

Biological Fact Sheet - Cooling Water Intake Structure
Bureau of Habitat, Steam Electric Unit

Name of Facility: AES Greenidge, LLC
Owner/Operator: AES Greenidge, LLC
SPDES #: NY- 000 1325
Location: Yates County, New York
Dresden, Town of Torrey
Seneca Lake/Keuka Lake Outlet

1. Description of Facility

The Greenidge Generating Station is a 161 megawatt coal fired station, located on the western shoreline of Seneca Lake. Constructed in the early 1950's, the station withdraws a maximum 161 million gallons per day of cooling water from offshore intake structures located in Seneca Lake. The station operates with two units. The intake pipe for Unit No. 3 splits to two capped intake structures located approximately 775 and 1000 feet offshore. Unit 3 has two traveling intake screens, each equipped with 3/8 inch mesh. The intake screens are washed on an “as needed basis”. Screen washings (including fish) are directed to a concrete pit, located below the screen wash sluiceway, and removed for upland disposal. Unit 4 has an above ground intake pipe, terminating in an intake structure surrounded by louvers approximately 800 feet offshore. Intake screens are not utilized at Unit 4. Debris removal is accomplished by back flushing the unit’s condensers.

Cooling water is discharged through a dug canal into the Keuka Lake outlet. The station’s SPDES permit requires a Summer delta T limit of 26 degrees F, and maximum discharge temperature of 108 degrees F. During Winter time, the permit limits the delta T to 31 degrees F, and the maximum discharge temperature to 86 degrees F.

2. Ecological Resource

Seneca Lake is the second longest Finger lake, measuring 35.1 miles in length, with an average width of 1.9 miles. Carved by glaciers, the lake basin is steep sided in an east to west direction, has an average depth of 290 feet and a maximum depth of 651 feet. Seneca is the largest Finger Lake in terms of volume, containing more than 4.2 trillion gallons of water (HDR/LM&S Engineers 2005).

Seneca Lake is best characterized as oligomesotrophic, (i.e. having between unproductive and moderately productive levels of nutrients). The clear waters are well oxygenated at all depths throughout the growing season. The water quality in the main portion of the lake is classified as AA(T), and the water supply uses in this part of the lake are described in the Oswego River/Finger Lakes Basin Waterbody Inventory/Priority Waterbodies List as threatened, which indicates a need to protect this valuable resource rather than the presence of identified

threats (NYSDEC 2009). The portion of the lake within a one mile radius of Keuka Lake outlet is classified as B(T). Waters with a B(T) classification are trout waters and the best usages are for primary and secondary contact recreation and fishing. B(T) waters shall be suitable for fish, shellfish and wildlife propagation and survival (NYSDEC 2009).

Traditionally, lake trout, yellow perch and small mouth bass have been the mainstays of the lake's fishery, but rainbow trout, brown trout, landlocked Atlantic salmon, northern pike and large mouth bass are also prominent. Lake trout, brown trout and landlocked salmon are annually stocked. Alewife and rainbow smelt make up an important part of the community's forage base. (NYSDEC 2009).

Historically, the lake's salmonids have been adversely effected by the parasitic sea lamprey. The Department maintains a sea lamprey control program which involves the application of a chemical agent, TFM, to known sea lamprey nursery areas in Catherine Creek and Keuka Lake outlet at three year intervals. Recent resurgence of the lake's salmonid fishery is, in part, attributed to this control program (NYSDEC 2009).

Fish impingement and entrainment studies were conducted at the station in 1976-77, 1993-94 and 2006-07. Approximately 29,000 fish, mainly alewife, were estimated to be impinged over a one year period during the first study. Approximately 23.3 million fish were entrained, predominantly rainbow smelt larvae. Unfortunately, a number of limitations prevent any valid conclusions to be made from the 1993-94 studies. The Department has not yet received reports from the impingement and entrainment studies conducted in 2006-07.

3. Alternatives Evaluated

The following feasible technologies are to be evaluated in the applicant's Design Construction Technology Review:

1. Closed Cycle Cooling: full and partial retrofit
2. Modified Traveling Intake Screens (including fine mesh panels) and Fish Return System
3. Wedge Wire Intake Screens
4. Barrier Net
5. Aquatic Filter Barrier
6. Variable Speed Pumps
7. Unit Outages and/or Flow Management Procedures
8. Behavioral Deterrent Devices

4. Discussion of Best Technology Available

According to 6NYCRR Part 704.5 - *Intake structures* and Section 316(b) of the federal Clean Water Act, the location, design, construction, and capacity of cooling water intake structures must reflect the "best technology available" (BTA) for minimizing adverse environmental impact. In keeping with the Department's established, environmentally-protective

BTA requirements for existing facilities with cooling water intake structures, an 80% reduction in impingement mortality and 60% reduction in entrainment, from full flow baseline level, are the minimum impact reductions the Department expects to achieve from implementation of these permit conditions.

