



Commonwealth of Virginia

VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY

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Secretary of Natural and Historic Resources

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Director

VWP Individual Permit Number 24-1547

Effective Date: July 7, 2025

Minor Modification Date: July 14, 2025

Expiration Date: July 6, 2040

VIRGINIA WATER PROTECTION PERMIT ISSUED PURSUANT TO THE STATE WATER CONTROL LAW AND SECTION 401 OF THE CLEAN WATER ACT

In compliance with § 401 of the Clean Water Act, as amended (33 USC § 1341) and the State Water Control Law and regulations adopted pursuant thereto, the Department has determined that there is a reasonable assurance that this VWP permit, if complied with, will protect instream beneficial uses, will not violate applicable water quality standards, and will not cause or contribute to a significant impairment of state waters or fish and wildlife resources. In issuing this VWP permit, the Department has not taken into consideration the structural stability of any proposed activities.

Permittee: Appalachian Power Company

Facility: Smith Mountain Lake Hydroelectric Project

Facility Address: Smith Mountain Dam: 2072 Ford Road, Sandy Level, VA 24161
Leesville Dam: Taylor Ford Road, Gretna, VA 24557

Activity Location: The Smith Mountain Hydroelectric Project is located on the Roanoke River at River Mile 314 through River Mile 296, approximately 25 miles southeast of the Town of Roanoke. The Project spans Bedford, Campbell, Franklin, Pittsylvania, and Roanoke Counties in Virginia.

Activity Description: This permit authorizes the continued operation of the Smith Mountain Hydroelectric Project, which diverts flows from Smith Mountain Lake to Leesville Lake, diverts flows from Leesville Lake to the Roanoke River, with pumped storage capabilities to move water from Leesville Lake to Smith Mountain Lake, and a required minimum release to the Roanoke River. The permitted withdrawal will be used for the purposes of hydroelectric power generation. Other uses are not authorized by this permit. Permitted activities shall be conducted as described in the Joint Permit Application dated and received July 2, 2024, and supplemental materials, revisions and clarifications received.

The permitted activity shall be in accordance with this Permit Cover Page, Part I - Special Conditions, and Part II - General Conditions.



Bryant Thomas
Interim Director, Water Division

07/14/2025
Date

Part I – Special Conditions

A. Authorized Activities

1. This permit authorizes the Smith Mountain Hydroelectric Project to divert surface water through two (2) powerhouses at the Smith Mountain Lake Dam and the Leesville Lake Dam and the pumping of water from Leesville Lake to Smith Mountain Lake for the purposes of hydroelectric power generation and storage.
2. The permittee shall conduct authorized activities as described in the Joint Permit Application and supplemental materials, revisions, and clarifications. Any changes to the authorized activities that affect permitted areas shall be submitted to the Department immediately upon determination that changes are necessary, and Department approval shall be required prior to implementing the changes.
3. The permittee shall notify the Department of any changes in authorized impacts to surface waters, of any modifications of the intake structure(s), or any changes to the design or type of construction activities in surface waters authorized by this permit. Department approval shall be required prior to implementing the changes. Any additional impacts, modifications, or changes shall be subject to individual permit review or modification of this permit.

B. Permit Term

1. This permit is valid for fifteen (15) years from the date of issuance. A new permit may be necessary for the continuance of the authorized activities, including water withdrawals, or any permit requirement that has not been completed, including compensation provisions.
2. The permittee shall submit a new permit application at least 270 calendar days prior to the expiration of this permit if reissuance will be requested. A complete permit application is due by October 10, 2039, in accordance with 9VAC25-210-65.

C. Standard Project Conditions

1. This permit does not constitute, convey, or imply authority to any permittee to unlawfully or incidentally take any threatened or endangered species that is protected by Virginia laws or regulations, pursuant to § 3.2-1000 through -1011; § 29.1-563 through -570; and 4VAC15-20 *et seq.*
2. The activities authorized by this permit shall be executed in such a manner that any impacts to beneficial uses are minimized. As defined in § 62.1-44.3 of the Code of Virginia, "beneficial use" means both instream and offstream uses. Instream beneficial uses include, but are not limited to, the protection of fish and wildlife habitat, maintenance of waste assimilation, recreation, navigation, and cultural and aesthetic values. The preservation of instream flows for purposes of the protection of navigation, maintenance of waste assimilation capacity, the protection of fish and wildlife resources and habitat, recreation, cultural and aesthetic values is an instream beneficial use of Virginia's waters. Offstream beneficial uses include, but are not limited to, domestic

(including public water supply), agricultural uses, electric power generation, commercial, and industrial uses.

3. No activity shall substantially disrupt the movement of aquatic life indigenous to the water body, including those species which normally migrate through the area, unless the primary purpose of the activity is to impound water.
4. Flows downstream of the project area shall be maintained to protect all uses.
5. No activity shall cause more than minimal adverse effect on navigation, and no activity shall block more than half of the width of the stream at any given time.
6. The activity shall not impede the passage of normal or expected high flows, and any associated structure shall withstand expected high flows.
7. All required notifications, reports, and submittals shall include project name and permit number and be submitted electronically to withdrawal.permitting@deq.virginia.gov. Alternatively, they can be mailed to the office stated below, unless otherwise directed in writing by the Department subsequent to the issuance of this permit: Department of Environmental Quality, Attn: Compliance Program Manager, Office of Water Permitting, P.O. Box 1105, Richmond VA 23218.
8. All reports required by this permit and other information requested by the Department shall be signed by the permittee or a person acting on the permittee's behalf, with the authority to bind the permittee. A person is a duly authorized representative only if *both* criteria below are met. If a representative authorization is no longer valid because of a change in responsibility for the overall operation of the facility, a new authorization shall be immediately submitted to the Department.
 - a. The authorization is made in writing by the permittee.
 - b. The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity, such as the position of plant manager, superintendent, or position of equivalent responsibility. A duly authorized representative may thus be either a named individual or any individual occupying a named position.
9. All submittals shall contain the following signed certification statement:

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."
10. Any fish kills or spills of fuels or oils shall be reported to the Department immediately upon discovery at (540) 562-6700 or <https://portal.deq.virginia.gov/v2/prep/search>. If the Department cannot be reached, the spill or fish kill shall be reported to the Virginia Department of Emergency

Management (VDEM) at 1-800-468-8892 or the National Response Center (NRC) at 1-800-424-8802. Any spill of oil as defined in § 62.1-44.34:14 of the Code of Virginia that is less than 25 gallons and that reaches, or that is expected to reach, land only is not reportable, if recorded per § 62.1-44.34:19.2 of the Code of Virginia and if properly cleaned up.

11. The Department shall be notified in writing within 24 hours or as soon as possible on the next business day when potential environmentally threatening conditions are encountered which require debris removal or involve potentially toxic substances. Measures to remove the obstruction, material, or toxic substance or to change the location of any structure are prohibited until approved by the Department.
12. Virginia Water Quality Standards shall not be exceeded in any surface waters as a result of the project activities pursuant to 9VAC25-260.
13. Measures shall be employed at all times to prevent and contain spills of fuels, lubricants, or other pollutants into surface waters.

D. Surface Water Withdrawals

1. Surface water diverted from Smith Mountain Lake to Leesville Lake, surface water diverted from Leesville Lake to the Roanoke River, and pumped water from Leesville Lake to Smith Mountain Lake authorized under this permit is for the purposes of hydroelectric power generation and storage.
2. The minimum release from Leesville Lake shall not be less than 375 cubic feet per second in terms of average hourly flow from November 1st through February 29th and 400 cubic feet per second (cfs) in terms of average hourly flow from March 1st through October 31st.
3. The permittee shall run a forecast-based simulation model at least once every three (3) days and evaluate the probability of Smith Mountain Lake being at a certain elevation in the future. Trigger 1 will activate when there is a twenty percent (20%) chance of dropping below 790.5' (adjusted) in 16 weeks. Trigger 2 will activate when there is a two percent (2%) chance of dropping below 790' (adjusted) in ten (10) weeks. Trigger 3 will activate if Trigger 2 is in effect and Smith Mountain Lake is less than 795' (adjusted) between December 1 and March 31, or anytime the adjusted elevation dropped below 791.0' after September 30. All triggers are lifted if the elevation has reached 795' (adjusted) and there is less than a 2% chance of dropping below 790.5' (adjusted) sixteen weeks from that time.
4. To the extent that inflows allow, the permittee shall store additional water in Leesville Lake so that the adjusted storage in Smith Mountain Lake shall be equal to 795.3 feet adjusted by April 15th of each year. The extra 0.3 feet of storage is intended to be used to ensure the success of the striped bass spawning run and need not be retained past the end of that run unless the permittee chooses to do so, while still complying with minimum instream flowby requirements.
5. The permittee shall release water at Leesville Lake Dam powerhouse in an attempt to meet the target flows listed in the table below. Target flows are measured at the Brookneal USGS Gage No. 02062500 and expressed in units of cubic feet per second. The permittee shall estimate tributary

flows between Leesville Dam and Brookneal when running the forecasting model and use such estimates in determining releases from Leesville Dam powerhouse when attempting to meet the target flows at Brookneal.

Month	Minimum Discharge at Leesville (avg hourly cfs)	Minimum Flow at Brookneal (cfs)			
		Normal	Trigger 1	Trigger 2	Trigger 3
January	375	1100	990	990	770
February	375	1100	990	990	770
March	400	1100	935	825	770
April	400	1500	1275	1200	1050
May	400	1500 ⁴	1275	1200	1050
June	400	900 ^{1,5}	765 ^{2,6}	765 ^{3,6}	630 ³
July	400	700 ¹	595 ^{2,7}	560 ^{3,7}	490
August	400	650 ¹	570 ⁷	570 ^{3,7}	420
September	400	550	550 ⁷	550 ⁷	385
October	400	600	570 ⁷	570 ⁷	420
November	375	700	595	560	490
December	375	800	720	720	560

Notes:

1. Minimum release at Leesville of 650 cfs in terms of an average hourly flow.
 2. The minimum release of 650 cfs at Leesville will be made on Saturdays and Sundays and on Memorial Day, July 4th, and on Labor Day for recreation. Appalachian times the release so that it arrives at Long Island (approximately 30 miles downstream of the Leesville Dam powerhouse) at 8 AM on Saturday and subsides at Brookneal at 8 PM on Sunday.
 3. A minimum release of 650 cfs will be made at Leesville for 12 hours timed to arrive at approximately sunrise at Long Island on Saturdays and on Memorial Day, July 4th, and Labor Day.
 4. Upon notification by DWR that striped bass spawning is complete, Appalachian may reduce releases and only be required to make release for the June normal target of 900 cfs.
 5. The maximum release Appalachian is required to release in an attempt to hit the target flow at Brookneal is 700 cfs.
 6. The maximum release Appalachian is required to release in an attempt to hit the target at Brookneal is 650 cfs.
 7. The maximum release Appalachian is required to release in an attempt to hit the target at Brookneal is 480 cfs.
6. The permittee shall operate the turbines at Smith Mountain Dam from July 1st through September 30th in a fashion that will minimize or eliminate exceedances of water quality standards for dissolved oxygen (DO) in the tail waters below Smith Mountain Dam. During this period, the permittee will dispatch the turbines with intakes that are highest in the water column first and take those turbines offline last when generating.
 7. Should the permittee plan to modify or replace turbine units 2 or 4 at the Smith Mountain Dam powerhouse during the permit term, the permittee shall install aerating turbine technology as feasible, or other technology that provides at least an equivalent level of introduction of dissolved oxygen, for the purposes of dissolved oxygen improvement in accordance with Part I. A. 3.

