

DOMINION VIRGINIA POWER / NORTH CAROLINA  
POWER  
WITHIN DAY PEAKING PLAN  
LICENSE ARTICLE 414  
Roanoke Rapids and Gaston  
FERC Project Number 2009

September 2006

**DOMINION GENERATION  
ROANOKE RAPIDS AND GASTON PROJECT  
FERC NO. 2009  
WITHIN DAY PEAKING PLAN**

**1. INTRODUCTION**

1.1 Project Description

The Roanoke Rapids and Gaston Project is located on the Roanoke River in Virginia and North Carolina downstream of the U.S. Army Corps of Engineers (USACE) Kerr Dam. Kerr, Gaston, and Roanoke Rapids form a continuous chain of reservoirs used for flood control and power generation along the middle portion of the Roanoke River basin.

The requirements of the Article 414 Within Day Peaking study plan are closely associated with the operation of the Roanoke Rapids Dam.

1.1.1 Gaston Development

The Gaston development is located approximately 34 miles downstream from the John H. Kerr dam and reservoir at river mile (RM) 145.5. The development's principal, existing features consist of: (1) a concrete and earthen dam measuring 3,600 feet in length, with a maximum height of about 105 feet; (2) a concrete ogee-type spillway, measuring 550 feet in length, with 11 steel radial gates measuring 40 feet wide by 38 feet high; (3) a 34-mile long impoundment, with a total storage volume of 450,000 acre-feet (AF; 20,000 AF useable storage) and surface area of 20,300 acres at a normal water surface elevation of 200 feet mean sea level (msl); (4) intakes integral with the powerhouse, with trashracks having a clear bar spacing of 8½ inches; (5) a submerged rockfill and concrete weir with a total length of about 1,010 feet, located upstream of the intake and surrounding the intake on three sides; (6) a 294-foot-long concrete and masonry powerhouse, and an adjacent 80-foot-long service bay and 45-foot-long uploading bay; (7) three vertical shaft, fixed blade turbines and one vertical shaft Kaplan turbine, having a total installed capacity of 225 MW (225 MW dependable) and a maximum hydraulic capacity of 44,000 cubic feet per second (cfs); (8) four 14.4-kilovolt (kV) generators connected to two 230-kV transformers; and (9) appurtenant facilities

The Gaston development was constructed between 1960 and 1962, with commercial operation beginning in February 1963. The development produces an average of 336,362,000 MWh annually. The Gaston development occupies all of the about 252 acres of federal land administered by the USACE.

### 1.1.2 Roanoke Rapids Development

The Roanoke Rapids development is located 42 miles downstream from the Kerr dam (7.5 miles downstream from the Gaston development) at RM 135. The development's principal, existing features consist of: (1) a concrete gravity dam, measuring 3,050 feet long (includes powerhouse) and a maximum of 72 feet high; (2) a concrete ogee-type spillway, measuring 1,133 feet in length and having 24 spillway bays, with 24 steel radial gates measuring 38 feet wide by 23 feet high,, one 25-foot-wide skimmer bay, and a 48-foot-wide non-overflow section; (3) an 8-mile long impoundment, with a total storage volume of 77,140 AF (20,640 AF useable storage) and surface area of 4,600 acres at a normal water surface elevation of 132 feet msl; (4) intakes integral with the powerhouse, with trashracks having a clear bar spacing of 6 inches; (5) a submerged rockfill weir, located upstream of the intake and surrounding the intake on three sides; (6) a 224-foot-long concrete and masonry powerhouse and an adjacent 182-foot-long service bay; (7) four Kaplan turbines (three fixed-blade propeller and one variable-pitch blade), having a total installed capacity of 104 MW (99 MW dependable) and a maximum hydraulic capacity of 20,000 cfs; (8) a 7,800-foot-long by 80-foot-wide tailrace channel, with variable depth (33 to 50 feet) and a normal water surface elevation of 55 feet msl; (9) four 14.4-kV generators connected to two 110-kV transformers; and (10) appurtenant facilities.

The Roanoke Rapids development was constructed between 1953 and 1955, with commercial operation beginning in September 1955. The development produces an average of 336,408 MWh annually. The Roanoke Rapids development does not occupy any federal lands.

