genesee/Finger Lakes Wellhead Protection Study, Prepared by Genesee/Finger Lakes Regional Planning Council, 1427 Monroe Avenue, Rochester, NY 14618, and the Wyoming County Economic Development Planning Department, 200 Allen Street, Warsaw, NY, December 1998.

Impacts from Project Water Use During Construction

During construction, the Project will require water for dust suppression, equipment washing, and the construction laydown yard offices. Table 23.a lists the usage rates and possible sources for the Project's construction water needs.

Table 23.a Project Water Use During Construction

Use	Maximum Use Rate (gal/day)	Possible Sources	Notes
Dust Suppression	17,000	Black River	Needs will depend on weather. Assumes one truck, filled 5x per day, 3,400 gallon capacity per truck. Possibly needed in first ~4 months of construction when aggregate and concrete trucks are most active.
Equipment Washing	8,000	Black River	Assumes use of three 5.5 gpm pressure washers simultaneously for 8 hours per day.
Laydown Yard	250	Well	Needed for toilets, bathrooms, drinking water at construction trailers. Usage will vary with number of workers on site. Scaled from estimated peak usage at High Sheldon Wind Farm of 1,500 gallons per week spread over 6 days per week.
TOTAL	25,250		

The total levels shown in Table 23.a are below the level for which DEC requires a special permit be issued (100,000 gal/day).[4]

Per the U.S. Geological Service, the average domestic water use by New Yorkers using self-supplied sources is 75 gallons per day.[5] Thus, a four-person family can be estimated to use 300 gallons/day, and the estimated maximum construction needs of the Project are approximately equal to those used by approximately 160 four-person households.

Impacts from Project Water Use During Operation

During operation, other than the O&M building, the Project will consume no water and will therefore not impact groundwater supplies.

Impacts to Wellhead and Aquifer Protection Zones

Using the 500 ft wellhead protection zone recommendation given for a well in western New York as a guide, Appendix 23.a-4 shows a 500-ft radius circle around any such wells in the Study Area.[6] As no Project facilities are proposed in these areas, no impacts are expected to municipal water wells.

[4] http://www.dec.ny.gov/lands/55509.html

[5] USGS Circular 1344, "Estimated Use of Water in the United States in 2005," Table 6. Available at http://pubs.usgs.gov/circ/1344/pdf/c1344.pdf

[6] Genesee/Finger Lakes Wellhead Protection Study, Prepared by Genesee/Finger Lakes Regional Planning Council, 1427 Monroe Avenue, Rochester, NY 14618, and the Wyoming County Economic Development Planning Department, 200 Allen Street, Warsaw, NY, December 1998.

23.b Surface Water

23.b.1 Map and Identification of Surface Waters

Appendix 23.b-1 maps surface waters in the Project Area. Several streams cross the Project Area, but there are no large open water lakes or ponds.

23.b.2 New York State-Listed Water Classifications for Project Area Streams

The DEC classifies streams by the water cleanliness and use:

- Class A and AA are waters used as a source of drinking water.
- Class B is acceptable for swimming and other contact recreation, but not for drinking water.
- Class C is for waters supporting fisheries and suitable for non-contact activities.
- Class D is the lowest classification.

In addition to the water cleanliness and use classifications, DEC classifies streams as to their value for trout fisheries, which are considered valuable and sensitive:

- "T" indicates a waterbody may support a trout population.
- "TS" indicate possible support of trout spawning.

Appendix 23.b-1 and Table 23.b present information from DEC, EPA, and USFWS National Wetlands Inventory for the named streams in the Project Area. In addition to the named streams in Table 23.b, several small ponds and unnamed streams also exist in the Project Area.

Table 23.b Named Streams in the Project Area

Name	Watershed	Drains Into	DEC Classification
Mill Creek	Black River	Black River	C
Negro Creek	Black River	Black River	C
Cobb Creek	Black River	Deer River	C
Mud Creek	Black River	Deer River	C
Stony Creek	Black River	Black River	C

NTW hired Fisher, Inc. to review wetlands and streams in the Project Area. Fisher identified 25 perennial streams, 17 intermittent streams, and 9 ephemeral streams in the Project Area. Widths of these streams varied from 2 to 52 feet wide, with the widest river being Deer River.