8. If required by operating emergencies beyond the control of the permittee, or when Trigger 3 events occur during drought or low inflow conditions, flows can be temporarily modified from those described above upon mutual agreement between the permittee and the Department, in consultation with the Department of Wildlife Resources, following appropriate public input as determined by the Department of Environmental Quality.
9. The permittee shall submit a Drought Management Plan to the Department for review within 180 days (January 3, 2026) of permit issuance. Any revisions to the approved plan shall be submitted to the Department for review prior to implementing the change. The plan shall include, at a minimum, the following:
 - a. Development of drought stages including when and how each stage will be implemented.
 - b. Description of the conservation measures to be implemented during each drought stage.
10. When a drought emergency is declared by the Commonwealth of Virginia in the Roanoke Drought Evaluation Region or in accordance with the County's (or Locality's) Drought Management Ordinance, the permittee shall implement either the provisions directed by the Commonwealth, the Drought Management Ordinance or the mandatory conservation measures as detailed in *Attachment B* of this permit, whichever is the most restrictive. The permittee shall be responsible for determining when drought emergencies are declared. The permittee shall retain records documenting that mandatory conservation measures were implemented during declared drought emergencies.

E. Water Withdrawal Monitoring, Recordation and Reporting Conditions

1. The permittee shall continue to consult with the Department on the implementation of the resource management plans required under FERC Operating License P-2210, including the Water Management Plan and efforts on the improvement of dissolved oxygen levels in the tail waters below Smith Mountain Dam.
2. Within 240 days (March 4, 2026) of the issuance of this permit, the permittee shall develop and submit a Dissolved Oxygen (DO) Improvement Plan (Plan) to the Department for review and approval. The permittee shall develop a comprehensive Plan, designed in consultation with DEQ, the Department of Wildlife Resources (DWR) and other state or federal agencies as directed, to address depressed DO levels downstream from Smith Mountain Lake Dam. The Plan shall include, at a minimum, the following:
 - a. A comprehensive report on the previously conducted Feasibility Study, completed in 2021, which evaluated physical and mechanical options for mitigating low DO water releases resulting from operation of the Smith Mountain Hydroelectric Project. The comprehensive report on the initial Feasibility Study shall include narrative and results related to DO downstream of Smith Mountain Lake Dam.
 - b. A process for understanding, describing and delineating the nature, extent and duration of impacts resulting from release of low DO-containing waters below the Smith Mountain Lake Dam. This shall include, but not be limited to:

- i. The geographic extent of the data collection and the duration of the monitoring to support the evaluation of impacts to beneficial uses as a result of the low DO-containing releases from the Smith Mountain Lake Dam;
 - ii. Methodology of monitoring proposed, to include types of physical, chemical and biological data to be collected; and
 - iii. Methodology for assessing and evaluating impacts to beneficial uses and predicting efficacy of control measures, both operational and technological, in mitigating low DO levels in waters released from the Smith Mountain Lake Dam.
- c. DO improvement methodologies and measures the permittee proposes to be assessed for implementation, including timelines associated for implementation.

Once approved, this Plan shall be implemented, and any subsequent Department approved revisions to the Plan shall become an enforceable part of this permit.

The results of the Plan, including the permittee's final proposal(s) of methods to improve DO downstream of Smith Mountain Lake Dam and timelines for implementation shall be provided to the Department as soon as they are available but not later than July 1, 2030, for Department review and approval.

3. Within 180 days (January 3, 2026) of the issuance of this permit, the permittee shall submit a Monitoring and Operations Plan for Department review. The Plan should specifically address the following:
 - a. Procedures for operating the diversion to ensure compliance with all water withdrawal/diversion conditions of this permit;
 - b. Procedures for estimating inflow in accordance with Part I D. 3. including the time of day that the estimate will be made;
 - c. Procedures for recording withdrawals as well as all other monitoring and reporting requirements in Part I E. 4. and E. 7., including a sample of the reporting form or table that will be used.
4. Each day the permittee must monitor and record the following, for Smith Mountain and Leesville Lakes:
 - a. Date and time;
 - b. Total amount of inflow at each development each day;

- c. The provisional stream flow in cubic feet per second (cfs) as measured at the USGS Stream Gaging Station #02062500 (Roanoke River at Brookneal, VA);
 - d. The amount of release from each dam in cfs and amount pumped from Leesville Lake to Smith Mountain Lake;
 - e. Identify which Trigger Event is in effect;
 - f. The required release from Leesville Dam to the Roanoke River in cfs;
 - g. The monthly target flow at Brookneal identified in Part I D. 5.;
 - h. Side flows between Leesville Dam and Brookneal; and
 - i. The reservoir levels at each dam.
5. The permittee shall monitor diversions from Smith Mountain Lake and Leesville Lake on a daily basis using flow totalizer technology to confirm that the diversions are in compliance with this permit. Such meters shall produce volume determinations within plus or minus 10% of actual flows. A defective meter or other device must be repaired or replaced within 60 days. A defective meter is not grounds for not reporting the withdrawals. During any period when a meter is defective, generally accepted engineering practice shall be used to estimate withdrawals and the period during which the meter was defective must be clearly identified in the report.
6. The permittee shall report any release not in compliance with Part I D. 2. by the fifth (5th) day of the month following the month in which the withdrawal or release occurred. Failure to report may result in compliance or enforcement activities. Failure to report may result in compliance or enforcement activities. Reports shall include project name and permit number and be submitted electronically to withdrawal.permitting@deq.virginia.gov or be mailed to the office stated below, unless otherwise directed in writing by the Department subsequent to the issuance of this permit; Department of Environmental Quality, Attn: Water Compliance Coordinator, Office of Water Permitting, P.O. Box 1105, Richmond VA 23218.
7. The permittee shall submit a water withdrawal monitoring report to the Department semi-annually. The semi-annual monitoring period shall be as follows: January through June and July through December. The daily records shall be tabulated by month. The report shall be submitted to the Department by February 10th and August 10th of every year within the permit term. Submittal of the report may be reported electronically, or another form determined to be acceptable by the Department. The report shall include the following information:
- a. The permittee's name and address;
 - b. The permit number;
 - c. The source(s) from which water is diverted;
 - d. The location (latitude and longitude) of each point of water diversion;

- e. Information listed in Part I E. 4.;
 - f. The method of measuring each diversion;
 - g. A summary of the dates on which the releases from the Leesville Reservoir into the Roanoke River did not meet the required volumes as determined in accordance with Part I D. 2.; and
 - h. If during a semi-annual reporting period a drought emergency is declared, the report shall include a summary of mandatory conservation measures implemented during the drought event.
8. Water withdrawal/diversion monitoring and reporting activities shall comply with this section, Part I C, and Part II General Conditions. All records and information that result from the monitoring and reporting activities required by this permit, including any records of maintenance activities to the withdrawal/diversion system, shall be retained for the life of the permit. This period of retention shall be extended automatically during the course of any unresolved litigation regarding the regulated activity or as requested by the Department.

Part II – General Conditions

A. Duty to Comply

The permittee shall comply with all conditions and limitations of the VWP permit. Nothing in this chapter shall be construed to relieve the permittee of the duty to comply with all applicable federal and state statutes, regulations, toxic standards, and prohibitions. Any VWP permit violation or noncompliance is a violation of the Clean Water Act and State Water Control Law and is grounds for enforcement action, VWP permit termination, VWP permit revocation, VWP permit modification, or denial of an application for a VWP permit extension or reissuance.

Nothing in this VWP permit shall be construed to relieve the permittee from civil and criminal penalties for noncompliance.

B. Duty to Cease or Confine Activity

It shall not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the activity for which a VWP permit has been granted in order to maintain compliance with the conditions of the VWP permit.

C. Duty to Mitigate

The permittee shall take all reasonable steps to minimize or prevent any impacts in violation of the VWP permit that may have a reasonable likelihood of adversely affecting human health or the environment.

D. VWP Permit Actions

A VWP permit may be modified in whole or in part, revoked and reissued, extended, transferred, or terminated in accordance with 9VAC25-210-180 of the Virginia Administrative Code.

1. During the drafting and authorization of a permit modification, only those conditions to be modified shall be addressed with preparing a draft modified permit. VWP permit terms and conditions of the existing permit shall remain in full force and effect during the modification of the permit.
2. This VWP permit may be modified upon the request of the permittee or upon Department initiative when any of the following developments occur:
 - a. When new information becomes available about the project or activity covered by the VWP permit, including project additions or alterations, that was not available at VWP permit issuance and would have justified the application of different VWP permit conditions at the time of VWP permit issuance;
 - b. When a change is made in the promulgated standards or regulations on which the VWP permit was based;

- c. When changes occur that are subject to "reopener clauses" in the VWP permit; or
 - d. When developments applicable to surface water withdrawals occur as specified in 9VAC25-210-380 of the Virginia Administrative Code.
3. When this VWP permit authorizes surface water withdrawals, it may be modified when any of the following developments occur:
- a. When the Department determines that minimum instream flow levels resulting directly from the permittee's withdrawal of surface water are detrimental to the instream beneficial use, existing at the time of permit issuance, and the withdrawal of surface water should be subject to further net limitations or when an area is declared a surface water management area pursuant to §§ 62.1-242 through 62.1-253 of the Code of Virginia, during the term of the VWP permit.
 - b. Significant changes to the location of the surface water withdrawal system are proposed such that the Department of Environmental Quality determines a new review is warranted due to the potential effect of the surface water withdrawal to existing beneficial uses of the new location.
 - c. Changes to the permitted project or the surface water withdrawal, including increasing the storage capacity for the surface water withdrawal, that propose an increase in the maximum permitted withdrawal volumes or rate of withdrawal or that cause more than a minimal change to the instream flow requirements with potential to result in a detrimental effect to existing beneficial uses.
 - d. A revision to the purpose of the surface water withdrawal that proposes to include a new use or uses that were not identified in the permit application or a modification of the existing authorized use or uses such that the use description in the permit application and permit is no longer applicable. Examples of uses include, but are not limited to agricultural irrigation, golf course irrigation, public water supply, manufacturing, and electricity generation.
4. When the permittee has submitted a timely and complete application for reissuance of an existing VWP individual permit, but through no fault of the permittee, the Department does not reissue or reissue with conditions a VWP individual permit or the Department does not provide notice of its tentative decision to deny the application before an existing VWP individual permit expires, the conditions of the expiring VWP individual permit shall be administratively continued in full force and effect until the effective date of a reissued permit or the date on which the Department denies the application. Timely application shall be a minimum of 180 days for an individual permit or a minimum of 270 days for an individual permit for a surface water withdrawal, unless otherwise specified in the existing permit.
5. Any permittee desiring to continue a previously permitted activity after the expiration date of this VWP permit shall apply for and obtain a new permit or, if applicable, shall request an extension in accordance with 9VAC25-210-180 of the Virginia Administrative Code. Any permittee with an effective VWP permit for an activity that is expected to continue after the expiration date of the

VWP permit, without any change in the activity authorized by the VWP permit other than as may be allowed under 9VAC25-210-180, shall submit written notification requesting an extension. The permittee must file the request 90 days prior to the expiration date of the VWP permit. VWP permit modifications shall not be used to extend the term of a VWP permit beyond 15 years from the date of original issuance. When a permit term, other than that of an Emergency Virginia Water Protection Permit, is less than 15 years, an extension of the permit terms and conditions may be granted in accordance with 9VAC25-210-180. Emergency Virginia Water Protection Permits shall not exceed a duration of one year or shall expire upon the issuance of a regular Virginia Water Protection Permit, whichever comes first.