## 1.2 Project Operation

The Roanoke Rapids and Gaston Project is operated in close coordination with the John H. Kerr Project. The Kerr Project is operated for flood control and power production. Generation of power is accomplished within the limits prescribed for flood control and minimum river flow regulation. The Kerr Project is operated in accordance with a reservoir guide curve and accompanying guidelines. Generally, whenever the reservoir is below the level of the guide curve, the power station is operated to meet the minimum power declaration per the Southeastern Power Administration (SEPA) contracts, which varies monthly. Water stored in the power pool and above the guide

curve is generally released as timely as is practical to provide additional capacity for the control of floods.

During a typical week, the energy declaration for Kerr (weekly declaration) is usually proportioned and scheduled to meet load following system requirements during the 5 working days (Monday through Friday). Generation from Kerr is normally not scheduled during the weekend days (Saturday and Sunday).

#### 1.2.1 Gaston Power Station

During normal operation, Dominion operates the Gaston development in a load following mode, in close coordination with the USACE's operation of the Kerr Project. The Gaston development typically operates with less than 1 foot fluctuation in its power pool (between elevations 199 and 200 feet msl). During the weekends, the Gaston station generally does not operate.

#### 1.2.2 Roanoke Rapids Power Station

The Roanoke Rapids development is normally operated in a peaking (or load following) mode from Monday through Friday. Because of differences in the hydraulic capacity and storage volume (reservoir size) between the Gaston and Roanoke Rapids developments, the normal pool elevation of Roanoke Rapids Lake fluctuates more than Lake Gaston, typically 3 feet during day-to-day operations and sometimes as much as 5 feet between elevations 127 and 132 feet msl.

Dominion operates Roanoke Rapids in a "run of Kerr" mode from March 1 through June 15 (with the exception of five peaking days in March as allowed by License Article 409). The run of Kerr mode was implemented to restore and enhance spawning habitat for anadromous fish impacted by flood control and hydropower operations. During this time frame Dominion does not load follow at Roanoke Rapids.

Like the Gaston dam, Roanoke Rapids has a submerged weir constructed just upstream of the intake forebays. This construction feature causes the hydropower turbines to take suction from the upper portion and most oxygenated portion of Roanoke Rapids Lake.

Dominion operates at least one unit at Roanoke Rapids to maintain the required minimum flow. During the weekends when Gaston is not normally operated, Roanoke Rapids Lake storage capacity is used to maintain the required minimum flow.

### 1.3 FERC License Article 414 Plan

Article 414. Project Within-Day Peaking Operations. Within one year of the issuance date of this license, the licensee shall file with the Commission, for approval, a plan to monitor, evaluate, and, if determined to be necessary, reduce the contribution of the licensee's within-day peaking operations to bank erosion and potential effects on fish and macroinvertebrates in the Roanoke River downstream from Roanoke Rapids dam. These operational changes shall not require modification to the U.S. Army Corps of Engineer's (Corps) weekly declaration (as defined in Settlement Agreement Article GP2). Such reduction shall be implemented to contribute to recruitment and survival of flora and fauna in numbers and locations that are adequate to sustain or restore the biological integrity of the bank and instream ecosystems.

The plan shall include, at a minimum, the following features, consistent with Settlement Agreement Article FL3:

(1) a description of the management objectives, all monitoring protocols, data standards, specific monitoring variables, testable hypotheses, success or decision criteria, monitoring cycles (consisting of five-year periods), procedures for selecting monitoring sites and notifying the Commission of the selections, any other appropriate monitoring protocols, and procedures for revisions to these protocols on the basis of the monitoring results;

(2) a provision for the licensee to provide annual funding to commence no later than January 31, 2005, in the amount of \$30,000 for implementation of this plan, subject to carry-over of any funds not spent in a given year and provisions for consulting with the CMT, as set forth in Article 427, in the thirtieth year of the license to determine if increased levels of funding are needed;

(3) a description of the procedures whereby the licensee, as set forth in Article 427, shall consult with the Cooperative Management Team (CMT), consisting of the North Carolina Wildlife Resources Commission, the North Carolina Department of Environment and Natural Resources, the U.S. Fish and Wildlife Service, the National Marine Fisheries Service, The Nature Conservancy, and the Regional Partnership of Local Governments in an ex officio capacity, to develop and, following the Commission's approval, implement the plan. Among other things, the plan shall provide for a determination, at the end of each monitoring cycle, of whether a causal link exists between within-day peaking operations, and bank erosion or adverse effects on fish and macroinvertebrates;