Intermittent Streams

The intermittent streams identified by Fisher are shown in the wetland delineations maps provided in Exhibit 22, Appendix 22.j.

Aquatic Habitat and Aquatic Invasive Species

Listed Species
Exhibit 22 discusses searches of the New York Natural Heritage Database and US FWS Information for Planning and Conservation (IPaC) database to identify species, including fish or other aquatic species, that may be in the area and listed as endangered, threatened, or of special concern. Neither of these searches identified aquatic species in the Project Area that may be endangered, threatened or of special concern.

Trout
Appendix 23.b-1 maps streams in the Project Area, including any that the DEC has designated as potential trout streams. The only stream in the Project Area designated as a trout stream is a tributary of the Deer River that runs along the northwest boundary of the Project Area.

Other Species
In addition to the trout stream, smaller streams and creeks in the Project Area likely support minnows and other small fish that are a valuable part of the food chain. Also, ponds in the Project Area likely support warm water fish communities with species such as bass, sunfish, and shiners.

Aquatic Invasive Species
NYSDEC maintains a list of the Common Aquatic Invasive Species of New York that includes fish, clam, mussel, insect, plant, and algae species, known habitat distributions of these species, and recommended boat-cleaning methods to prevent their spread. Of the 23 species included on the list, the following might occur in in the Project Area, based on the DEC's description of species distribution:

- Eurasian watermilfoil (*Myriophyllum spicatum*),
- European frogbit (*Hydrocharis morsus-ranae*),
- Curly leaf pondweed (*Potamogeton crispus*),
- Fanwort (C*abomba caroliniana*)
- Zebra mussel *(Dreissena polymorpha*).

During wetland delineations, NTW biologists did not identify any of the species above.

23.b.3 Downstream Surface Water Drinking-Water Supply Intakes

NTW is not aware of any surface drinking water supply intakes in the Study Area.

23.b.4 Impacts to Surface Water

Stream Impacts
Appendix 23.b-3 lists impacts from Project facility crossings of streams, including the reason for the crossing, the length of impact, and whether the impact is temporary or permanent.

In total, the Project will result in 32 stream crossings, totaling 3,021 feet of linear temporary impacts, summarized as follows:

- 2 crossings by the interconnection line, counted as 400 feet of temporary impact and no permanent impacts;

- 8 crossings by Project access roads, resulting in approximately 400 feet of permanent impacts from new culverts installed in the streams, including:
    - 3 crossings of perennial streams,
    - 3 crossings of intermittent streams (one of which has an existing culvert that will be upgraded), and
    - 2 crossings of ephemeral streams.

- 21 crossings by ECS cables, resulting in approximately 1,200 feet of temporary impacts.

Avoidance and Minimization of Stream Impacts

Design Changes to Avoid Stream Impacts
Through the iterations discussed in Exhibit 22, Section 22.n, NTW designed the Project to minimize wetland and stream impacts. Specifically, in developing the application layout, NTW reduced the number of stream crossings from 40 to 32. Five reductions were accomplished by using HDD methods to install ECS cables under streams, two were accomplished by modifying wind turbine assembly areas plans, and one was accomplished by changing plans for a road entrance.

In some places where NTW cannot avoid an access road stream crossing, it will minimize impacts of the crossing by routing the access road at the location of an existing unimproved farm crossing of the stream. At these locations, NTW will upgrade the crossing to use a culvert and re-vegetate the nearby area. This will improve local water quality by keeping farm equipment out of waterways.

To reduce the number of stream impacts, NTW designed the Project to use horizontal directional drilling (HDD) methods to install ECS cables under perennial streams where the crossing was away from an access road and could be accessed by HDD equipment without additional forest clearing. HDD essentially avoids all stream impacts from a cable crossing as there is no physical disturbance to the streambed, banks or vegetation along the stream. HDD adds a small risk of "frac-outs," which is the term used to describe the unintended leak of pressurized drilling mud from a boring into surrounding areas. Frac-outs under a streambed could result in drilling mud entering the stream. Steps NTW will take to minimize the risk of frac-outs are discussed later in this Section 23.