6. This VWP permit may be transferred to a new permittee only by modification to reflect the transfer, by revoking and reissuing the permit, or by automatic transfer. Automatic transfer to a new permittee shall occur if the current permittee: a) Notifies the Department of the proposed transfer of the permit and provides a written agreement between the current and proposed permittees containing the date of transfer of VWP permit responsibility, authorization, and liability to the new permittee; and b) the Department does not within 15 days notify the existing permittee of its intent to modify the VWP permit.
7. After notice and opportunity for a formal hearing pursuant to § 62.1-44.15:02 of the Code of Virginia, a VWP permit can be terminated for cause. Reasons for termination for cause are as follows:
 - a. Noncompliance by the permittee with any condition of the VWP permit;
 - b. The permittee's failure in the application or during the VWP permit process to disclose fully all relevant facts or the permittee's misrepresentation of any relevant facts at any time;
 - c. The permittee's violation of a special or judicial order;
 - d. A determination by the Department that the permitted activity endangers human health or the environment and can be regulated to acceptable levels by VWP permit modification or termination;
 - e. A change in any condition that requires either a temporary or permanent reduction or elimination of any activity controlled by the VWP permit; and
 - f. A determination that the permitted activity has ceased and that the compensation for unavoidable adverse impacts has been successfully completed.
8. The Department may terminate this permit without cause when the permittee is no longer a legal entity due to death, dissolution, or when a company is no longer authorized to conduct business in the Commonwealth. The termination shall be effective 30 days after notice of the proposed termination is sent to the last known address of the permittee or registered agent, unless the permittee objects within that time. If the permittee does object during that period, the Department shall follow the applicable procedures for termination under § 62.1-44.15:25 of the Code of Virginia and 9VAC25-230 of the Virginia Administrative Code.

9. This VWP permit may be terminated by consent, as initiated by the permittee. The permittee shall submit a request for termination by consent within 30 days of completing or canceling all permitted activities and all required compensatory mitigation requirements. When submitted for project completion, the request for termination by consent shall constitute a notice of project completion. The director may accept this termination on behalf of the Department. The permittee shall submit the following information:
- a. Name, mailing address, and telephone number;
 - b. Name and location of the activity;
 - c. The VWP permit number; and
 - d. One of the following certifications:
 - i. For project completion: "I certify under penalty of law that all activities and any required compensatory mitigation authorized by a VWP permit have been completed. I understand that by submitting this notice of termination that I am no longer authorized to perform activities in surface waters in accordance with the VWP permit, and that performing activities in surface waters is unlawful where the activity is not authorized by a VWP permit, unless otherwise excluded from obtaining a permit. I also understand that the submittal of this notice does not release me from liability for any violations of this VWP permit."
 - ii. For project cancellation: "I certify under penalty of law that the activities and any required compensatory mitigation authorized by this VWP permit will not occur. I understand that by submitting this notice of termination that I am no longer authorized to perform activities in surface waters in accordance with the VWP permit, and that performing activities in surface waters is unlawful where the activity is not authorized by a VWP permit, unless otherwise excluded from obtaining a permit. I also understand that the submittal of this notice does not release me from liability for any violations of this VWP permit, nor does it allow me to resume the permitted activities without reapplication and issuance of another permit."
 - iii. For events beyond permittee control, the permittee shall provide a detailed explanation of the events, to be approved by DEQ, and the following certification statement: "I certify under penalty of law that the activities or the required compensatory mitigation authorized by this VWP permit have changed as the result of events beyond my control (see attached). I understand that by submitting this notice of termination that I am no longer authorized to perform activities in surface waters in accordance with the VWP permit, and that performing activities in surface waters is unlawful where the activity is not authorized by a VWP permit, unless otherwise excluded from obtaining a permit. I also understand that the submittal of this notice does not release me from liability for any violations of this VWP permit, nor does it allow me to resume the permitted activities without reapplication and issuance of another permit."

E. Inspection and Entry

Upon presentation of credentials, the permittee shall allow the Department or any duly authorized agent of the Department, at reasonable times and under reasonable circumstances, to conduct the actions listed in this section. For the purpose of this section, the time for inspection shall be deemed reasonable during regular business hours. Nothing contained herein shall make an inspection time unreasonable during an emergency.

1. Enter upon any permittee's property, public or private, and have access to, inspect and copy any records that must be kept as part of the VWP permit conditions;
2. Inspect any facilities, operations or practices (including monitoring and control equipment) regulated or required under the VWP permit; and
3. Sample or monitor any substance, parameter, or activity for the purpose of ensuring compliance with the conditions of the VWP permit or as otherwise authorized by law.

F. Duty to Provide Information

The Department may request (i) such plans, specifications, and other pertinent information as may be necessary to determine the effect of an applicant's discharge on the quality of state waters or (ii) such other information as may be necessary to accomplish the purposes of this chapter. Any owner, permittee, or person applying for a VWP permit or general permit coverage shall provide the information requested by the Department.

G. Monitoring and Records Requirements

1. Monitoring of parameters, other than pollutants, shall be conducted according to approved analytical methods as specified in the VWP permit. Analysis of pollutants will be conducted according to 40 CFR Part 136 (2017), Guidelines Establishing Test Procedures for the Analysis of Pollutants.
2. Samples and measurements taken for the purpose of monitoring shall be representative of the monitored activity.
3. The permittee shall retain records of all monitoring information, including all calibration and maintenance records and all original strip chart or electronic recordings for continuous monitoring instrumentation, copies of all reports required by the VWP permit, and records of all data used to complete the application for the VWP permit, for a period of at least three years from the date of permit expiration. This period may be extended by request of the Department at any time.
4. Records of monitoring information shall include:
 - a. The date, exact place and time of sampling or measurements;

- b. The name of the individuals who performed the sampling or measurements;
- c. The date and time the analyses were performed;
- d. The name of the individuals who performed the analyses;
- e. The analytical techniques or methods supporting the information such as observations, readings, calculations and bench data used;
- f. The results of such analyses; and
- g. Chain of custody documentation.

H. Property rights

The issuance of a VWP permit does not convey any property rights in either real or personal property, or any exclusive privileges, nor does it authorize injury to private property or any invasion of personal rights or any infringement of federal, state or local laws or regulations.

I. Reopener

This VWP permit may be reopened for the purpose of modifying the conditions of the VWP permit to meet new regulatory standards duly adopted by the board. Cause for reopening VWP permits includes, but is not limited to when the circumstances on which the previous VWP permit was based have materially and substantially changed, or special studies conducted by the board or the permittee show material and substantial change, since the time the VWP permit was issued and thereby constitute cause for VWP permit modification or revocation and reissuance.

J. Compliance with State and Federal Law

As to the permitted activity(ies), compliance with a VWP permit constitutes compliance with the VWP permit requirements of the Law and regulations.

K. Severability

The provisions of this VWP permit are severable.

L. Oil and Hazardous Substance Liability

Nothing in this VWP permit shall be construed to preclude the institution of legal action or relieve the permittee from any responsibilities, liabilities, or penalties to which the permittee is or may be subject under § 311 of the Clean Water Act or §§ 62.1-44.34:14 through 62.1-44.34:23 of the State Water Control Law.

M. Unauthorized Discharge of Pollutants

Except in compliance with a VWP permit, unless the activity is otherwise exempted or excluded, no person shall dredge, fill, or discharge any pollutant into, or adjacent to surface waters; withdraw surface water; otherwise alter the physical, chemical, or biological properties of state waters regulated under this chapter and make them detrimental to the public health, to animal or aquatic life, or to the uses of such waters for domestic or industrial consumption, for recreation, or for other uses; excavate in wetlands; or on or after October 1, 2001, conduct the following activities in a wetland:

1. New activities to cause draining that significantly alters or degrades existing wetland acreage or functions;
2. Filling or dumping; or
3. Permanent flooding or impounding.



Commonwealth of Virginia

VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY

www.deq.virginia.gov

Stefanie K. Taillon
Secretary of Natural and Historic Resources

Michael S. Rolband, PE, PWD, PWS Emeritus
Director

July 14, 2025

Minor Modification Summary Sheet

Virginia Water Protection Individual Permit No. 24-1547

Smith Mountain Hydroelectric Project, Bedford, Campbell, Franklin, Pittsylvania, and Roanoke Counties, Virginia

The Virginia Department of Environmental Quality (Department or DEQ) has reviewed the request for modification of the Virginia Water Protection (VWP) Individual Permit Number 24-1547 and has determined that the project qualifies for a Minor Modification in accordance with VWP Permit Program Regulation 9 VAC 25-210-180 E 1 and 9VAC25-210-380 B.

The following details the minor modification application review process.

1. Processing Dates:

Modification Request Received:	July 8, 2025
Request Reviewed:	July 9, 2025
Minor Modification Issued:	July 14, 2025

2. Minor Modification Description:

The modification is warranted due to the accidental omission of language required in Special Condition Part I.D.3 of VWP Permit Number 24-1547. The added language is underlined in Section 3 below.

3. Revisions to Part I - Special Conditions:

Special Condition Part I.D.3 was revised to state the following: “The permittee shall run a forecast-based simulation model at least once every three (3) days and evaluate the probability of Smith Mountain Lake being at a certain elevation in the future. Trigger 1 will activate when there is a twenty percent (20%) chance of dropping below 790.5’ (adjusted) in 16 weeks. Trigger 2 will activate when there is a two percent (2%) chance of dropping below 790’ (adjusted) in ten (10) weeks. Trigger 3 will activate if Trigger 2 is in effect and Smith Mountain Lake is less than 795’ (adjusted) between December 1 and March 31, or anytime the adjusted elevation dropped below 791.0’ after September 30. All triggers are lifted if the elevation has reached 795’ (adjusted) and there is less than a 2% chance of dropping below 790.5’ (adjusted) sixteen weeks from that time.”

PERMIT DECISION RATIONALE

Virginia Water Protection Individual Permit No. 24-1547

Smith Mountain Hydroelectric Project, Bedford, Campbell, Franklin, Pittsylvania, and Roanoke Counties,
Virginia

This document provides the pertinent information concerning the legal basis, scientific rationale, and justification for the reissuance of the VWP permit listed below. The Department of Environmental Quality (Department or DEQ) has reviewed the application for the Virginia Water Protection (VWP) Individual Permit Number 24-1547 and has determined that the project qualifies for an individual permit. Based on the information provided in the application and in compliance with (§ 401 of the Clean Water Act as amended (33 USC 1341 et seq.)) the State Water Control Law and regulations, the Department has determined that there is a reasonable assurance that the activity authorized by this permit will protect instream beneficial uses, will not violate applicable water quality standards, and will not cause or contribute to significant impairment of state waters or fish and wildlife resources, provided the permittee complies with all permit conditions. Surface water impacts have been avoided and minimized to the maximum extent practicable.

Approved:



Bryant Thomas
Interim Director, Water Division

07/07/2025
Date

The following details the application review process and summarizes relevant information for developing the Part I - Special Conditions for permit issuance.

1. Contact Information:

Permittee / Legal Responsible Party

Appalachian Power Company
Attn: Brannon Littleton, Plant Manager
40 Franklin Road SW
Roanoke VA 24011
bjlittleton@aep.com

Facility Name and Address

Smith Mountain Hydroelectric Project
Smith Mountain Dam: 2072 Ford Road, Sandy Level, VA 24161
Leesville Dam: Taylor Ford Road, Gretna, VA 24557

Agent Legal Name and Address:

American Electric Power Service Corporation
Attn: Jonathan Magalski, Environmental Manager
1 Riverside Plaza
Columbus Ohio 43215
(614) 716-2240
jmmagalski@aep.com

2. JPA Processing Dates:

Pre-Application Meeting Held:	April 24, 2024
Received Application:	July 2, 2024
1 st Request for Additional Information Sent:	July 17, 2024
Letters sent to Local Government(s):	July 26, 2024
Letters sent to Tribal Nations:	July 26, 2024
Response to 1 st Request for Additional Information Received:	August 1, 2024
Permit Fee Deposited by Accounting:	August 5, 2024
2 nd Request for Additional Information Sent:	August 7, 2024
Response to 2 nd Request for Additional Information Received:	August 8, 2024
Application Complete:	August 8, 2024
Coordination with VDH, VDWR, VDCR, VMRC:	August 8, 2024
Letters sent to Riparian Landowners:	August 13, 2024
Draft Permit Package Issued:	December 19, 2024
Public Notice Published:	March 4, 2025 & March 5, 2025
Notification of Public Notice sent to Local Government:	March 4, 2025
Received Verification of Publication:	March 5, 2025
End of 30-Day Public Comment Period:	April 4, 2025

3. Project Location:

The Smith Mountain Hydroelectric Project is located on the Roanoke River at River Mile 314 through River Mile 296, approximately 25 miles southeast of the Town of Roanoke. The Project spans Bedford, Campbell, Franklin, Pittsylvania, and Roanoke Counties in Virginia.

