170 FERC ¶ 61,108
UNITED STATES OF AMERICA
FEDERAL ENERGY REGULATORY COMMISSION

Before Commissioners: Neil Chatterjee, Chairman;
Richard Glick and Bernard L. McNamee.

Appalachian Power Company Project No. 2514-188

ORDER ON REHEARING

(Issued February 20, 2020)

1. On November 18, 2019, the Director, Office of Energy Projects (Director), issued a study plan determination pursuant to the Integrated Licensing Process (ILP) for Appalachian Power Company's (Appalachian) proposed relicensing of the 30.1-megawatt Byllesby-Buck Hydroelectric Project No. 2514.[1] On December 18, 2019, Appalachian filed a request for rehearing objecting to one aspect of the required water quality study: the timing and scope of monitoring to gather data on turbidity. As discussed below, we grant in part and deny in part Appalachian's request for rehearing.

I. Background

2. The Byllesby-Buck Project consists of two developments, Byllesby and Buck, which are located on the New River in Carroll County, Virginia. The Byllesby development is located about nine miles north of the City of Galax, while the Buck development is located approximately three river miles downstream of Byllesby. Each development includes an impoundment, concrete gravity dam and spillway, and powerhouse.

3. On January 7, 2019, Appalachian initiated the ILP for relicensing the project pursuant to Part 5 of the Commission's regulations.[2] As part of the ILP, Appalachian is required to consult with resource agencies, tribes, and other stakeholders to develop and conduct studies that will inform Commission staff's environmental analysis and, ultimately, the Commission's decision on whether, and with what conditions, to issue a

[1] *Appalachian Power Co*., Study Plan Determination for the Byllesby-Buck Hydroelectric Project (Nov. 18, 2019).

[2] 18 C.F.R. pt. 5 (2019).

new license for the project.[3] The studies also provide information that resource agencies can use to prepare comments, recommendations, and terms and conditions for inclusion in any license that may be issued for the project.

4. Any request for a particular study must address seven criteria[4] designed to ensure that the requested study is "not [] frivolous and would add some appreciable evidentiary value to the record."[5] The license applicant files a proposed study plan.[6] After a comment period, the applicant files a revised study plan for the Commission's approval.[7] The Director then issues a study plan determination that includes any modifications the Director determined necessary.[8]

A. Appalachian's Pre-Application Document (PAD) and Proposed Study Plan

5. In its PAD, Appalachian proposed to conduct a single-season water quality study,[9] in which it would monitor dissolved oxygen, water temperature, and water levels at 15-minute intervals and measure temperature, dissolved oxygen, pH, and specific conductance monthly.[10] This proposed water quality study did not include a component to study water turbidity.

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[3] *TransCanada Hydro Ne. Inc*., 151 FERC ¶ 61,116, at P 4 (2015); *see also* 18 C.F.R. §§ 5.1, 5.6(b) (2019). The study plan development process is governed by sections 5.9 through 5.14 of the Commission's regulations. 18 C.F.R. §§ 5.9-5.14 (2019).

[4] 18 C.F.R. § 5.9(b).

[5] *Hydroelectric Licensing Under the Federal Power Act*, Order No. 2002, 104 FERC ¶ 61,109, at P 87 (2003) (discussing the purpose of the study criteria) (citing *Hydroelectric Licensing Under the Federal Power Act*, Notice of Proposed Rulemaking, 102 FERC ¶ 61,185, at P 67 (2003)).

[6] 18 C.F.R. § 5.11(a).

[7] *Id.* §§ 5.12, 5.13.

[8] *Id.* § 5.13(c).

[9] Appalachian January 7, 2019 Pre-Application Document at 6-3 to 6-4.

[10] *Id.* at 6-4.