To further reduce potential impacts to streams, in locations where NTW must cross a stream with more than one ECS cable, to the extent practicable it has routed the cables to cross the stream at the same location with the minimum spacing between the cables needed for proper electrical design. This design practice will result in a slightly wider stream crossing, but overall it avoids impacts by eliminating other locations where crossings would have occurred.

Construction Practices to Minimize Stream Impacts
In addition to the designs steps taken by NTW to avoid and minimize stream impacts, NTW will take the following steps to minimize stream impacts during construction.

1. SWPPP. NTW will implement a stormwater management and pollution prevention plan (SWPPP) as discussed in Section 23.c. The SWPP will include erosion and sedimentation control practices designed to minimize the potential for silt and sediment to enter streams (e.g., silt fences, hay or straw bales).

2. Spills. NTW will implement a spill prevention, control, and countermeasure plan (SPCC) as discussed in Section 23.d that will require practices that minimize the potential for fuel spills to contaminate streams.

3. Environmental Monitor. To assist in training contractors and monitoring compliance with minimization measures, NTW shall employ a third party environmental monitor as discussed in Exhibit 12, Section 12.3.

4. Access Road Crossings of Streams. For locations where NTW must construct an access road across a DEC-regulated stream, NTW will install a culvert according to designs specified in the Project SWPPP. These designs shall require:

    - Culvert Types. NTW will install round culverts or drainage pipes of CMP (corrugated metal pipe) or plastic pipe.
    - Culvert Sizing. NTW will size culverts to maintain stream flow under the access road and to be at least 1.25 times as wide as streambed. Culverts will accommodate flows for a 25-year design storm or the crossing will include an overflow spillway that will direct the water immediately back to the stream.
    - Culvert Installation Depth. NTW will install culverts so that 20% or more of the diameter of the culvert is embedded under the streambed.

5. Dry Crossings of Class C Streams. When installing crossings of DEC Class C streams that could result in sedimentation of the stream, NTW will construct the improvements in dry conditions by either (i) performing the work at times of no flow for intermittent or ephemeral streams, or (ii) temporarily redirecting the water around the work site and, if necessary, installing a device such as a cofferdam to impede the water flow. When using the second method:

    - To minimize increases in downstream turbidity or erosion, NTW will employ appropriate erosion and sediment controls and will use cofferdam materials that will not contribute to turbidity or siltation.
    - To protect aquatic life, NTW will maintain downstream flows when performing dry crossings.
    - To prevent running water in the work area, NTW will construct temporary diversion channels, culverts, or pump-arounds using non-erodible materials.
    - To prevent sediment transport or scour, NTW will baffle or otherwise diffuse dewatering discharges.
    - Upon completion of the crossing, NTW will remove any imported cofferdam material (stone, jersey barriers, sandbags, etc.) and diversion materials, and return the area as close as reasonably practicable to conditions prior to the start of work.

6. Crane Crossings. If NTW must “walk” a crane across a wetland area, it will do so on either on constructed access roads or on temporary matting.

7. Concrete Management. NTW will take appropriate and reasonable precautions to prevent the discharge of concrete to streams. If a discharge occurs, NTW will isolate or remove the water around the spill and contact the DEC regional supervisor within 2 hours.

8. Vegetation Clearing at Overhead Crossings of DEC-Regulated Streams. At locations where NTW is installing an overhead electric line across a DEC-regulated stream and where matting has not been permitted, if trees or shrubs within 50 feet of the stream must be cut or cleared, then to the extent practicable, NTW will cut the trees or shrubs with at least two feet of the stump remaining. To facilitate stump sprouting, during construction, NTW will avoid damaging the stumps and root systems of these trees and shrubs. NTW will leave on the ground the trees and shrubs it cuts within 50 feet of a DEC-protected stream, except that it will pull back to vegetated areas those trees and shrubs that drop into the stream or on bare gravel bars.