City/County: Bedford, Campbell, Franklin, Pittsylvania, and Roanoke Counties

Waterbody: Smith Mountain Lake, Leesville Lake

Basin: Roanoke River

Subbasin: Upper Roanoke River

Section: 6h

Class: IV

Special Standards: PWS

HUC: 030101011301, 030101011302

U.S.G.S. Quadrangle: Smith Mountain Dam and Leesville

4. Project Description:

Appalachian Power Company (Appalachian or Applicant), a unit of American Electric Power (AEP), is the owner and operator of the existing Smith Mountain Hydroelectric Project (Project). The Project consists of two (2) developments, the Smith Mountain Development (Smith Mountain), a pumped storage hydroelectric station, and the Leesville Development (Leesville), a conventional hydroelectric station. The Project diverts flows used to generate an annual average of 636,000 megawatt (MW) hours of renewable electricity. Diversions are considered a surface water withdrawal under 9VAC25-210-300 and the terms “diversion” or “withdrawal” will be used interchangeably. No new facility structures, modifications to existing structures, or jurisdictional impacts are proposed as part of the application. Should any new facility structures be proposed during the permit term, determined necessary by the result of required studies, the permit may be required to go through the modification process per regulation 9VAC25-210-380.

The Project is currently licensed by the Federal Energy Regulatory Commission (FERC) under FERC Operating License P-2210. FERC issued the original license for the Project on April 1, 1960, with the current FERC license expiring on March 31, 2040. Appalachian is requesting to continue operation of the Project as authorized under VWP Permit No. 08-0572 and current FERC Operating License P-2210 with no proposed changes.

Existing Water Supply System

The Smith Mountain Hydroelectric Project was constructed in the 1960s and all water used for power generation is diverted and passed through the powerhouses or over existing spillways at the Smith Mountain Lake Dam or the Leesville Dam. The Project utilizes Smith Mountain Lake and Leesville Lake, both located in the Roanoke River Basin. Water is released from Smith Mountain Lake to Leesville Lake during periods of high electrical demand and water is pumped back from Leesville Lake to Smith Mountain Lake when electrical demand is low. A minimum release is maintained below Leesville Dam to the Roanoke River year-round.

Power generated by the Project is used to meet peak energy demands for the PJM (Pennsylvania, New Jersey, Maryland) regional transmission organization. Power generation is based on demand for electricity with no set schedule of operation.

Smith Mountain Development

The Smith Mountain Development includes the Smith Mountain powerhouse, a concrete structure immediately downstream from the toe of the dam, containing five (5) generating units that have a combined generating capacity of 586 MW and a maximum combined hydraulic capacity of 47,000 cubic feet per second (cfs). Water is conveyed to the units in the Smith Mountain powerhouse through separate intakes and penstocks (Table 1), all equipped with trash-racks. Wheeled headgates are used to seal the intakes and control flow through the penstocks to the units.

The Smith Mountain Lake Dam is 235 feet (ft) tall and 816 ft long concrete arch dam with two (2) 100 ft long ogee crest spillways, each spillway consisting of two (2) 50 ft long openings separated by a pier. Smith Mountain Lake has a surface area of 20,260 acres with a gross storage capacity of 1,082,480 acre-ft, and under normal conditions, is maintained at an elevation of 795 ft above mean sea level (AMSL). The Smith Mountain Development also contains a 600,000 kilovolt-ampere (kVA) substation and double circuit, 138-kilovolt (kV) tie-in lines that vary in length from 946 feet to 998 feet.

Table 1: Smith Mountain Intakes, Penstocks, and Unit Parameters

Intake/Penstock/Unit No.	Penstock Intake Invert Elevation (feet)	Penstock Diameter (feet)	Unit Type
1	655	20	Pump-turbine generator
2	737	26	Turbine generator
3	737	26	Pump-turbine generator
4	737	26	Turbine generator
5	600	20	Pump-turbine generator

Mean flows through the Smith Mountain Development are estimated at 1,211 cfs. The flow from generating units is released to the tailrace directly into Leesville Lake. When Smith Mountain is generating electricity, Smith Mountain Lake’s level can decrease up to two (2) feet before Leesville Lake becomes full. In other words, a two (2) foot decrease in Smith Mountain Lake results in Leesville Lake increasing 13 ft or from a minimum elevation of 600 ft AMSL to a maximum elevation of 613 ft AMSL. Once Leesville Lake is full, power cannot be produced at the Smith Mountain powerhouse until some portion of the water is pumped back to Smith Mountain Lake or released through the Leesville Dam.

Leesville Development

The Leesville Development includes the Leesville Dam, a 94 ft tall, 980 ft long concrete gravity dam with four (4) gated spillway sections with 50 ft wide by 35 ft high Tainter gates in each section, and two (2) non-overflow sections. The spillway is 269 ft long with a crest elevation of 578 ft AMSL. The Leesville powerhouse, a reinforced concrete structure integrated with the intakes, is approximately 111 ft long and a maximum height of approximately 92 ft, has two (2) generating units with an invert elevation of 580 ft AMSL, a combined generating capacity of 50 MW, and a total combined maximum hydraulic capacity of 9,000 cfs. Water is conveyed to the units in the Leesville powerhouse through separate intakes equipped with trash racks. Flow is conveyed to each unit through two (2) penstocks formed within the concrete intake monolith and controlled using four-wheeled head gates, two (2) for each unit. The flow from

generating units is discharged through two (2) draft tubes to the tailrace in the Roanoke River. The Leesville Reservoir has a surface area of 3,260 acres and a gross storage capacity of 89,210 acre-ft. The Leesville powerhouse also contains a 50,000 kVA substation and a 317 ft long, double circuit, 138-kV tie-in line.

Leesville Lake levels fluctuate within a 13-foot operating band. To the extent that inflows allow, Appalachian stores additional water in Leesville Lake so that the adjusted elevation equals 795.3 feet AMSL in Smith Mountain Lake by April 15th of each year. The extra 0.3 ft of storage is intended to be used to help ensure the success of the striped bass spawning run, which ends April 15th.

Studies required for the Project as part of VWP Permit No. 08-0572

1. Auto-cycling vs. continuous release study: The study was required to determine the relative impact of providing streamflows through hourly auto-cycling as compared to continuous releases and to investigate the potential effects of hourly auto-cycling releases on bank erosion, water quality, fishery and benthic habitat, recreation, public safety, or other factors determined. The study was developed in consultation with DEQ, the Department of Wildlife Resources (DWR, previously DGIF), the Citizens for the Preservation of the River, and the Tri-County Re-licensing Committee. Appalachian submitted the study plan in 2010 and included the following components: 1) contacting and interviewing landowners with property along the river between Leesville Dam and the confluence of Goose Creek to identify concerns pertaining to hourly auto-cycle operations, 2) to determine the magnitude of water level changes, including rates of rise and fall, occurring downstream of Leesville Dam as a result of hourly auto-cycling operations, 3) to evaluate effects on public safety and recreation, including angling, resulting from changes in water conditions associated with auto-cycling, 4) to assess changes in aquatic habitat associated with hourly auto-cycling compared to continuous flow, and assess fish and macroinvertebrate responses, 5) to evaluate erosion potential resulting from both types of operation, 6) determine effects of both types of operations on dissolved oxygen (DO) levels, 7) to evaluate the effectiveness of re-vegetating shorelines as a bank stabilization measures at selected active erosion sites downstream of Leesville Dam, 8) the effects of auto-cycling on Roanoke Logperch, and 9) to conduct a feasibility evaluation on the ability to add a minimum flow to Leesville Dam.
2. Dissolved Oxygen Monitoring Plan: During periods of natural thermal stratification, the deeper portions of the Smith Mountain Lake water column have low DO levels and cooler water temperatures. The DO Monitoring Plan was required to evaluate alternatives to increase DO levels in Smith Mountain releases to Leesville Lake. See Special Condition E. 2., requiring an additional study to monitor and ensure improvement of depressed DO levels. See *Section 15: Changes in Permit Part I- Special Conditions Due to Public Comments* below for additional information on the required plan.
3. Feasibility Study Plan: Plan was required to evaluate physical or mechanical alterations of water release procedures to increase DO levels in releases from Smith Mountain Lake and eliminate exceedances of water quality standards for DO. The Plan was developed in consultation with the Water Quality Technical Review Committee (WQTRC). The Plan was broken into two (2) phases: Phase 1- feasibility of operational methods and Phase 2- feasibility of physical aeration methods. Phase 1 included the following considerations: 1) continue to use the “first on, last off” operating protocol (See No. 6: Water Quality Management Plan in FERC required studies below for definition of the first on, last off method), but consider an extension from October 31 to November

15, 2) alter generation and pump-back schedules during critical periods, 3) continue to evaluate protocols for flushing units that consider timing and/or duration when using Units 1 or 5, as well as the need to operate additional units and modify as necessary, 4) modify protocols and use the low DO alarm that was set up in late 2014 and utilize the information to make timely responses of low DO occurrences, and 5) to explore options for providing real-time calculation of daily average DO values. Phase 2 included the consideration of turbine venting, auto-venting turbines, reservoir porous house diffuser system, surface water pumps, aerating weir, forced air, hypolimnetic cone oxygenation, and modified side-stream oxygen supersaturation. The Feasibility Study was completed in 2021. No measure was identified that could potentially improve the DO levels to meet water quality standards 100% of the time. Special Condition E. 2. requires additional study and the implementation of a method(s) to improve DO levels below Smith Mountain Lake Dam. See *Section 15: Changes in Permit Part I- Special Conditions Due to Public Comments* below for additional information on the required plan.

Studies required for the Project as part of FERC License P-2210

1. Water Management Plan (WMP): The plan was developed in consultation with DEQ, DWR, the Virginia Department of Conservation and Recreation (DCR), the U.S. Army Corps of Engineers (USACE), the U.S. Fish and Wildlife Service (USFWS), the Tri-County Lake Administrative Commission (TLAC), Smith Mountain Lake Association (SMLA), Leesville Lake Association (LLA), the Roanoke River Association (RRBA), and Dominion Power. The plan was approved in 2011, with the purpose to address water management activities at the Smith Mountain Project. The plan includes stipulations from VWP Permit Special Conditions and FERC license requirements.
2. Shoreline Management Plan: The purpose of the plan is to provide guidelines and processes for managing shoreline development within the respective FERC Project boundaries for Smith Mountain and Leesville Lakes. The plan also ensures the protection and enhancement of the Project's recreational, environmental, cultural, and scenic resources and the Project's primary function of producing electricity. Through implementation of the plan and the permitting processes, Appalachian provides for the protection of streambed and riparian areas, wetlands, habitat and spawning areas, shoreline aesthetics, and shoreline cultural resources.
3. Aquatic Vegetation Management Plan: The goal of the plan is to ensure that Submerged Aquatic Vegetation (SAV), particularly invasive species, do not increase to nuisance levels in Smith Mountain or Leesville Lake. The plan includes a monitoring component, consultation process, and control measures to be done, with status reports due every five (5) years.
4. Recreation Management Plan: The plan addresses recreation management activities for the existing recreational facilities, as well as proposed recreational sites. The plan was developed in consultation with DWR, DCR, SMLA, LLA, Franklin County, and the Recreation Technical Review Committee.
5. Roanoke Logperch Enhancement Plan: The Plan requires Appalachian to collaborate with DWR to develop habitat restoration and species reintroduction projects related to the recovery of the Roanoke Logperch in the upper Roanoke Watershed. Appalachian meets at least annually with the USFWS and DWR to identify projects and files a progress report with FERC every five (5) years. In the most recent filing, Appalachian has provided funding to support stream restoration efforts,

stream and riverbank stabilization, stream hydraulic improvements, installation of cattle exclusion fencing, and biological studies.