(4) a description of the procedures whereby the licensee, at the beginning of a monitoring cycle, shall respond to the determination required by paragraph (3) above,

including (a) continuation and any revision to the monitoring for the next monitoring cycle and (b) a protocol for determining the need for any modification (or step change) to the licensee's discretion for within-day peaking operations if the determination required by paragraph (3) is affirmative. A step change shall reduce the licensee's discretion for within-day peaking operations by a proportional amount equivalent to 5 divided by the term of the license in years (1/8). The number of peaking days per year will not be reduced below the frequency of unregulated high flow days, on a monthly or seasonal basis, and the minimum number of days available for within-day peaking shall not be reduced below 40 days per year;

(5) a definition of an unregulated high flow day and a procedure for determining the frequency of unregulated high flow days per (4) above and Settlement Agreement Article FL3, section 3.3;

(6) a description of the starting point and range of possible modifications of the licensee's discretion for "within-day" peaking operations, including items listed in Settlement Agreement Article FL3, Sections 2.1 and 3;

(7) a provision to file, with the Commission, every 5 years, commencing April 1, 2010, and continuing throughout the license term, a monitoring report that includes the results of the monitoring, evaluations of the effects of within-day peaking operations, and notice of intended within-day peaking operations for the next five years. Copies of the monitoring report shall also be sent to the members of the CMT; and

(8) an implementation schedule.

With respect to the plan required by this article, the licensee shall submit to the Commission documentation of its consultation, as set forth in Article 427. The Commission reserves the right to require changes to the plan. The plan shall not be implemented until the Commission notifies the licensee that the plan is approved. Upon Commission approval, the licensee shall implement the plan, including any changes required by the Commission.

The monitoring cycles shall last for the duration of the license term, unless terminated earlier. The licensee shall submit any recommendation for such early termination, following consultation with the CMT, as set forth in Article 427, for the Commission's approval.

Short-term changes to any study or monitoring plan required by this article and undertaken in response to events that may alter flow releases or affect monitoring effectiveness may be made after consultation with the members of the CMT, as set forth

in Article 427. Any such changes shall be reported to the Commission within 30 days of being determined necessary.

Following plan approval, any long-term changes to project operations or facilities identified by the monitoring results to mitigate environmental impacts, and not previously approved as part of the plan, may not be implemented without prior Commission approval.

## 2.0 PLAN DEVELOPMENT

### 2.1 Background

Concerns were raised during the relicensing of the Roanoke Rapids/Gaston Project about the effects of within-day peaking operations on bank erosion and biological communities in the lower Roanoke River downstream of Roanoke Rapids Dam. It was hypothesized during the relicensing discussions that the peaking operations accelerated erosion, caused unnatural erosion patterns, contributed to downstream sedimentation, impacted riparian communities, and prevented establishment of ecologically important biological communities. During the course of relicensing the Project, Dominion conducted a short-term (2-year) pin erosion and sedimentation study in conjunction with a similar study conducted by the US Fish and Wildlife Service (USFWS) at the Roanoke River Wildlife Refuge downstream of the project. Results of the short-term studies were inconclusive.

As a result of the relicensing negotiations, the Settlement Agreement and subsequent revised license order required further assessment of peaking effects on river bank erosion and biological communities, and the potential requirement for Dominion to make operational changes at the Roanoke Rapids Dam.

### 2.2 Consultation

This plan was developed in consultation with the Cooperative Management Team (CMT) consisting of USFWS, the National Marine Fisheries Service (NMFS), the North Carolina Wildlife Resources Commission (NCWRC) the North Carolina Department of Environment and Natural Resources (NCDENR), The Nature Conservancy (TNC) and the Regional Partnership of Local Governments in an ex officio capacity. CMT meetings were held on September 29, 2004; January 13, 2005; March 30, 2005; October 14, 2005; February 10, 2006; June 1, 2006; July 17, 2006; and September 8, 2006. Notes from those meetings are included as Appendix 1. Dominion provided the CMT with copies of the final draft study plans for review on March 8, 2006 (erosion studies) and July 19, 2006

(fish and benthic macroinvertebrates) and this plan on August 9, 2006 and a revised version on August 29, 2006.

Written comments to the draft plan sent out on August 9 were received from NCDENR, TNC, NMFS and USFWS. Comments were all in the form of edits to an electronic document. E-mail cover letters from the consulting parties are included as Appendix 2 to this plan. Edits not accepted by Dominion were discussed and resolved in the September 8, 2009 CMT meeting. Final edits to the plan were made at this meeting and are incorporated in the plan.