9. Clearing of Vegetation and Snags in DEC-Regulated Streams. NTW will limit clearing of vegetation in DEC-regulated streams to that material which poses a hazard or hindrance to the construction activity. In addition, unless they cause serious obstructions, scouring or erosion, NTW will not disturb snags in DEC-regulated streams that provide shelter for fish. Trees that NTW removes from DEC-regulated streams will not be felled into the stream or onto the immediate stream bank.

10. Maintain Water Flow. When performing construction work at a DEC-regulated stream site, NTW's activities will ensure the flows immediately upstream and downstream of the work site are equal.

11. Trout Stream Crossings. To minimize the chance of Project construction introducing new sediment into trout streams during the trout spawning and incubation period, NTW will not install crossings of DEC class T trout streams during the cold-weather period for streams in this region.

12. Continuous Trenching Operation. In locations where NTW will trench across a stream to install an ECS cable, NTW will perform the construction in one continuous operation.

HDD Construction Practices to Minimize Impacts to Waterbodies

HDD adds a small risk of "frac-outs" where pressurized drilling mud from the boring inadvertently travels out of the bore hole into surrounding areas. Such "leaks" or "surface returns" are of greater concern when they enter an environmentally sensitive area such as a wetland or stream. To minimize and mitigate the impacts of HDD installations and potential leaks, NTW will take the following steps during HDD installations:

1. HDD Erosion and Sediment Control. At the boring pits for HDD installations, NTW will employ erosion and sediment control measures to prevent sediment-laden discharges from escaping the drill site and entering a stream.

2. HDD Drilling Fluids Management. To the extent practical, NTW shall conduct HDD installations to recirculate and re-use drilling fluid in a closed system.

3. HDD Site Restoration. Upon the completion of HDD installations, NTW will restore the disturbed area to a condition as close to conditions prior to the start of work as reasonably practicable, and will reseed the disturbed area.

4. HDD Leaks to Upland Areas. If an HDD installation results in a leak to an upland area, NTW will immediately contain and collect the leaked fluids. If the leak is too small for practical collection, NTW will dilute the affected area with freshwater and allow it to dry and dissipate naturally. If the leak is too large to collect using small pumps, NTW will suspend drilling operations in that area until it can control the leak.

5. HDD Leaks to Wetlands or Streams. If an HDD installation results in a leak to a wetland, stream, or other water body, NTW will notify the DEC immediately and prepare a monitoring report documenting the leak location, estimated volume, cleanup efforts. If the leak poses a threat to the waterbody or to public health or safety, NTW will suspend the HDD installation. NTW will remove the leaked material from a wetland, stream, or other waterbody, but only if the removal does not result in additional adverse impacts to the waterbody.

Dewatering

If during construction relatively high groundwater levels result in water infiltrating areas excavated for foundations, NTW may need to "dewater" foundations by pumping water out of the excavation areas. To dewater a foundation pit, NTW will use one or more portable pumps, typically powered by a portable generator near the foundation pit, to pump water from the foundation pit to a nearby area where it won't impact a stream or wetland. Discharge will be managed using filter bags or other measures per SWPPP requirements to minimize distribution of silt into wetlands or streams.

After construction is complete, NTW does not anticipate the Project will require on-going dewatering operations.

23.b.5 Reasonable Avoidance and Mitigation Measures for Groundwater Impacts

NTW does not anticipate the Project will impact groundwater supplies. As discussed in Section 23.a.3, the water uses for the O&M building, dust suppression and laydown yards are low enough so as to not require a DEC permit, and thus presumably should not impact groundwater supplies.

To avoid potential impacts from HDD installations, NTW has designed the Project to minimize the number of HDD installations 500 feet or less from year-round residences, a distance which should ensure the HDD occurs outside of any zone of influence for any groundwater well for that residence.