6. Water Quality Management Plan: The goal of the plan is to provide a means to ensure that the observed low DO levels in the tailrace of the Smith Mountain Development are mitigated to the greatest extent practicable by the order in which units are brought online. Appalachian implements a “first on, last off” operating mode at the Smith Mountain Development for units with intakes higher in the water column. In this mode, Appalachian prioritizes the use of Units 2, 3, and 4 over Units 1 and 5 during the months of July through November 15th. The intakes for Units 2,3, and 4 are higher in the water column where higher DO levels are expected during the stratification period. Therefore, water passing through Units 2, 3, and 4 presumably have higher DO levels than water passing through Units 1 and 5. This goal of this operational mode is to meet state standards of 4.0 milligrams per liter (mg/l) on an instantaneous basis and a 5.0 mg/l as a daily average in the Smith Mountain Dam tailwaters. Annual monitoring of water quality on Smith Mountain Lake occurs at least monthly between June 1 and September 20, monitoring total phosphorus, chlorophyll-a, and Secchi depth at 26 sites, and E. coli sampling at 14 sites. In addition, water quality monitoring is conducted within tributaries to Smith Mountain Lake as well as sites downstream of Smith Mountain Lake in Leesville Lake. Leesville Lake is monitored for total phosphorus, DO, and Secchi depth at six (6) sites, chlorophyll-a monitoring at three (3) of those six (6) sites, and E. coli sampling at seven (7) sites. The results are shared annually with stakeholders.
7. Erosion Monitoring Plan: Plan requirements include shoreline monitoring at seven (7) sites, (five (5) at Smith Mountain Lake and two (2) at Leesville Lake) every five (5) years to compare shoreline profiles with 2007 profiles. In addition, Appalachian has two (2) shoreline stabilization projects and riverbank erosion monitoring at ten (10) sites between Leesville Dam and Altavista.
8. Habitat Management Plan: The plan includes guidelines for mitigating the loss of habitat due to the construction within the Project boundary, with reports due every five (5) years. The plan includes monitoring of mitigation measures associated with shoreline habitat, enhancement activities, inspection of habitat enhancement areas, and public environmental education activities.
9. Island Management Plan: The plan was developed to be consistent with the requirements of the Recreation Management Plan. Components of the plan included public recreation, shoreline resources including soil compaction, erosion, water quality associated with sanitation, and Endangered Species Act-listed species. The initial tasks associated with the plan are complete and the only remaining activity is an annual review of island resource management with the Recreation Technical Review Committee.
10. Sedimentation Monitoring Plan: The plan requires Appalachian to conduct a sediment survey every five (5) years. The monitoring report identifies actions to address impacts of sedimentation on public access sites, actions to be taken by the Erosion/Sediment Technical Review Committee, identification of measures and actions to be implemented, identification of impacts of sediment deposits on Project operation and actions to address such impacts, and comments from the Technical Review Committee. Appalachian is currently monitoring sediment at 24 sites. The survey sites with the greatest amount of sedimentation since 2005 are located on the upper reaches of the Pigg River and Blackwater River associated with non-Project activities.

11. Debris Management Plan: To maintain boating opportunities and public safety on both Smith Mountain and Leesville Lakes, Appalachian coordinates with the Tri-County Association and the Leesville Lake Association to remove debris floating on the surface of the lakes, including public swimming beaches, recreation facilities, and other areas as appropriate. The program operates from Memorial Day to Labor Day for the purpose of removing debris on an as-needed basis. The plan establishes methods and procedures for removing debris, clarifies roles and responsibilities, establishes a procedure for managing debris considered beneficial as aquatic habitat, establishes a procedure for identifying off-load and disposal sites for debris, and establishes a Debris Technical Review Committee.
12. Aids to Navigation Management Plan: The plan requires Appalachian to mark and maintain a defined navigation channel under various water levels on both Smith Mountain and Leesville Lakes, cooperate with the Tri-County Association in marking obstructions outside of the defined waterway, provide an educational program, produce navigation maps, and form an Aids to Navigation Technical Review Committee. In addition, Appalachian is to install and maintain a lighted navigation system on Leesville Lake, subject to DWR and U.S. Coast Guard approval.

5. Project Purpose & Need:

Purpose of Water Uses and Basis of Need

The purpose of the diversion is for power generation and to obtain a new Section 401 Water Quality Certification. Pursuant to 9VAC25-210-260, the Applicant has demonstrated that the Project meets an established need for water diversion to meet the project purpose.

Water Need: Demand Projection

The Department permits water withdrawals to meet the justified water demands over the 15-year permit term. The Department evaluated the Applicant's demand projections from the Joint Permit Application (JPA) and supplemental information. The demand for the Project is based on minimum instream flows and not limited by volume.

6. Alternatives Evaluated to Meet the Water Need (Least Environmentally Damaging Practicable Alternative):

Pursuant to 9VAC25-210-360 3 C, the applicant is required to evaluate each alternative for the purpose of establishing the least environmentally damaging practicable alternative. Appalachian analyzed the following three (3) alternatives during the development of the current FERC license and previous VWP permit:

1. No-Action Alternative: A continuation of the operation of the Project as authorized under the first FERC license.
2. Appalachian's Proposal: Appalachian proposed to implement additional environmental measures including the Water Management Plan (WMP); an Erosion Monitoring Plan; a Sediment Monitoring Plan; a Water Quality Management Plan; funding to both the Smith Mountain Lake Association and Leesville Lake Association to support water quality monitoring; a Roanoke Logperch Enhancement Plan; a Habitat Management Plan; an Aquatic Vegetation Management

Plan; a Recreation Management Plan; the Aids to Navigation Management Plan; a Debris Management Plan; continued implementation of the Shoreline Management Plan; and a Historic Properties Management Plan.

3. FERC Staff Proposal: The FERC proposal included Appalachian's proposed environmental measures as modified by mandatory conditions and FERC staff recommendations, including VWP requirements.

The FERC Staff Proposal, or continued operation as authorized under their current FERC license, with no proposed changes was determined to be the least environmentally damaging practicable alternative.

7. Evaluating Water Withdrawal Volumes Based on Beneficial Use Impacts and Flow-by/Release Requirements:

§ 62.1-11 E establishes that the "right to the use of water or to the flow of water in or from any natural stream, lake or other watercourse in this Commonwealth is and shall be limited to such water as may reasonably be required for the beneficial use of the public to be served." The Department is directed by § 62.1-44.15:22 to establish limits that preserve instream flow "to the volume of water that may be withdrawn as a part of the permitted activity and conditions necessary to protect beneficial uses." Pursuant to 9VAC25-210-370 B 3, the Department shall take into consideration the combined effect on the hydrologic regime of the surface water within an affected stream reach due to consumptive water uses in the development of instream flow conditions for new withdrawals. Further, 9VAC25-210-370 D 1 requires a determination that the amount of the surface water withdrawal is limited to the amount of water that can be put to beneficial use.

Department Recommended Withdrawal Limitations

The permit limits surface water withdrawals to the volume justified based upon the application materials submitted and modeling analyses. The Department concluded that the water demand and statement of need is reasonable and has been adequately justified by the application through the information submitted in the VWP permit application process. The Department has determined the proposed withdrawal volumes for the project, as limited in the permit, complies with applicable standards identified in 9VAC25-210-370 D 1.

Return Flow / Consumptive Use

There is no consumptive use of water as one hundred percent (100 %) of withdrawals will flow through the powerhouses or the spillway(s) and are returned to the Roanoke River, Smith Mountain Lake, or Leesville Lake.

Cumulative Impact Analysis (CIA)

A cumulative impact analysis was conducted by the Department on flow-by requirements, the current water diversion system, and cumulative impacts to existing beneficial uses and existing water users. Based upon the results of the analysis, the Department determined the proposed project as limited in the draft permit, will protect existing beneficial uses while meeting the applicant's purpose and need.

The full Department staff modeling analysis is attached to this document (Attachment A).

Flow-by and Release Requirements

Appalachian uses the Roanoke River Basin Reservoir Operations Model (RRBROM) to provide forecasts of Smith Mountain Lake Level trends based on the historic record of inflows (1930-present). During forecasted periods of low inflow, as described in the Water Management Plan (WMP), Appalachian adjusts Leesville discharge flows to achieve a balance between maintaining Smith Mountain Lake levels and flow requirements needed to maintain downstream fishery and recreation resources.

Probability-based triggers, based on the ensemble forecasts, are used so Appalachian can reduce flow earlier but to a lesser degree than what occurred during low inflow periods under the previous FERC license. This is intended to keep lake levels and downstream flows higher for a longer period of time instead of waiting until lake levels drop too low and subsequently reducing downstream flows more severely. The Leesville average hourly discharge is reduced if the forecasted Project inflow reaches a predetermined "Trigger" condition (Table 2). Triggers are activated when the forecasted lake level has an "X" percent chance of reaching a level of "Y" within "Z" week.

The three (3) trigger levels (Table 2) enable Appalachian to act early, looking out four (4) months, to reduce flows with the goal of limiting additional reductions. During multiyear, extreme drought situations, additional steps may need to be taken to mitigate the low inflow impacts to the lake level and downstream areas. In these circumstances, Appalachian plans to seek a variance.

Information provided by the Department of Wildlife Resources (DWR) as well data from both the Instream Flow Needs Study conducted during the FERC relicensing was used to formulate the monthly downstream flows from Leesville to maintain aquatic habitat for species of concern (Table 3). DWR provided information related to the required flows for downstream aquatic habitat needs by month and a minimum ("Floor") for each month based on the weighted useable area / physical habitat index curves produced as part of the Instream Flow Needs Study for the species of concern.

Table 2: Trigger Points and Reduction in Flows

Trigger	Conditions for Activation	Flow Reduction at Brookneal Gage
Trigger 1	Forecasted lake level has a 20% chance of dropping below 790.5 feet AMSL, adjusted in 16 weeks	85% of the monthly Minimum Flow at Brookneal (Normal conditions- no trigger events in effect) or "Floor" Flow, whichever is larger
Trigger 2	Forecasted lake level has a 2% chance of dropping below 790 feet AMSL, adjusted in 10 weeks	"Floor" Flow at Brookneal
Trigger 3	If Trigger 2 is in effect and adjusted elevation is less than 795 feet AMSL between December 1 and March 31 or anytime the adjusted elevation drops below 791 feet after September 30	70% of monthly Minimum Flow at Brookneal (Normal conditions- no trigger events in effect)

These flows are measured at the United States Geological Survey (USGS) gage No. 02062500 at Brookneal, Virginia, located approximately 40 miles downstream of Leesville Dam, which captures river flows from Leesville powerhouse and from the local drainage area (i.e. downstream side flows). The floor flow represents the maximum acceptable deviation from the recommended flows by month at Brookneal during extended low inflow conditions. There is also a minimum average hourly flow, by month, to be released from the Leesville powerhouse regardless of the flow at the Brookneal gage (Table 3). The minimum average hourly flows from Leesville powerhouse are intended to ensure aquatic habitat is maintained downstream of the Leesville powerhouse regardless of the distribution of side flow inputs during any given time. All triggers are lifted if Smith Mountain Lake elevation has reached 795 ft AMSL and there is less than a 2 percent (2%) chance of falling below 790.5 feet sixteen weeks from that time.

Appalachian releases water at Leesville in an attempt to meet the target flows listed in Table 3. Units at Leesville are operated on a one-hour auto-cycling basis. If the units are out of service, the release may be made by spillway gate or other alternative methods available.