6. At a public scoping held on April 11, 2019, participants, including the Virginia Department of Game and Inland Fisheries (Virginia DGIF), commented that the New River carries a heavy sediment and debris load. Appalachian stated that it takes actions to mitigate or prevent adverse effects caused by sedimentation and debris accumulation at the project.[11] For example, Appalachian stated it routinely uses a drag rake system installed at both developments in 1997, which "goes out into the forebay any distance you want, drops to the bottom, to the forebay bed, drags along that, and then comes up to the intake screen."[12] While larger debris collected by the drag rake is deposited into an above-water trash trough that sluices the debris downstream, material that is small enough to pass through the project's intake trash racks (i.e., re-suspended fine sediments) will pass downstream through the powerhouse.[13]

7. On May 7, 2019, Virginia DGIF filed comments on the PAD and Scoping Document 1, asserting that "[l]iberation of reservoir sediment deposits during operations result in increased turbidity in downstream reaches influenced by project flow, disrupting ecological processes, suspending contaminants like PCB's, and negatively affecting angling and recreational use."[14] The U.S. Fish and Wildlife Service (FWS) noted that the project is located on a stretch of the New River that is important for recreation[15] and, more specifically, mirrored Virginia DGIF's concerns about the increased turbidity negatively affecting angling and recreational use.[16] Both agencies also explicitly stated

[11] Transcript of April 11, 2019 Public Scoping Meeting held in Galax, Virginia at 32-38.

[12] *Id.* at 35.

[13] *Id.* at 35-36.

[14] Virginia DGIF May 7, 2019 Comments at 2.

[15] FWS May 7, 2019 Comments at 4; *see also id.* at 8 (noting that there are desirable fishing locations at the tailrace areas of both dams). These comments are consistent with the PAD, which states that the upper New River is a popular sportfishing area and that the project area is specifically known for the quality of angling opportunities for several species of fish. Appalachian January 7, 2019 Pre-Application Document at 5-35.

[16] FWS May 7, 2019 Comments at 4. FWS also identified as a resource management goal "angling opportunities" when requesting a hydraulic and instream flow study. *See id.* at 12.

that the water quality study needs to "examine turbidity effects of project operations."[17] The New River Conservancy echoed these comments.

8. On June 21, 2019, Appalachian filed its proposed study plan. It proposed a water quality study consisting of Task 1 – Continuous Water Temperature and [Dissolved Oxygen] Monitoring and Task 2 – Monthly Water Quality Monitoring of temperature, dissolved oxygen, pH, specific conductance, chlorophyll a, and turbidity. Appalachian added that "[c]hlorophyll a and turbidity will also be measured in the forebay of each development during the monthly sampling events."[18] Appalachian stated that the estimated level of effort for the water quality study in total would be approximately 400 hours, at a cost of approximately $60,000.[19]

9. On June 21, 2019, Commission staff issued a revised scoping document. Responding to the comments by Virginia DGIF, FWS, and the New River Conservancy, the document stated that "turbidity could be affected by project operation and maintenance (e.g., by releasing sediment collected by the drag rake through the project intakes) . . . Accordingly, . . . our environmental analysis will include the effects of project operation and maintenance on turbidity levels . . . ."[20]

10. On September 18, 2019, Virginia DGIF commented on the proposed study plan, again noting that "[l]iberation of reservoir sediment deposits during Project operations result in increased turbidity in downstream reaches influenced by Project flow, disrupting ecological processes and negatively affecting angling and recreational use."[21] Virginia DGIF also stated that its "staff mentioned concerns about downstream turbidity effects of the Project in our May 7 comments, but this study fails to provide a plan for assessing turbidity effects."[22] On September 19, 2019, FWS commented that the proposed study plan "does not address the magnitude and spatial scale of Project influence. Determining

[17] Virginia DGIF May 7, 2019 Comments at 5; FWS May 7, 2019 Comments at 7.

[18] Appalachian June 21, 2019 Proposed Study Plan at 7.6.2.

[19] *Id.* at 7.8.

[20] *Appalachian Power Co*., Scoping Document 2 for the Byllesby-Buck Hydroelectric Project at 7-8 (June 21, 2019).

[21] Virginia DGIF September 18, 2019 Comments at 1.