### 3.0 PLAN

#### 3.1 Management Objectives

In executing this plan it is the Cooperative Management Team's objective to assess and, if necessary, reduce the contribution of the Dominion's within-day peaking operations to (1) erosion of the banks of the Roanoke River downstream of Roanoke Rapids Dam and (2) potential adverse effects on fish and benthic macroinvertebrate communities downstream. If reduction methodology is required after a 5-year assessment period, plan implementation is intended to contribute to recruitment and survival of flora and fauna in numbers and locations adequate to sustain or restore the biological integrity of the riparian floodplain, riverbank and instream ecosystems.

#### 3.2 Specific Monitoring Plans

##### 3.2.1 Technical plans

Two technical plans are attached as Appendices 3 and 4 that describe in detail the scientific studies that will occur. The Effects of Within-Day and Within-Week Peaking on bank Erosion of the Roanoke River Downstream of the Roanoke Rapids Dam addresses the erosion objective [(1) in 3.1 above] and is Appendix 3. The Effects of Within Day Peaking on Fish and Benthic Macroinvertebrates addresses the fish and benthic objective [(2) in 3.1 above] and is Appendix 4. The plans address all the following requirements of paragraph (1) of Article 414: monitoring protocols, data standards, specific monitoring variables and selection of monitoring sites. It should be noted that Appendix 3 addresses the bank erosion component of Article 415 Effects of Within Week Peaking plan as well as this plan.

##### 3.2.1 Testable hypotheses

It is the determination of the CMT to keep the testable hypothesis for this plan as simple as possible. It was hypothesized by several agencies and NGO's during the relicensing that Dominion's daily peaking operation causes adverse effects on riparian morphological processes, including accelerated erosion on banks in the upper portion of the Roanoke River (from the Roanoke Rapids Dam to approximately the Route 11 bridge near Hamilton), and/or reduces the richness and/or diversity of fish assemblages and/or benthic macroinvertebrate communities.

### 3.3 Decision Criteria

#### 3.3.1 Decision Criteria

The CMT again desires the decision criteria to remain as simple as possible. Simply stated, if data from the studies disprove the hypotheses of detrimental peaking effects, then the decision will be to discontinue further studies and leave the peaking operation in the current state. This can occur at the end of any 5-year study cycle. If the CMT agrees that the data support the hypotheses of detrimental peaking effects, then modifications to the peaking operations will be evaluated and selected. The CMT recognizes that due to the complicated nature of interactive forces within the Roanoke system (e.g., flood control and peaking releases), it may be difficult to statistically test some hypotheses. Therefore, the CMT may also determine after substantial testing that while there is no direct evidence to disprove or support the hypotheses of detrimental peaking effects, studies may be discontinued or continued as determined by the CMT's decision making procedures (Section 3.3.2).

#### 3.3.2 Decision making procedures and study protocol changes

All CMT decision-making shall be by consensus and all Members of the CMT (Members) are committed to make a good faith attempt to reach consensus on all issues. Consensus means that the Members state they can live with the decision, as follows: A decision based on consensus shall have either the unanimous support of all Members, or at least no opposition from any Member; provided, however, that a decision by consensus need not have the support of an ex officio Member. It is the responsibility of Members to make known their views if they are in disagreement or need to confer with their respective organization. If a Member cannot live with a decision, that Member will propose an alternative for consideration by the CMT. It will have the option to enter into informal consultations with one or more of the other Members. Successful resolution through such informal consultation will then be brought back to all Members of the CMT for approval. If consensus cannot be reached, a Member may proceed with dispute resolution according to Section 6 of the Roanoke Rapids and Gaston Comprehensive Settlement Agreement (Settlement Agreement). Success criteria and revisions to any protocols or change in study cycle duration will also be determined using this decision making process.

### 3.4 Monitoring Cycles

Monitoring cycles will normally be five-year cycles. The first monitoring cycle for compliance with Article 414 is from January 1, 2007 – December 31, 2011. The second

study cycle is January 1, 2012 – December 31, 2016. Study cycles can be altered in one-year increments per consensus agreement following the protocol of section 3.3.2 above.

#### 4.0 Funding

##### 4.1 Annual Funding

Funding for the studies and plan was made available by Dominion for accounting purposes as of January 1, 2005. Funding shall be for \$30,000 annually (in 2002 dollars and adjusted for the CPI as detailed in the Settlement Agreement Section 13). Funding shall continue until the CMT determines that no additional study cycles are required.

##### 4.2 Annual Carryover of Funds

Any calendar year funds not utilized in that year may be carried over to the next year or held for a future year as determined by the CMT. Since this plan was not provided to FERC for approval and no studies were performed in 2005, \$60,000 is available for studies in calendar year 2006. Dominion will keep an up to date accounting worksheet for annual review by the CMT to indicate availability of funds for this Plan.