As mentioned above, target flows are measured at the downstream Brookneal USGS gage. Appalachian estimates tributary flows between Leesville and Brookneal when running the forecasting model and uses these estimates to determine releases from Leesville. Appalachian runs the forecast-based simulation model at least once every three (3) days to evaluate the probability of being at a certain elevation in the future. Appalachian monitors adjusted storage levels in both lakes, inflow into the Project, downstream flows between Leesville powerhouse and Brookneal, and releases from the Project into the Roanoke River on a daily basis. Appalachian is proposing the continuation for these requirements for VWP Permit No. 24-1547.

Table 3: Downstream Flow Requirements

Month	Minimum Discharge at Leesville (avg hourly cfs)	Minimum Flow at Brookneal (cfs)				Species of Concern
		Normal	Trigger 1	Trigger 2	Trigger 3	
January	375	1100	990	990	770	Walleye- spawning habitat
February	375	1100	990	990	770	Walleye-spawning habitat
March	400	1100	935	825	770	Sucker-spawning habitat
April	400	1500	1275	1200	1050	Striped bass and American shad- habitat and fish passage/attraction
May	400	1500 ⁴	1275	1200	1050	Striped bass and American shad- habitat and fish passage/attraction
June	400	900 ^{1,5}	765 ^{2,6}	765 ^{3,6}	630 ³	Smallmouth bass and American Shad- reproductive success
July	400	700 ¹	595 ^{2,7}	560 ^{3,7}	490	550 cfs represents the minimum acceptable flows for all species

August	400	650 ¹	570 ⁷	570 ^{3,7}	420	550 cfs represents the minimum acceptable flows for all species
September	400	550	550 ⁷	550 ⁷	385	550 cfs represents the minimum acceptable flows for all species
October	400	600	570 ⁷	570 ⁷	420	550 cfs represents the minimum acceptable flows for all species
November	375	700	595	560	490	550 cfs represents the minimum acceptable flows for all species
December	375	800	720	720	560	Flows > than 700 cfs-winter habitat for all species and to transition to Jan/Feb flows

Notes:

1. Minimum release at Leesville of 650 cfs in terms of an average hourly flow.
2. The minimum release of 650 cfs at Leesville will be made on Saturdays and Sundays and on Memorial Day, July 4th, and on Labor Day for recreation. Appalachian times the release so that it arrives at Long Island (approximately 30 miles downstream of the Leesville Dam powerhouse) at 8 AM on Saturday and subsides at Brookneal at 8 PM on Sunday.
3. A minimum release of 650 cfs will be made at Leesville for 12 hours timed to arrive at approximately sunrise at Long Island on Saturdays and on Memorial Day, July 4th, and Labor Day.
4. Upon notification by DWR that striped bass spawning is complete, Appalachian may reduce releases and only be required to make release for the June normal target of 900 cfs.
5. The maximum release Appalachian is required to release in an attempt to hit the target flow at Brookneal is 700 cfs.
6. The maximum release Appalachian is required to release in an attempt to hit the target at Brookneal is 650 cfs.
7. The maximum release Appalachian is required to release in an attempt to hit the target at Brookneal is 480 cfs.

Inflows to Smith Mountain Lake and Leesville Lake are developed from data available from the USGS gaging sites in Table 4 below.

Table 4: USGS Gages used to calculate Project inflows

River	Gage Number
Roanoke River at Roanoke	02055000
Back Creek near Dundee	02056650
Blackwater River near Rocky Mount	02056900
Blackwater River near Union Hall	02057000
Pigg River at Sandy Level	02058400
Pigg River near Toshes	02058500

8. Water Supply Plan Review:

The Department is required by § 62.1-44.15:20 C to give full consideration to any relevant information contained in the state water supply plan described in Subsection A of § 62.1-44.38:1. The water supply

plans (WSP or Plan(s)) used, submitted for Bedford County, Campbell County, Franklin County, Pittsylvania County, and Roanoke County were developed in accordance with the Water Supply Planning Regulation 9VAC25-780. These plans provided the basis of review for the proposed project.

Smith Mountain Lake is a primary water source identified in both the Region 2000 (2011) and Roanoke Valley Alleghany Regional Commission (2011) Water Supply Plans (see WSP p.3 and Section 4 p.4-5, respectively). Smith Mountain Lake was also included as a highest rated alternative within both WSPs (see WSP p.332 and Section 9 p.9-16, respectively). The continued preservation and consideration of Smith Mountain Lake as a water source for the region is integral to planning for projected long-term deficits in water supply expected in Bedford, Campbell, and Franklin counties.

Smith Mountain Hydroelectric Project is not included in the Region 2000 WSP (2011), the Roanoke Valley Alleghany RC WSP (2011), or the West Piedmont PDC WSP (2011). Water Supply Plan demand projections for the facility were not included in the applicable Plans and could not be considered in the evaluation of the permit request. The applicable Water Supply Plans state that existing sources for Bedford County, Campbell County, and Franklin County were not projected to meet demands through 2060. The applicable Water Supply Plans state that existing sources for Roanoke County and Pittsylvania County were projected to meet demands through 2060. As a diversion used for hydropower generation, no demand projection information can be applied.

9. Surface Water Impacts:

There are no jurisdictional impacts associated with the permit renewal.

Water quality impacts are expected to be temporary and minimal provided the permittee abides by the conditions of the permit. A loss of state waters shall occur. However, the impacts have been avoided and minimized to the greatest extent practicable.

10. Compensation for Unavoidable Impacts:

No compensation is required as there are no impacts proposed.

11. Site Inspection:

A site visit was not deemed necessary by the Department.

12. Relevant Regulatory Agency Comments:

As required by § 62.1-44.15:20 C and the Joint Permit Application (JPA) review process, the Department consulted the appropriate state regulatory agencies and coordinated with various federal regulatory agencies. Agencies had 45 days to submit written comments on the proposed permit application after notification by the Department. All written agency comments received were given full consideration and addressed in the VWP individual permit Part I - Special Conditions.

Summary of State Agency Comments and Actions

By email dated August 8, 2024, comments were requested from the following state agencies: Virginia Department of Wildlife Resources (DWR), Virginia Department of Conservation and Recreation (DCR),

Virginia Marine Resources Commission (VMRC) and the Virginia Department of Health (VDH). Failure to provide comments within 45 calendar days of the Department request for comments infers that the agency has no comments on the project activities. Comments were not received from VMRC or VDH.

Virginia Department of Conservation and Recreation (DCR)

DCR provided the following comments in a memorandum dated September 23, 2024. The comments provided are summarized below:

- DCR's Division of Natural Heritage searched its Biotics Data System for occurrences of natural heritage resources from the area outlined on the submitted map. Natural heritage resources are defined as the habitat of rare, threatened, or endangered plant and animal species, unique or exemplary natural communities, and significant geologic formations.
- Leesville Dam: According to DCR's files, the Leesville Dam- Roanoke River Stream Conservation Site (SCS) is within the project area, downstream of the impoundment. SCSs encompass stream/river reaches, water bodies, and terrestrial contributing areas containing or associated with aquatic or semi-aquatic resources, including upstream and downstream reaches and tributaries up to 3-km stream distance from the aquatic resources. The size and dimensions of an SCS are based on the hydrology of the waterway and surrounding landscape, taking into consideration dam locations and whether the waterway is tidal. SCSs are also given a biodiversity significance rating (B-rank) based on the rarity, quality, and number of element occurrences they contain.
- The Leesville Dam- Roanoke River SCS has been given a B-rank of B2, which represents a site of high significance. The natural heritage resource associated with this SCS is: *Percina rex* (Roanoke Logperch).
- Roanoke Logperch is endemic to the Roanoke and Chowan River drainages in Virginia and inhabits medium and large, warm and usually clear rivers with sandy to boulder spotted bottoms. Please note that this species is classified as endangered by the United States Fish and Wildlife Service (USFWS) and the Virginia Department of Wildlife Resources (VDWR).
- The Roanoke Logperch is threatened by channelization, siltation, impoundment, pollution, and de-watering activities.
- In addition, the Roanoke River has been designated by DWR as a "Threatened and Endangered Species Water" for the Roanoke Logperch. Due to the legal status of the Roanoke logperch, DCR supports continued coordination with the USFWS and DWR, Virginia's regulatory authority for the management and protection of this species to ensure compliance with protected species legislation, as stated on page 69 of the Joint Permit Application.
- Smith Mountain Dam: Biotics documents the presence of natural heritage resources within the project boundary including a 100 ft buffer. However, due to the scope of the activity DCR does not anticipate that the project will adversely affect the natural heritage resources.

- Under a Memorandum of Agreement established between the Virginia Department of Agriculture and Consumer Services (VDACS) and DCR, DCR represents VDACS in comments regarding potential impacts on state-listed threatened and endangered plant and insect species. The current activity will not affect any documented state-listed plants or insects.
- There are no State Natural Area Preserves under DCR's jurisdiction in the project vicinity.

Staff Actions/Responses are summarized below:

- *As part of FERC License P-2210, Appalachian is required to collaborate with DWR to develop habitat restoration and species reintroduction projects related to the recovery of the Roanoke Logperch in the upper Roanoke Watershed as part of their Roanoke Logperch Enhancement Plan. Appalachian meets at least annually with the USFWS and DWR to identify projects and files a progress report with FERC every five (5) years. Appalachian will continue to coordinate with USFWS and DWR for the management and protection of the Roanoke Logperch to ensure compliance with protected species legislation.*

Virginia Department of Wildlife Resources (DWR)

DWR provided the following comments in an email dated and received October 24, 2024. The comments provided are summarized below:

- Based on the scope and location, DWR does not anticipate a result in significant adverse impacts upon listed species or designated resources under their jurisdiction.
- To minimize impacts upon aquatic species from impingement and entrainment, DWR recommends that the intake be fitted with a 1mm mesh screen, and that the intake velocity does not exceed 0.25 fps.
- In addition, to ensure continued access to necessary instream habitats by resident aquatic species, we recommend that the intake not withdraw more than 10% of instantaneous flow.

Staff Actions/Responses are summarized below:

- *When the Project is in operation, all water used for power generation is diverted and passed through the powerhouses or over existing spillways at the Smith Mountain Lake Dam or the Leesville Dam. Therefore, the project is considered non-consumptive, negating the need to put a limit on instantaneous flow as all water that is diverted is then returned immediately to the waterbody. The Project does not have an intake or screens as seen used for public water supplies etc. but instead passes water through powerhouses to generate electricity.*

Summary of Federal Agency Comments and Actions

By email dated August 8, 2024, comments were requested from the following federal agencies: FERC and the U.S. Army Corps of Engineers (USACE). Comments were not received from FERC or USACE.

13. Public Involvement during Application Process:

Pre-Application

A virtual pre-application meeting was held on April 24, 2024, with Appalachian staff and Department staff to discuss application requirements prior to submission.

Riparian Landowner Notification

The Department notified riparian landowners located adjacent to and within one-half mile downstream of the Smith Mountain Lake Dam and the Leesville Dam by letter dated August 13, 2024. No responses were requested or received.

Local Government Notification

The Department notified County Administrators of Bedford, Campbell, Franklin, Pittsylvania, and Roanoke Counties of the Joint Permit Application via email on July 26, 2024. No responses were requested or received.

Tribal Nations Notification

The Department issued a Notice of Proposed Project Letter via email on July 26, 2024, to the following recognized Tribal Nations: Chickahominy Tribal Nation Eastern Division, Chickahominy Tribal Nation, Monacan Tribal Nation, Nansmond Tribal Nation, Pamunkey Tribal Nation, Rappahannock Tribal Nation, and the Upper Mattaponi Tribal Nation.

The Monacan Tribal Nation provided the following comments in an email dated August 5, 2024, the comments are summarized below:

- At this time, the Nation does not wish to actively participate in this consultation project because the tribal office does not currently have the capacity to participate in the project.
- However, the Nation requests to be contacted if sites associated with native history may be impacted by the project, if adverse effects associated with the project are identified, human remains are encountered, unanticipated native cultural remains are encountered, other tribes consulting on the project cease consultation, or the project size or scope becomes larger or more potentially destructive than currently described.