5. Determination of Best Technology Available

After evaluating all of the available alternatives, the Department will determine the technology or combination of technologies and/or operational measures which are BTA for minimizing adverse environmental impacts from the cooling water intake structure(s).

6. Monitoring Requirements

Following approval of the schedule for implementing the alternative(s) selected as BTA, and the methodology for assessing their efficacy, the permittee is required to submit a *Verification Monitoring Plan* for Department review and approval. The plan details the procedures necessary to confirm that the reductions in impingement mortality and entrainment required by this permit are being achieved. The specific requirements of the monitoring plan are set forth in Biological Monitoring Requirement No. 4. of the modified SPDES permit.

7. Legal Requirements

The requirements for the cooling water intake structure in this State Pollutant Discharge Elimination System permit are consistent with the policies and requirements embodied in the New York State Environmental Conservation Law, in particular - Sec.1-0101.1.; 1-0101.2.; 1-0101.3.b., c.; 1-0303.19.; 3-0301.1.b., c., i., s. and t.; 11-0107.1; 11-0303.; 11-0535.2; 11-1301.; 11-1321.1.; 17-0105.17.; 17-0303.2., 4.g.; 17-0701.2. and the rules thereunder, specifically 6NYCRR Part 704.5. Additionally, the requirements are consistent with the Clean Water Act, in particular Section 316(b).

8. Summary of Proposed Permit Changes

Additions (New Permit Conditions)

New Permit Condition	Reason for Addition or Change
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Biological Monitoring Requirement No. 1	Requires Submittal of and Impingement and Entrainment (IM&E) characterization study which was conducted in 2006.
Biological Monitoring Requirement No. 2.	Requires submittal of a <i>Design Construction Technology Plan (DCTP)</i> to assess BTA alternatives.
Biological Monitoring Requirement No. 3.	Requires submittal of a <i>Proposed Suite of Technologies or Operational Measures (PSTOM)</i> to propose how cooling water intake system will achieve BTA.
Biological Monitoring Requirement No. 4.	Requires submittal of a <i>Technology Installation and Operation Plan (TIOP)</i> to receive approval of the installation schedule of the Department approved BTA measures.
Biological Monitoring Requirement No. 5.	Requires submittal of a <i>Verification Monitoring Plan (VMP)</i> to measure the efficacy of the BTA measures and verify meeting performance requirements in the permit.
Biological Monitoring Requirement No. 6.	Requires submittal of a report to verify compliance with 6 NYCRR Part 704.5
Biological Monitoring Requirement No. 7.	Requires maintenance of all data, reports, etc. for a minimum of 10 years.
Biological Monitoring Requirement No. 8.	Requires submittal of status report updates.
Biological Monitoring Requirement No. 9.	Requires submittal of a additional requirements to assess cumulative reductions in IM&E over life of permit and assess what additional measures are available to reduce impacts further..
Biological Monitoring Requirement No. 10.	Requires submittal of an updated general requirement for the applicant to submit plans for approval if they are going to change/alter their cooling water intake structure.

Deletions (Former Permit Conditions)

Former Permit Condition	Reason for Deletion
Additional Requirement No. 9	Condition has been replaced with an updated Biological Monitoring Requirement No. 10.
Additional Requirement No. 10	Previous impingement sampling completed and IM&E studies completed in 2006 are to be reported as per Additional Requirement No. 1..

9. References

HDR/LM&S Engineers. 2005. Proposal for Information Collection with Section 316(b) Phase II Requirements of the Clean Water Act for Greenidge Generation Station. Prepared for AES Greenidge. October 31, 2005.

NYSDEC (2009). Waterbody Inventory for Seneca River (Upper) Watershed. Seneca Lake, Main Lake, Middle. Pages 211-212. dec.ny.gov.
http://www.dec.ny.gov/docs/water_pdf/pwlorflsenu.pdf (11 March 2009).

NYSDEC (2009). Part 701: Classifications-Surface Waters and Groundwaters. 701.5 Class B fresh waters. dec.ny.gov. <http://www.dec.ny.gov/regs/4592.html#15988> (11 March 2009).

NYSDEC (2009). Seneca Lake. dec.ny.gov. <http://www.dec.ny.gov/lands/25574.html> (11 March 2009).

Document prepared by Michael J. Calaban and last revised on 31 July, 2009.