To help mitigate any groundwater problems, in the unlikely event they would be caused by Project construction, NTW will advertise a complaint-handling hotline number as described in Exhibit 12, Section 12.d. Residents or businesses experiencing groundwater supply problems they believe to be caused by the Project will be encouraged to report the problem to NTW via the hotline so that appropriate mitigation measures can be taken.

23.c Stormwater

23.c.1 Storm Water Control During Construction

NTW will design and construct the Project in accordance with a Storm Water Pollution Prevention Plan (SWPPP) prepared in accordance with the applicable SPDES General Permit and the current New York

State Standards and Specifications for Erosion and Sedimentation (E&S) Control. NTW's SWPPP is composed of the following elements:

- Details for installation of erosion and control measures, as shown in Appendix 23.c,
- Locations for installation of erosion and control measures, as shown in the Site Plans provided in Exhibit 11, Appendix 11.a-1,
- A Spill Response and Prevention Plan provided as Appendix 23.d-2.

As specified in Exhibit 32, NTW requests that the Siting Board approve the Project's SWPPP as part of the siting certificate.

The plans provided in Exhibit 11, Appendices 11.a-1 through 11.a-5 show expected locations of temporary stormwater management features, such as silt fencing, that NTW will install when constructing the Project. Appendix 23.c shows typical details that NTW will use for construction erosion and sedimentation control measures.

23.c.2 Post-Construction Stormwater Control

The plans provided in Exhibit 11, Appendices 11.a-1 through 11.a-5 show expected locations of permanent stormwater features, such as filter strips and stormwater basins and preliminary sizes of culverts NTW will install when constructing access roads. Details on construction methods for these features are provided in Appendix 23.c.

23.d Chemical and Petroleum Bulk Storage

23.d.1 Spill Prevention and Control Measures

Project Operation
As part of its O&M procedures, NTW will implement a spill prevention, control, and countermeasure plan (SPCC) similar to the draft provided as Appendix 23.d-1. The plan identifies hazardous materials to be housed on-site, precautions to minimize the risk of spills, and steps to be taken in the event of a spill including calling the DEC spill hotline.

Containment Measures and Risk of Leaks
As described in the SPCC (Appendix 23.d-1), once operational, the Project will use and store a limited quantity of replacement and waste oils and chemicals in the O&M Building. In addition, the following chemicals and fluids will be contained in Project components:

- Gearbox Oil in the WTGs. The gearbox in every WTG nacelle contains approximately 180 gallons of gearbox oil. Chances of gearbox oil or hydraulic fluid from the wind turbines impacting water resources are minimal because (i) leaks are infrequent, (ii) the turbine nacelle base includes a containment structure that helps to prevent oil from leaking out of the nacelle, (iii) most oil or fluid that leaks from the nacelle would be captured inside the turbine tower, and (iv) the volume of oil is relatively small and able to be contained by the various containments mentioned here.
- Hydraulic Fluid in the WTGs. Components inside of every WTG nacelle contain a relatively small quantity of hydraulic fluid, approximately 5 gallons per WTG. For a leak to reach the ground it

must breach the same containments and foundation paths described for the gearbox oil. Hydraulic fluid leaks occur, but are relatively infrequent. Over an approximate five-year period, while operating an average of 550 GE 1.x series turbines, Invenergy experienced no failures in operating turbines that involved hydraulic fluid leaks.[7] However, during construction and commissioning, crews identified approximately five failures where hydraulic fluid from the turbine was spilled. On-site crews quickly identified and corrected these leaks.

- Mineral Oil in Pad-Mount Transformers. Pad-mount transformers for 3.x MW wind turbines contain approximately 900 gallons of clear mineral oil. A tank in the transformer and integrated cooling fins contain the oil. Any oil leak would most likely be a slow leak at either the welded seams of the tank, or in the bushings where the power cables enter the tank. Catastrophic failures rarely occur, partly because the transformers contain no moving components, and partly because manufacturers design the transformers for a 25-year outdoor service life.
- Mineral Oil in Substation Transformers. At the Project Substation, the main power transformer(s) will contain mineral oil, like that used for pad-mount transformers. Main power transformers will be physically larger than the pad-mount transformers and will contain between 10,000 and 20,000 gallons of mineral oil each. The main transformers in the Project Substation will be installed in a concrete containment designed to contain a leak from the transformer.