Public Meetings

During the previous FERC relicensing and VWP permitting process, there were efforts made by both Appalachian, FERC, and the Department to involve the public. Appalachian has continued to consult with stakeholder organizations during implementation of the FERC license and VWP Permit conditions including holding a public meeting in 2015 to review performance of the Project consistent with the WMP. Appalachian maintains a website (<https://www.smithmtn.com>) to keep the public informed on current lake levels, various management plans, and other pertinent information on the Project.

14. Public Comments received during Comment Period:

The public notice was published in the *Danville Register & Bee* on March 4, 2025. The public notice was published in the *Bedford Bulletin*, *Altavista Journal*, *Franklin News Post*, and *The Roanoke Times* on March 5, 2025. The public comment period ran from March 6, 2025, to April 4, 2025.

The Leesville Lake Association (LLA) provided the following comments on March 26, 2025. The comments provided are summarized below:

- The comments stated previous years' data from the Annual Water Quality Monitoring document that Instantaneous and Daily Average DO water quality standards have not been met over the last ten (10) years in the Project area.
- LLA recommends DEQ incorporate a time phased requirement for the permittee to achieve year-round compliance of 4.0 mg/l instantaneous dissolved oxygen, and 5.0 mg/l daily average dissolved oxygen in order to meet Virginia state water quality standards and that DEQ should describe penalties if those standards are violated.
- LLA recommends DEQ mandate aggressive debris removal, reporting, and expeditious fielding of the Debris Diversion and Collection at the Pigg River/Leesville Lake Confluence in order to provide safe navigation of the lake.

15. Changes in Permit Part I - Special Conditions Due to Public Comments:

Special Condition D. 7. was added to the permit and states: "Should the permittee plan to modify or replace turbine units 2 or 4 at the Smith Mountain Dam powerhouse during the permit term, the permittee shall install aerating turbine technology as feasible, or other technology that provides at least an equivalent level of introduction of dissolved oxygen, for the purposes of dissolved oxygen improvement in accordance with Part I. A. 3.."

Special Condition D. 7. was added to ensure should any modifications to turbines 2 or 4 happen over the permit term that the permittee would be required to install measures concurrently, with the goal to improve DO levels as a result of turbine operations.

In the facility's previous VWP Permit No. 08-0572, part of the permit requirements included a Feasibility Study be conducted to evaluate physical or mechanical alterations of water releases procedures to increase DO levels in releases from Smith Mountain Lake and eliminate exceedances of water quality standards for DO (see *Section 4: Studies required for the Project as part of VWP Permit No. 08-0572* above for further details on the Feasibility Study). The Feasibility Study was completed in 2021, with no measure identified that could potentially improve the DO levels to meet water quality standards 100% of the time and that were cost effective for the permittee. Special Condition E. 2. was added, requiring the permittee to continue studying, monitoring, and identifying additional methods to improve DO levels below Smith Mountain Lake Dam. Special Condition E 2 states:

"Within 240 days of the issuance of this permit, the permittee shall develop and submit a Dissolved Oxygen (DO) Improvement Plan (Plan) to the Department for review and approval. The permittee shall develop a comprehensive Plan, designed in consultation with DEQ, the Department of Wildlife Resources

(DWR), and other state or federal agencies as directed, to address depressed DO levels downstream from Smith Mountain Lake Dam. The Plan shall include, at a minimum, the following:

- a. A comprehensive report on the previously conducted Feasibility Study, completed in 2021, which evaluated physical and mechanical options for mitigating low DO water releases resulting from operation of the Smith Mountain Hydroelectric Project. The comprehensive report on the initial Feasibility Study shall include narrative and results related to DO downstream of Smith Mountain Lake Dam.
- b. A process for understanding, describing, and delineating the nature, extent and duration of impacts resulting from release of low DO-containing waters below the Smith Mountain Lake Dam. This shall include, but not be limited to:
 - i. The geographic extent of the data collection and the duration of the monitoring to support the evaluation of impacts to beneficial uses as a result of the low DO-containing releases the Smith Mountain Lake Dam;
 - ii. Methodology of monitoring proposed, to include types of physical, chemical and biological data to be collected; and
 - iii. Methodology for assessing and evaluating impacts to beneficial uses and predicting efficacy of control measures, both operational and technological, in mitigating low DO levels in waters released from the Smith Mountain Lake Dam.
- c. DO improvement methodologies and measures the permittee proposes to be assessed for implementation, including timelines associated for implementation.

Once approved, this Plan shall be implemented, and any subsequent Department approved revisions to the Plan will become an enforceable part of this permit.

The results of the Plan, including the permittee's final proposal of method(s) to improve the DO downstream of Smith Mountain Lake Dam and timelines for implementation shall be provided to the Department as soon as they are available but not later than July 1, 2030, for Department review and approval.

16. Special Conditions Summary Description:

The following conditions were developed to protect instream beneficial uses, to ensure compliance with applicable water quality standards, to prevent significant impairment of state waters or fish and wildlife resources, and to provide for no net loss of wetland acreage and function through compensatory mitigation and success monitoring and reporting.

Section A Authorized Activities

No. 1 addresses the activities authorized by this permit.

- No. 2 states that the authorized activities shall be conducted in accordance with the application materials and any subsequent materials received during the application process.
- No. 3 requires the applicant to notify the Department of any changes to the authorized activities or of new activities which require a VWP permit.

Section B Permit Term

- Nos. 1 and 2 addresses the permit term and re-issuance process to ensure that all permit conditions are completed.

Section C Standard Project Conditions

- No. 1 ensures no unlawful or incidental take of any threatened or endangered species.
- No. 2 addresses the requirement for the minimization of adverse impacts to instream beneficial uses.
- No. 3 ensures that the project will be executed in a manner that limits the disruption of the movement of aquatic life.
- No. 4 ensures that downstream flows will be maintained to protect both instream and off-stream beneficial uses.
- No. 5 ensures the minimization of adverse effects on navigation.
- No. 6 ensures the passage of high flows.
- Nos. 7 through 11 set forth all submittal requirements concerning reporting, compliance items, construction, monitoring, compensation, and restoration as required by current law and regulations.
- No. 12 prohibits the exceedances of Water Quality Standards in surface waters as a result of project activities.
- No. 13 requires measures to be employed at all times to prevent and contain pollutants from getting into state waters.

Section D Surface Water Withdrawals

- No. 1 states the use of the water withdrawal is for hydroelectric power generation and storage.
- No. 2 establishes the minimum release requirements for Leesville Lake.
- No. 3 establishes the permittee will run a forecast based simulation model at least once every three days to evaluate the probability of Smith Mountain Lake being at a certain elevation in the future.
- No. 4 states that additional water shall be stored in Leesville Lake so that the storage in Smith Mountain Lake is able to ensure the success of the striped bass spawning run.
- No. 5 and its table and notes establish the flow targets at Brookneal and specify when the recreation releases occur.
- No. 6 requires the permittee to operate the turbines at Smith Mountain Dam in a fashion that will minimize or eliminate exceedances of water quality standards for dissolved oxygen.
- No. 7 states should the permittee modify or replace turbines 2 or 4 at the Smith Mountain Dam powerhouse, the permittee would be required to install aerating turbine technology, or an equivalent of, for the purposes of DO improvement in accordance with Part I. A. 3.
- No. 8 outlines the procedures to take if operating emergencies beyond the control of the permittee or when Trigger 3 events occur during drought or low inflow conditions.
- No. 9 requires the permittee to submit a Drought Management Plan for Department review.
- No. 10 requires conservation measures to protect instream flows during drought events.

Section E ***Water Withdrawal Monitoring, Recordation and Reporting Conditions***

No. 1 requires the permittee to continue consultation with the Department on resource management plans.
No. 2 requires the permittee to submit a Dissolved Oxygen Improvement Plan.
No. 3 requires submission of a Monitoring and Operations Plan for Department review.
Nos. 4 through 8 establish monitoring and reporting activities and procedures.

16. General Conditions:

General Conditions are applied to all VWP individual permits, as stated in the VWP Permit Program regulation.

17. General Standard:

This project may result in minimal, temporary impacts to beneficial uses related to the propagation and growth of aquatic life as defined in the General Standard. Provided the permittee abides by the conditions of the permit, no substances shall enter state waters in concentrations, amounts or combinations that would contravene established standards or interfere with beneficial uses or are inimical or harmful to human, animal, plant, or aquatic life.

18. The Department Finds That:

- The proposed activity is consistent with the provisions of the Clean Water Act and State Water Control Law and will protect beneficial uses.
- The amount of the surface water withdrawal is limited to the amount of water that can be put to beneficial use.
- The proposed permit addresses avoidance and minimization of surface water impacts to the maximum extent practicable.
- Based on the size and location of the surface water withdrawal, the withdrawal is not likely to have a detrimental impact on existing instream or offstream uses.
- The effect of the impact will not cause or contribute to a significant impairment of state waters or fish and wildlife resources; adverse impacts on other existing beneficial users; or a violation of water quality standards.
- The proposed permit conditions address no net loss of wetland acreage and function through compensatory mitigation.
- This permit is proposed to prevent unpermitted impacts.
- The draft permit reflects the required consultation with and full consideration of the written recommendations of VMRC, VDH, VDACS, DCR and DWR.

The Department recommends VWP Individual Permit Number 24-1547 be issued as proposed.

Attachment A: Department Modeling Summary

Instream Flows Analysis – Smith Mountain Lake Hydropower

11/07/2024

Project Overview

Facility & Intake Model Description This model simulates the Smith Mountain Lake and Leesville Lake impoundments, with an approximate simulation of the required release protocols known as “HL-8” developed during the application for licensing under FERC P-2210/VWP 08-0572. HL-8 was devised to balance power generation needs with aquatic life, with monthly flow targets set for walleye, striped bass, American shad and suckers. This model also estimates evaporative losses from the surface of Smith Mountain and Leesville Lake combined, which may average as much as 90 cfs during periods of no rainfall, or 6% of the estimated baseline flow in the Roanoke River at the project outlet below Leesville Lake.

Despite this model using an approximation of the complex HL-8 adaptive demand and drought measure operations, a reasonable simulation of low-flow releases during extreme 30-90 drought conditions in the Roanoke River are achieved. The VAHydro model achieves a 0% error relative to the HL-8 simulation for all monthly flows below the 10th percentile, with the exception of the 10% flow in June, which is under-simulated by the VAHydro model, and in March, April and May the VAHydro model simulates a higher drought release than HL-8. A correction factor of 1.38 should be applied to VAHydro flows during June when VAHydro simulated flows are between 420-500 cfs. Note, that some of the differences between VAHydro and HL-8 may stem from the “fully permitted” mode of operation for VAHydro, as well as the potential for the rainfall-runoff inputs of VAHydro to more accurately simulate inflows during rain events after the construction of Smith Mountain Lake. On the whole, VAHydro simulation of extreme drought flows are nearly identical to the HL-8 model, and reasonable for estimating cumulative flows throughout the Roanoke River basin, provided that the June 10% flow correction is applied.

Permit requirements are aimed at preserving and augmenting downstream flows during drought, to alleviate stresses on the instream biota by the presence of this large dam. While this focus results in a large alteration of stream flows as compared to historic pre-dam conditions, the system is assumed to be naturalized, providing a wide range of habitat for aquatic life, and unique ecosystem services and recreational functions, and therefore, deviations to pre-development flow regimes is expected to be less instructive than continuous long-term monitoring of aquatic resources downstream of the dam.