##### 4.3. Synergy with CMT from Article 415

The CMTs identified in License Article 414 Within Day Peaking and Article 415 Within Week Peaking are identical. Hypothesized effects of within day and within week peaking at the Roanoke Rapids Dam are expected to be, in many cases, difficult to differentiate. The CMT determined that funds for the two plans can be used interchangeably.

#### 5.0 Plan Management Decisions

##### 5.1 General

By utilization of a cooperative management process, as well as decision making processes, the execution of this plan requires numerous decisions to be made. These decisions will typically be made using appropriate study results, applying sound scientific principles and utilizing methods described in section 3.3.

##### 5.2 Causal Link

The CMT Members have agreed to cooperatively make appropriate decisions related to within day peaking effects. The determination of the presence or lack thereof of a

causal link between the Roanoke Rapids Dam peaking operations will be through the cooperative examination of study results, appropriate application of scientific principles and knowledge, and mutual exchange of ideas and theories to the study results. The methods described in section 3.3 and Settlement Agreement (License Appendix B) Articles 6 (Dispute Resolution) and 12 (Cooperative Management Teams) will be used to give guidance to reaching consensus.

As stated in 3.3.1 above, if the data from the studies disprove or do not support the hypothesis, then the decision will be to discontinue further studies and leave the peaking operation in the current state. This can occur at the end of any 5-year study cycle.

Three decisions can be reached by the CMT:

- Not enough information is present to make a decision. Studies need to continue.
- The data indicates that there is no causal link or at least fails to support a causal link for either study. Studies cease and Roanoke Dam Operations are to remain status quo.
- A causal link is established for one or both of the studies. Changes in the operations shall be made according to section 5.3 and one or both studies will continue as determined by the CMT.

### 5.3 Potential Modifications to Within Day Peaking Operations

Changes in the Roanoke Rapids Dam peaking operation may be required if a causal link is established. Changes required may be one of the following that the CMT determines would reduce the latitude available to Dominion in its peaking operation: (NOTE: the examples stated are just that. Other means may be chosen by Dominion and approved by the CMT to accomplish the general goal of the stated alternatives.)

#### 5.3.1 Reducing the difference between base flow and peak flow on peaking days.

Example: Currently in the month of July the peaking flow varies from a minimum of 2,000 cubic feet per second (cfs) to approximately 20,000 cfs, a difference of 18,000 cfs. If a causal link was established in the first study cycle, the difference between base and peak flows might be reduced by 1/8 (5 divided by the license term) or 2,250 cfs. Maximum change in flow for a daily peak for the second study cycle would then be 15,750 cfs. If after the second study cycle a causal link continues, then the peak allowed would be reduced by another 2,250 cfs. However, 40 days per year would remain available for the full 18,000 cfs peak-height as described in Settlement Agreement Article FL3 paragraph 3.4.

#### 5.3.2 Incorporating ramping rates.

Example: If incorporation of ramping rates was determined to be the method used to

reduce within day peaking effects, the Roanoke River Basin Operations Model (RRBROM) could be used to determine the shape of a typically occurring natural peak. The CMT would then determine a method to incorporate the peak in some portion of the peaks produced by Roanoke Rapids. If a causal link is established in the first 5-year study then 1/8 of Dominion peaks would have to have a similar shape in the second five years. Another option would be to modify all but 40 of the peaking days to have a ramping rate that is 1/8 modified from the existing rate to that typical for an unregulated high flow event.

5.3.3 Changes to duration of base flow (in hours) between peaking releases.

Example: Actual USGS Roanoke Rapids data could be used to determine the average length of time between Dominion peaks. RRBROM could be used to verify that naturally occurring peaks were separated by longer time periods. The length of time between Dominion peaks would be increased by 1/8 during the second study period.

5.3.4 Reduction in the number of peaking days per month or per year.

Example: Actual USGS Roanoke Rapids data could be used to determine the average number of peaking days per year or per month. This total would then be reduced by 1/8 of the difference between the average number of peaking days and the number of unregulated high flow days - on a monthly or yearly basis. The total number of peaking days per year would not fall below 40.

5.3.5 Modification of the “peaking period” (Settlement Agreement glossary item 1.18).

Example: Dominion in consultation with the CMT may determine that longer duration but less frequent peaks are desirable to reduce peaking effects. If this method of modification is chosen, the CMT shall define the requirements and subsequent modifications and show how each modification step taken would be 1/8<sup>th</sup> step in a modification plan.