Inspections of Pad-Mount Transformers
To identify any faulty pad-mount transformers likely to leak, NTW will perform infra-red or equivalent surveys of all pad-mount transformers within 90 days of the Project beginning commercial operations.

During Project Operations, visual inspections and fault detection equipment will help to identify any leaking pad-mount transformers. First, as part of regularly-scheduled wind turbine maintenance, NTW will visually inspect the pad-mount transformers and the nearby ground to identify any leaks. If technicians observe leaks, NTW will take prompt measures to prevent the leak from contaminating soil under the transformer, including possibly replacing or repairing the transformer. Second, the electrical collection system (ECS) will function as a fault detection system. A leaking pad-mount transformer will affect transformer performance and cause the circuit breaker for that ECS circuit to trip open. The open circuit breaker would alert NTW to a problem in the ECS circuit such as a pad-mount transformer with a low oil level.

Project Construction
During Project construction, NTW and its contractors will use and store various fuels, lubricants and fluids on site. In addition, construction will use chemicals such as concrete plasticisers, antifreeze, and cleaning chemicals. Much of the diesel and gasoline powered equipment used for Project construction will also use hydraulic implements that will contain hydraulic fluid.

Fuel and hydraulic fluid leaks from construction vehicles present a risk of hazardous materials entering surface waters. The risk from such spills is small due to the relatively small quantities of fluid contained in

[7] From 2005 to 2010. Invenergy operated no GE turbines prior to 2005 and approximately 1,100 GE turbines by the end of 2010. 550 is a reasonable estimate of the average over this period.

any one vehicle and the fact that most equipment will be operating at turbine sites that are located 1,000 feet or more from residences and their associated wells.

To avoid, minimize and mitigate impacts of any chemical and fuel spills during construction, NTW will require its contractor to follow a Spill Prevention and Response Plan similar the one provided as Appendix 23.d-2. This plan requires (i) notification of the DEC spill hotline within two hours of a spill, (ii) spill clean-up in accordance with NYSDEC Final Commissioner Policy, CP-51, (iii) personnel training, (iv) and restrictions on refueling vehicles within 100 feet of a DEC wetland.

23.d.2 State Regulation of Chemicals

Project Construction
During construction, petroleum products and chemicals will be contained in either operational or temporary tank systems not subject to DEC registration or permit requirements.

Project Operation
During operation, the only materials stored on site will be fuel oil and hydraulic oil stored in above ground tanks of sizes that fall below the 1,100-gallon threshold requiring registration.

23.d.3 Local Regulation of Chemicals

Based on NTW's review of town and county laws, there are no county or town laws that would regulate NTW's storage of expected materials and wastes.

23.e Aquatic Species and Invasive Species

23.e.1 Impacts on Biological Aquatic Resources

At locations where Project access roads and electric circuits cross streams, Project construction could have limited impacts on the streams and fish communities. As shown in Appendix 23.b-1, NTW proposes to cross one trout stream with an access road and cable at a point north of Turbine 38. Because this crossing is near the start of that stream, where flow is likely to be small, this crossing will not have a significant impact on the streams or trout populations.

Construction activities occurring in or near streams could spread invasive species present in the streams where work is being done. Exhibit 22 discusses methods NTW will use to avoid the spread of invasive species.

Project operation will not impact streams or fish.

23.e.2 Reasonable Avoidance and Mitigation Measures for Impacts to Aquatic Resources

NTW has avoided impacts to aquatic resources by electing to use HDD methods for ECS cable crossings of streams away from access roads. At access road crossings, NTW will minimize impacts to aquatic species by constructing these crossings using the design practices described in Section 22.b.

Measures to control invasive species, including aquatic invasive species, are discussed in Exhibit 22, Section 22.p.

23.f Cooling Water

As a wind energy project, no cooling water will be required. As such, no impacts related to cooling water use will occur.