[22] *Id.* at 2.

the spatial scale of Project influence should include consideration of Project flow attenuation and downstream turbidity effects of Project operations . . . ."[23]

B. Appalachian's Revised Study Plan

11. On October 18, 2019, Appalachian filed a revised study plan, proposing, as relevant here, to add to Task 2 measuring turbidity monthly at each of the continuous water quality monitoring locations using a portable turbidity meter to measure turbidity at a single depth of approximately one meter.[24] Appalachian estimated the level of effort for the water quality study in total would increase to approximately 500 hours and the cost to approximately $110,000.[25] Appalachian also stated in the revised study plan that "the [drag] rake[s] [are] not intended to clear sediment, but that some sediments are incidentally scraped/mobilized during operation."[26]

12. On November 4, 2019, Virginia DGIF commented on the revised study plan, again noting that "[l]iberation of reservoir sediment deposits during Project operations result in increased turbidity in downstream reaches influenced by Project flow, disrupting ecological processes and negatively affecting angling and recreational use" and that "[d]etermining the downstream spatial influence will involve consideration of Project flow attenuation and downstream turbidity effects of Project operations."[27] Virginia DGIF also noted that it "appreciate[d] the inclusion of data collection on [turbidity] at the Project reservoirs."[28] On November 4, 2019, FWS provided a nearly identical comment.[29] It also added that "data collection for [turbidity] at the Project reservoir [is an] important improvement[]" to the revised study plan.[30]

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[23] FWS September 19, 2019 Comments at 1.

[24] Appalachian October 18, 2019 Revised Study Plan at 5.6.2.

[25] *Id.* at 5.8.

[26] *Id.* at 5.1.

[27] Virginia DGIF November 4, 2019 Comments at 1.

[28] *Id.* at 3.

[29] FWS November 4, 2019 Comments at 1.

[30] *Id.*

C. Director's Study Plan Determination Regarding Turbidity

13. The study plan determination rejected Appalachian's proposal to sample turbidity once per month as lacking the "frequency needed to properly assess the effects of project operation (drag rake) on downstream turbidity at each development" because the drag rake operation, while dependent on debris load, generally occurs multiple times per day.[31] The Director instead required Appalachian to "install continuously-recording turbidity sensors (with 15-minute measurement intervals) on each of the 10 multiparameter data sondes that would be deployed across . . . eight sampling sites."[32] The Director also required that Appalachian maintain a daily log of drag rake operations, reasoning that such a log would allow for turbidity values "to be compared between time periods when the drag rakes are operating and when they are not, which would facilitate an evaluation of the relative role of (natural) high-flow events versus drag rake operations in causing turbidity spikes."[33]

14. The determination referenced Virginia DGIF's and FWS's comments on turbidity[34] and explained that the drag rake operations in each forebay (Byllesby and Buck) cause resuspension of sediment from the bottom (due to the scraping action of the rake), which is then passed downstream through the intakes and could increase downstream turbidity and affect aquatic and recreation resources. Finally, the Director noted that the study results:

> could inform the development of potential license requirements (e.g., the optimal timing of drag rake operation in terms of maintaining desirable turbidity levels during prime angling periods) [section 5.9(b)(5)]. The cost would be minimal and largely depend on whether Appalachian currently has access to additional turbidity sensors or needs to purchase them (the approximate cost of the sensors is $10,000 to $15,000). Additional field efforts associated with staff's recommended turbidity monitoring would be minimal because the turbidity sensors would be added to the same sondes

[31] *Appalachian Power Co*., Study Plan Determination for the Byllesby-Buck Hydroelectric Project at B-7 (Nov. 18, 2019).

[32] *Id.* The eight sampling sites are: (1) upper end of the Byllesby impoundment; (2) Byllesby forebay; (3) Byllesby bypassed reach; (4) Byllesby tailrace; (5) Buck forebay; (6) upper Buck bypassed reach; (7) lower Buck bypassed reach; and (8) Buck tailrace.

[33] *Id.* at B-7 to B-8.

[34] *Id.* at B-7.

that would be used for continuous monitoring of temperature and [dissolved oxygen].[35]

D. Appalachian's Rehearing Request

15. On December 18, 2019, Appalachian requested rehearing of the Director's determination. Appalachian asks for the continuous turbidity monitoring requirement to be removed from the determination, or alternatively that the Commission accept a revised water quality study that includes continuous turbidity monitoring during a two-day period to address turbidity effects associated with drag rake operation.

