

**ROANOKE RAPIDS AND GASTON
FERC HYDROPOWER PROJECT 2009
SECOND LICENSE, ISSUED 3-31-2004
ROANOKE RAPIDS DISSOLVED OXYGEN MONITORING PLAN**

1.0 Goals

The purpose of this plan is to ensure compliance with license Articles 402 and 403 as revised and issued by the Commission on March 4, 2005. The plan is to provide a means to independently verify compliance with the license articles listed above and to ensure consistent operation of the project.

2.0 General

2.1 Dominion has developed and implemented an internal tracking system through use of an existing database licensed to the company. The system was previously (and currently) in use to ensure compliance with environmental regulatory requirements. The system has been customized to send out to responsible personnel reminders for meeting license required due dates at appropriate intervals to ensure compliance deadlines are met. The system will be referred to as the Environmental Tracking System (ETS).

3.0 Measurement of Dissolved Oxygen (DO) Downstream of the Roanoke Rapids Dam

- 3.1 The existing tailrace DO sampling location will continue to be used.
- 3.2 The current analyzer is equipped with a polarographic sensor with an oxygen permeable membrane and a built-in thermocouple for temperature measurement (manufactured by Mettler Toledo).
- 3.3 The system produces an instantaneous DO analysis which displayed on the control room Environmental Monitoring System (EMS).
- 3.4 A visual and audible DO alarm will be installed in the operations control center. The alarm will sound / be displayed whenever the DO value goes below 5.0 mg/l and again whenever the DO value goes below 4.0.
- 3.5 The top of the hour DO values are uploaded to the station electronic log hourly.
- 3.6 Every hour the station log system calculates average DO concentration for the day, with a final mean daily value for the 24-hour period calculated from the 24 top-of-the-hour values.
- 3.7 At such times when the in situ DO analyzer is not functioning, hourly (top of the hour) DO values will be obtained by use of a portable DO analyzer and entered into the electronic logs manually. Any manual entries will be noted and have an associated data qualifier code entered into the database.

- 3.7.1 The DO values will be measured using a YSI model 55 analyzer or equivalent.
- 3.7.2 The analyzer shall be air calibrated before each use and maintenance performed according to manufacturer's specifications and documented in the station maintenance logs.
- 3.8 Within 3 years of submittal of this plan, Dominion may enter into consultation with North Carolina Division of Water Quality (NCDWQ) to change the sample location downstream of Roanoke Rapids.

- 4.0 Measurement of Dissolved Oxygen (DO) Upstream of the Roanoke Rapids Dam
 - 4.1 Gaston Dam Tailwater
 - 4.1.1 Dominion shall consult with NCDWQ to establish a location downstream of the Gaston Dam in which to install an automated DO analyzer by 12/31/2005.
 - 4.1.2 Analyzer shall be of the same type or better and configured the same as the Roanoke Rapids tailrace DO analyzer described in 3.2 above.
 - 4.1.3 The analyzer will normally record data only when the DO standards at Roanoke Rapids are not being met (per Article 402).
 - 4.1.4 Analyzer output will be displayed on the Roanoke Rapids control room monitor and top-of-the-hour values will be uploaded to the station electronic log system every hour (when required to operate the Gaston analyzer).
 - 4.1.5 Analyzer will normally be ready to operate when required from June 1 to September 30. The ETS shall notify the Station Manager and Station Services Coordinator on May 1 annually to ensure appropriate start-up of the Gaston DO system.
 - 4.1.6 When water quality conditions at Roanoke Rapids require operation of the Gaston tailrace DO analyzer, data collection shall begin within two business days of any measured concentration of DO at the Roanoke Rapids tailrace falling below any applicable state standard.
 - 4.1.7 If the Gaston analyzer is out of service and the Roanoke Rapids tailrace DO is below state standard (as described in Article 402), DO shall be manually measured daily and entered in the Roanoke Rapids electronic logs. The same type analyzer and methods of calibration / maintenance described in section 3.7 above shall be utilized.
 - 4.1.8 If the Gaston in situ analyzer is out of service and manual analyses are not available, the station operation shall take all measures required to ensure DO requirements of Settlement Agreement Article FL7 sections 4.1 and 4.2 are met.