Scenarios: 1 model scenario was simulated to evaluate proposed project impacts:

VWP 24-1547: The proposed permit represents a continuation of the operational rules that were first outlined in VWP 08-0572 and FERC P-2210. These rules ensure stable lake-levels for power generation, while simultaneously minimizing downstream flow depletion during drought. Flow releases from Leesville Lake are based on targets for flow at the Brookneal USGS gage 02062500 downstream of the project, with releases set to augment estimated inflows from tributaries between Leesville Lake and Brookneal. During times when estimated inflows between Leesville Lake and Brookneal exceed the

Brookneal flow target, a minimum release from Leesville Lake of 375 cfs is required from November-February, and 400cfs is required from March-October, in order to ensure that aquatic habitat below the dam does not become depleted.

Analysis: Operations prescribed by the current VWP permit/FERC license, reduce flows in the 25-50% range, and store that water to augment during flows below the 10th percentile. Combining evaporative losses from Smith Mountain and Leesville lakes (estimated at 6%) with total permitted withdrawals above and within the lakes, results in an average flow decrease of approximately 9%, remaining just under the 10% flow reduction recommended by DWR during agency coordination. However, due to the low-flow augmentation provisions of the permit, the project often increases flows in drought conditions, defined as the lowest 10% of flows on a monthly basis. From August through December, the operations result in increases during all drought flows, with a maximum increase of approximately 200% for minimum simulated flows in October and November. During February, March, June and July, impacts to the 5% and 10% simulated flows are mixed, ranging between +14% to -36% as compared to the baseline condition. Note that June 10% flows in this simulation should be viewed with a correction factor of 1.35, resulting in an *increase* in June 10% flows, rather than a decrease as is shown in the table below.

Conclusions: The existing permit maintains a mean flow decrease of approximately 9% and succeeds in augmenting drought flows throughout the summer and fall months, as was the goal during development of the initial FERC licensing process. While some spring extreme drought flows are reduced by this permit, the majority of low flow reductions occur during February and March and are generally less than 20%. No modification of operational rules outlined in FERC P-2210/VWP 08-0572 are recommended.

Table 1 Consumptive use frequency non-exceedance table for VWP 24-1547

Month	Min	5%	10%	25%	30%	50%	Mean
Jan (Jan%)	375 (+55%)	434.5 (-5%)	644.3 (+12%)	863.8 (-15%)	946.9 (-15%)	1415.8 (-13%)	1889.7 (-7%)
Feb (Feb%)	375 (-8%)	468.5 (-33%)	637.6 (-22%)	945.1 (-21%)	1091.9 (-19%)	1654 (-9%)	2091.9 (-8%)
Mar (Mar%)	400 (+4%)	603.2 (-23%)	768.1 (-16%)	1193.3 (-9%)	1325.1 (-9%)	1840.1 (-7%)	2307 (-5%)
Apr (Apr%)	400 (-36%)	763.6 (-1%)	929.1 (+6%)	1097.9 (-10%)	1168.2 (-15%)	1622.8 (-9%)	2270.1 (-5%)
May (May%)	400 (-17%)	792.9 (+15%)	903.8 (+7%)	1027.3 (-5%)	1062.1 (-8%)	1387 (-13%)	1964.1 (-5%)
Jun (Jun%)	400 (+27%)	400 (-23%)	468.4 (-27%)	597.3 (-31%)	649.6 (-28%)	937.4 (-19%)	1440.5 (-12%)
Jul (Jul%)	400 (+62%)	400 (+8%)	400 (-17%)	441.6 (-30%)	466 (-31%)	670.4 (-25%)	950.2 (-15%)
Aug (Aug%)	400 (+127%)	400 (+39%)	400 (+16%)	406.6 (-23%)	425.8 (-26%)	531.4 (-30%)	773.6 (-14%)
Sep (Sep%)	400 (+155%)	400 (+44%)	400 (+21%)	400 (-13%)	400 (-20%)	452.9 (-35%)	974.2 (-16%)

Month	Min	5%	10%	25%	30%	50%	Mean
Oct (Oct%)	400 (+221%)	400 (+76%)	400 (+45%)	406.6 (-16%)	439.9 (-18%)	540.1 (-31%)	1229.7 (-6%)
Nov (Nov%)	375 (+267%)	375 (+92%)	375 (+20%)	487.3 (-13%)	523.2 (-15%)	659.1 (-23%)	1257.1 (-8%)
Dec (Dec%)	375 (+197%)	375 (+20%)	414.2 (-4%)	613.6 (-19%)	659.2 (-24%)	1106.3 (-14%)	1548.7 (-8%)

1.1.1. Appendices

Attachment B – Water Conservation Conditions

Mandatory Non-essential Water Use Restrictions Virginia Drought Assessment and Response Plan

The following non-essential water uses will be prohibited during periods of declared drought emergencies. Please note the exceptions that follow each prohibited use. These prohibitions and exceptions will apply to uses from all sources of water and will only be effective when the Governor of Virginia or the Virginia Drought coordinator declares a Drought Emergency. Water use restrictions shall not apply to the agricultural production of food or fiber, the maintenance of livestock including poultry, nor the commercial production of plant materials, *provided that best management practices are applied to assure the minimum amount of water is utilized.*

1. *Unrestricted irrigation of lawns is prohibited.*

- Newly sodded and seeded areas may be irrigated to establish cover on bare ground at the minimum rate necessary for no more than a period of 60 days. Irrigation rates may not exceed one inch of applied water in any 7-day period.
- Gardens, bedding plants, trees, shrubs and other landscape materials may be watered with handheld containers, handheld hoses equipped with an automatic shutoff device, sprinklers or other automated watering devices at the minimum rate necessary but in no case more frequently than twice per week. Irrigation should not occur during the heat of the day.
- All allowed lawn irrigation must be applied in a manner to assure that no runoff, puddling or excessive watering occurs.
- Irrigation systems may be tested after installation, routine maintenance or repair for no more than ten minutes per zone.

2. *Unrestricted irrigation of golf courses is prohibited.*

- Tees and greens may be irrigated between the hours of 9:00 p.m. and 10:00 a.m. at the minimum rate necessary.
- Localized dry areas may be irrigated with a handheld container or handheld hose equipped with an automatic shutoff device at the minimum rate necessary.
- Greens may be cooled by syringing or by the application of water with a handheld hose equipped with an automatic shutoff device at the minimum rate necessary.
- Fairways may be irrigated between the hours of 9:00 p.m. and 10:00 a.m. at the minimum rate necessary not to exceed one inch of applied water in any ten-day period.
- Fairways, tees and greens may be irrigated during necessary overseeding or resodding operations in September and October at the minimum rate necessary. Irrigation rates during this restoration period may not exceed one inch of applied water in any seven-day period.

- Newly constructed fairways, tees and greens and areas that are re-established by sprigging or sodding may be irrigated at the minimum rate necessary not to exceed one inch of applied water in any seven-day period for a total period that does not exceed 60 days.
- Fairways, tees and greens may be irrigated without regard to the restrictions listed above so long as:
 - The only water sources utilized are water features whose primary purpose is stormwater management;
 - Any water features utilized do not impound permanent streams;
 - During declared Drought Emergencies these water features receive no recharge from other water sources such as ground water wells, surface water intakes, or sources of public water supply; and,
 - All irrigation occurs between 9:00 p.m. and 10:00 a.m.
- All allowed golf course irrigation must be applied in a manner to assure that no runoff, puddling or excessive watering occurs.
- Rough areas may not be irrigated.

3. ***Unrestricted irrigation of athletic fields is prohibited.***

- Athletic fields may be irrigated between the hours of 9:00 p.m. and 10:00 a.m. at a rate not to exceed one inch per application or more than a total of one inch in multiple applications during any ten-day period. All irrigation water must fall on playing surfaces with no outlying areas receiving irrigation water directly from irrigation heads.
- Localized dry areas that show signs of drought stress and wilt (curled leaves, foot-printing, purpling) may be syringed by the application of water for a cumulative time not to exceed fifteen minutes during any twenty-four-hour period. Syringing may be accomplished with an automated irrigation system or with a handheld hose equipped with an automatic shutoff device at the minimum rate necessary.
- Athletic fields may be irrigated between the hours of 9:00 p.m. and 10:00 a.m. during necessary overseeding, sprigging or resodding operations at the minimum rate necessary for a period that does not exceed 60 days. Irrigation rates during this restoration period may not exceed one inch of applied water in any seven-day period. Syringing is permitted during signs of drought stress and wilt (curled leaves, foot-printing, purpling).
- All allowed athletic field irrigation must be applied in a manner to assure that no runoff, puddling or excessive watering occurs.
- Irrigation is prohibited on athletic fields that are not scheduled for use within the next 120-day period.
- Water may be used for the daily maintenance of pitching mounds, home plate areas and base areas with the use of handheld containers or handheld hoses equipped with an automatic shutoff device at the minimum rate necessary.

- Skinned infield areas may utilize water to control dust and improve playing surface conditions utilizing handheld containers or handheld hoses equipped with an automatic shutoff device at the minimum rate necessary no earlier than two hours prior to official game time.
4. ***Washing paved surfaces such as streets, roads, sidewalks, driveways, garages, parking areas, tennis courts, and patios is prohibited.***
- Driveways and roadways may be pre-washed in preparation for recoating and sealing.
 - Tennis courts composed of clay or similar materials may be wetted by means of a hand-held hose equipped with an automatic shutoff device at the minimum rate necessary for maintenance. Automatic wetting systems may be used between the hours of 9:00 p.m. and 10:00 a.m. at the minimum rate necessary.
 - Public eating and drinking areas may be washed using the minimum amount of water required to assure sanitation and public health.
 - Water may be used at the minimum rate necessary to maintain effective dust control during the construction of highways and roads.
5. ***Use of water for washing or cleaning of mobile equipment including automobiles, trucks, trailers and boats is prohibited.***
- Mobile equipment may be washed using handheld containers or handheld hoses equipped with automatic shutoff devices provided that no mobile equipment is washed more than once per calendar month and the minimum amount of water is utilized.
 - Construction, emergency or public transportation vehicles may be washed as necessary to preserve the proper functioning and safe operation of the vehicle.
 - Mobile equipment may be washed at car washes that utilize reclaimed water as part of the wash process or reduce water consumption by at least 10% when compared to a similar period when water use restrictions were not in effect.
 - Automobile dealers may wash cars that are in inventory no more than once per week utilizing handheld containers and hoses equipped with automatic shutoff devices, automated equipment that utilizes reclaimed water as part of the wash process, or automated equipment where water consumption is reduced by at least 10% when compared to a similar period when water use restrictions were not in effect.
 - Automobile rental agencies may wash cars no more than once per week utilizing handheld containers and hoses equipped with automatic shutoff devices, automated equipment that utilizes reclaimed water as part of the wash process, or automated equipment where water consumption is reduced by at least 10% when compared to a similar period when water use restrictions were not in effect.
 - Marine engines may be flushed with water for a period that does not exceed 5 minutes after each use.

6. ***Use of water for the operation of ornamental fountains, artificial waterfalls, misting machines, and reflecting pools is prohibited.***

- Fountains and other means of aeration necessary to support aquatic life are permitted.

7. ***Use of water to fill and top off outdoor swimming pools is prohibited.***

- Newly built or repaired pools may be filled to protect their structural integrity.
- Outdoor pools operated by commercial ventures, community associations, recreation associations, and similar institutions open to the public may be refilled as long as:
 - Levels are maintained at mid-skimmer depth or lower;
 - Any visible leaks are immediately repaired;
 - Backwashing occurs only when necessary to assure proper filter operation;
 - Deck areas are washed no more than once per calendar month (except where chemical spills or other health hazards occur);
 - All water features (other than slides) that increase losses due to evaporation are eliminated; and
 - Slides are turned off when the pool is not in operation.
- Swimming pools operated by health care facilities used in relation to patient care and rehabilitation may be filled or topped off.
- Indoor pools may be filled or topped off.
- Residential swimming pools may be filled only to protect structural integrity, public welfare, safety and health and may not be filled to allow the continued operation of such pools.

8. ***Water may be served in restaurants, clubs, or eating-places only at the request of customers.***