II. Discussion

16. Appalachian argues that no participant in the proceeding requested continuous turbidity monitoring, the Director's determination relies on assertions not in the record, and the Director erroneously determined that the cost and level of effort associated with continuous monitoring would be minimal. Alternatively, Appalachian argues that should the Commission require continuous turbidity monitoring, it should adopt its proposed revised study parameters. We address these arguments below.

A. Continuous Monitoring Is Appropriate

1. Record Support

17. Appalachian contends that the Director's determination is unsupported by the record, first noting that neither Virginia DGIF nor FWS asked for continuous turbidity monitoring in their comments on the PAD.[36] Appalachian further states that it added monthly turbidity measuring in each development's forebay to its proposed study plan in response to agency comments that any water quality study should examine turbidity,[37] but that no reference to *downstream* turbidity was made until Virginia DGIF later commented on the proposed study plan.[38] Appalachian also points out that Virginia DGIF's comment lacked the study plan criteria required by section 5.9 of the

[35] *Id.* at B-8.

[36] Appalachian Rehearing Request at 4, 10.

[37] *Id.* at 4-6.

[38] *Id.* at 6-7.

Commission's regulations. In addition, Appalachian cites to the agencies' approving comments regarding the proposed data collection in the revised study plan.[39]

18. We disagree. When read in their entirety, agency comments on the PAD, proposed study plan, and revised study plan all express concerns about downstream turbidity and potential negative effects on angling and recreation.[40] These comments, along with statements made at the scoping meeting, support the explanation in the determination that "concern remains regarding the mobilization of impoundment sediment deposits during project operation, which could result in increased turbidity in downstream reaches that disrupts ecological processes and negatively affects angling and recreational use."[41]

19. Moreover, notwithstanding Appalachian's suggestion to the contrary, section 5.9 of the Commission's regulations does not limit the Director to consider only requested studies. Under the Commission's regulations, the Director's determination may ultimately include "*any* modifications determined to be necessary in light of the record."[42] The Director's study plan determination is intended to require studies that will produce the information necessary to further shape both Commission staff's environmental analysis and the Commission's eventual legally enforceable license order.

20. Here, the Director determined that continuous turbidity monitoring is necessary because "Appalachian's proposal to sample turbidity once per month . . . lacks the sampling frequency needed to properly assess the effects of project operation (drag rake)

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[39] *Id.* at 10-11. Appalachian also notes that Commission staff did not file comments related to water quality on the PAD or proposed study plan or inform Appalachian of the need for information or study requests related to turbidity monitoring. *Id.* at 4, 7.

[40] *See, e.g.*, Virginia DGIF May 7, 2019 Comments at 2; FWS May 7, 2019 Comments at 4; Virginia DGIF September 18, 2019 Comments at 1; Virginia DGIF November 4, 2019 Comments at 1; FWS November 4, 2019 Comments at 1. We also note that Commission staff called out in the scoping document 2 that "turbidity could be affected by project operation and maintenance (e.g., by releasing sediment collected by the drag rake through the project intakes)" and noted that the forthcoming environmental analysis conducted under the National Environmental Policy Act would include effects of project operation and maintenance on turbidity levels. *See Appalachian Power Co*., Scoping Document 2 for the Byllesby-Buck Hydroelectric Project at 7-8 (June 21, 2019).

[41] *Appalachian Power Co*., Study Plan Determination for the Byllesby-Buck Hydroelectric Project at B-7 (Nov. 18, 2019).