- 4.2 Kerr Dam Tailwater (upstream of Lake Gaston)
 - 4.2.1 The sample point for the Kerr tailwater DO shall be the USGS Buggs Island Gage.
 - 4.2.2 May 1 of each year the ETS shall remind the Station Manager and Station Services Coordinator to monitor the Buggs Island DO.
 - 4.2.3 If the Buggs Island DO gage is out of service and Dominion desires to utilize the low DO exception described in Settlement Article FL7 section 4.4, Dominion shall daily verify the low DO concentration through manual DO analysis or provide a temporary automated method of analysis and data collection.
 - If Dominion utilizes a manual method of analysis, analysis methodology shall be as described in section 3.7 above.
 - If Dominion utilizes an automated analysis data collection system, Dominion shall notify NCDWQ of sampling, analysis and data collection methods at the time of putting such methods into service.
 - 4.2.4 If Dominion is unable to verify the DO concentration released from Kerr, station operation shall take all measures required to ensure requirements of license Article 402 are met.
- 5.0 Notification of Upstream Water Conditions
 - 5.1 Dominion shall notify NCDWQ's Washington Regional Office and Raleigh Regional office in writing (electronic notification) and via telephone whenever the mean hourly DO concentrations at the Roanoke Rapids Dam go below 4.0 mg/l or the mean daily DO concentrations are below 5.0 mg/l.
 - 5.2 Dominion shall notify NCDWQ via telephone within 24 hours and by e-mail within 5 business days.
 - 5.3 Dominion shall notify NCDWQ within 5 working days the first time each calendar year warm weather season the Buggs Island USGS gage DO goes below 4.0 mg/l.
- 6.0 Availability and reporting of data
 - 6.1 Real time data
 - 6.1.1 Dominion shall maintain a real-time web-based DO page for Roanoke Rapids tailrace DO and temperature. The data will be updated on 15-minute intervals and provide a rolling 30-day trend. The web page address is:
<http://www.dom.com/about/companies/ncpower/quality.jsp>
 - 6.1.2 The USGS will provide real-time lake stage, DO and temperature data for the Buggs Island gage at their web site

http://waterdata.usgs.gov/va/nwis/uv/?site_no=02079500&PAR_Ameter_cd=00065,00060,00067,00062

6.2 Reports

- 6.2.1 Dominion's ETS system will send out monthly reminders of reporting due dates.
- 6.2.2 Flow in cfs will be collected from the USGS website Roanoke Rapids Gage.
- 6.2.3 The date, time, depth, DO concentration in mg/l and water temperature in degrees Celsius will be collected from the Dominion tailrace site.
- 6.2.4 Gaston tailwater DO and temperature in degrees Celsius will be included if applicable per 4.1.6 above.
- 6.2.5 Kerr tailwater DO, temperature in degrees Celsius, depth and stage will be included if applicable per 5.2 above and Settlement Agreement Article FL7 section 4.4.
- 6.2.6 The data will be formatted in an electronic spreadsheet with columns for sample location, date (formatted as 1/1/2005), time (24 hour clock), depth (meters), parameter, result, units and remarks (including indicators for manual measurements).
- 6.2.7 The above data will be collated into a standard excel or similar electronic spreadsheet format and sent electronically to:
 - The NC Water Quality Wetland / 401 Unit in Raleigh
 - The NC Ecosystems Unit
 - The Raleigh and Washington Water Quality regional offices
 - The Commission's Secretary.
- 6.2.8 The data shall be sent by the 20th of the month following the month of data collection.
- 6.2.9 A letter to each of the sections of NC Water Quality shall be mailed by the 20th of each month verifying that the data has been sent.

7.0 Implementation Schedule

- 7.1 Data reporting shall begin on the first full month following FERC approval of this plan.
- 7.2 Instrumentation for measurement of DO and temperature from the Roanoke Rapids tailrace DO, and funding for the USGS Roanoke Rapids Gage currently are in place due to the previous license requirement.
- 7.3 Data logging system for Roanoke Rapids water quality data was installed prior to license issuance in anticipation of the license requirement.
- 7.4 The USGS Buggs Island Gage and water quality site was installed in early 2004.
- 7.5 The Gaston tailwater DO analyzer will be installed by December 31, 2005.