5.3.6 Some other modification or combination of modifications that the CMT agrees may reduce adverse impacts of within-day peaking on aquatic biota and/or stream bank stability.

In all cases, changes will be made in 1/8 increments of the maximum possible change as stated in article 414.

## 5.4 Other Required Decisions

These decisions would be made using criteria developed in section 3.5.

- Shortening or extending study cycle length,
- Modification of the Roanoke Rapids Dam operation prior start of second, third, etc. study cycles,
- Criteria for and determination of required fractional application of operational modifications

## 5.5 Determination of Unregulated High Flow Days.

### 5.5.1 Background

This determination is only applicable if a causal link is determined to exist and Dominion chooses, with CMT consensus, to reduce peaking effects through reduction in the number of days per year that it peaks the Roanoke Rapids Dam. (This is a potential alternative for 5.3.5 above.)

Article FL3 (Settlement Agreement) section 3 paragraph 3 states that “the number of peaking days in a year will not be reduced below the frequency of unregulated high flow days, on a monthly or seasonal basis.” Paragraph 4 states “the minimum number of days experiencing within-day peaking will not be reduced below 40 days per year.” Further, Article GP 2 paragraph 1.17 states “a peaking day is defined in the Settlement Agreement as “any day when the amount of water released by the Licensee from the Roanoke Rapids Dam exceeds the daily mean of the USACE weekly declaration by 1000 cfs averaged over the day.”

### 5.5.2 Unregulated high flow days

Unregulated high flow days will be determined using the Roanoke River Basin Reservoir Operations Model. The period of record will be modeled without the Kerr-Gaston-Roanoke Rapids reservoirs in place. An analysis will be performed that determines the number of days per month for each month that naturally occurring peaks exceeded 18,000 cfs, 15,000 cfs and 10,000 cfs exclusive of March 1 – June 15.

### 5.5.3 Utilization of high flow day data

Utilizing the data developed in 5.5.2 above, if Dominion chooses to use this method as an alternative means for peaking modification for 5.3 above, Dominion will determine, with consensus approval of the CMT, a method of reducing the number of peaking days to more closely approximate that which would occur in an unregulated (flow) lower Roanoke River, with a maximum reduction to 40 each 20,000 cfs peaking days.

The currently available number of peaking days, if a causal link is determined, available for reduction of occurrences is 224. (365 days per year minus 106 anadromous spawning days in March 1-June 14, minus 40 days from FL 3 section 3.4, plus 5 discretionary peaking days in March.) If a causal link is determined after the first study cycle, those peaking days would be reduced by 1/8.

## 6.0 Reports

### 6.1 Report Due Dates

The first report shall be submitted to the Commission by April 1, 2012 and every five years thereafter for the duration of the study. The Commission shall be notified by April 1 of a year in which the study shall be shortened or lengthened. For example, if in 2010 the CMT determines that only four years of data are needed in the first cycle, the Commission would be notified by April 1 of that year; and if in 2011 the CMT determined an additional year of data was needed, the Commission would be notified by April 1, 2012.

### 6.2 Report Content

Dominion's 5-year report will be developed in consultation with the CMT. The report will have a technical section and administrative section. The technical section shall contain a summary of the technical data from the scientific studies described in Appendices 2 and 3 and referred to in condition 7 of the Article 414 as results of the monitoring. This section shall also discuss the relationship of the study data to a determination of a causal effect.

The administrative section will address the remainder of the requirements of condition 7. If a causal effect is determined, the report shall discuss the operational change that will be put in place; a determination of how the operational change will be a 1/8<sup>th</sup> step proportional to the maximum operational change if the method were to be fully implemented by the end of the license term; and any modifications proposed to the studies for the next 5-year study period.

## 7.0 Implementation Schedule

In order to provide the Commission and the CMT a basis for developing this plan, Dominion contracted with Virginia Tech to develop the technical study protocol for the erosion portion of the plan. Virginia Tech was also awarded the contract to perform the work once approved by the Commission. This portion of the plan shall be implemented as soon as the Commission approves the plan and Dominion notifies the principal investigator. The fish and benthos portion of the plan will be implemented as soon as practical. A contract will be awarded for much of the data collection. Some of the work is seasonal and shall be conducted in the next available season (for example, February – March 2007 for swamp benthic macroinvertebrates; summer 2007 for fish assemblage).