[42] 18 C.F.R. § 5.13(c) (emphasis added).

on downstream turbidity at each development."[43] Because the drag rake may operate multiple times per day, depending on debris load, the Director required continuous monitoring to ascertain the effects of the operation of the drag rake on downstream turbidity. As discussed in more detail below, the required monitoring will help the Commission determine both project impacts and any necessary mitigation.[44]

2. Information is Needed to Inform Potential License Conditions

21. Appalachian questions how continuous turbidity monitoring could inform potential license conditions.[45] As indicated above, the Director, based on the stated concerns of the resource agencies, noted that operation of the project's drag rake may increase downstream turbidity and negatively affect angling and recreational use. Therefore, in order to identify and fully quantify the scope of the potential effect, turbidity data would need to be collected continuously during the period spanning from prior to commencement of the event (raking), for a sufficient enough duration to establish pre-raking turbidity levels at the monitoring sites, to when the raking has been completed and any increased turbidities caused by the event have subsided. Continuously recorded downstream values from the tailraces would be compared to those continuously recorded in each forebay as well as the monitoring location in the upper portion of Byllesby reservoir, which would provide information on background turbidity levels of waters entering the project. To the extent drag rake operations are found to increase downstream turbidity levels relative to background turbidity levels, continuous turbidity monitoring data collected during drag rake events could be used to inform the need for and identify potential license requirements for consideration to minimize downstream turbidity effects of drag rake operation on angling and recreational use (e.g., implementing a drag rake operation plan that involves shifting the operation of the drag rake to time periods outside of prime fishing hours, or limiting the duration of a drag rake event, or implementing

[43] *Appalachian Power Co*., Study Plan Determination for the Byllesby-Buck Hydroelectric Project at B-7 (Nov. 18, 2019).

[44] Appalachian's statement that the study plan determination must be supported by "substantial evidence," *see* Appalachian Rehearing Request at 9 (citing 16 U.S.C. § 825*l*(b) (2018); *City of Centralia*, 213 F.3d 742, 748 (D.C. Cir. 2000); *Bangor Hydro-Electric Co. v. FERC*, 78 F.3d 659, 663 (D.C. Cir. 1996)), is correct. Section 313(b) of the Federal Power Act states that the "finding of the Commission as to the facts, if supported by substantial evidence, shall be conclusive." 16 U.S.C. § 825*l*(b). As we demonstrate in P 21, *infra*, the monitoring study will yield information relevant to our consideration of Appalachian's license application, thus providing substantial evidence supporting the study requirement.

[45] Appalachian Rehearing Request at 10.

seasonal restrictions on when the drag rake is allowed to scrape the forebay bed). Spot sampling once per month as originally proposed by Appalachian would not necessarily result in the collection of turbidity data precisely during a drag rake operational event, let alone the collection of turbidity data during the full period of the event.

3. Costs

22. Appalachian also objects to the cost and level of effort associated with continuous turbidity monitoring, which the determination described as "minimal."[46] Appalachian explains that it planned to deploy a HOBO logger instrument[47] at each continuous monitoring location to record water temperature and dissolved oxygen levels, and a more expensive Hydrolab sonde instrument[48] would be moved from site to site to measure additional water quality parameters, including turbidity, on a monthly basis.[49] According to Appalachian, HOBO loggers can only measure water temperature and dissolved oxygen; thus, Appalachian would be required to rent or purchase Hydrolab MS5 sondes for each location to continuously monitor turbidity at a cost of $67,500, rather than the Director's estimate of $10,000 to $15,000.[50] Appalachian also states that additional effort and labor will be required to maintain the larger Hydrolab sondes at "various river levels [and] to address data gaps as a result of such issues."[51] Finally, Appalachian expresses concern that "placing large sondes *in situ* . . . will result in higher rates of damage and other problems with the probes,"[52] asserting that the larger Hydrolab sondes would be more visible to the public and thus more susceptible to vandalism or theft.[53]

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[46] *Id.* at 12.

[47] Appalachian states that the list price for a HOBO logger is $1,250. *See id.* at Appendix B.

[48] Appalachian estimates each Hydrolab sonde to cost $10,000 to purchase or $1,500 to rent per month based on "past experiences of Appalachian personnel and consultants." *Id.* at 6 & n.17.

[49] *Id.* at 12-13.

[50] *Id.* at 13.

[51] *Id.*

[52] *Id.*

[53] *Id.* at 6.

23. As indicated in the study plan determination, Commission staff inferred from the information in the record that the continuous turbidity sensors could be added to the same multiparameter sondes[54] that Appalachian would deploy to measure water temperature and dissolved oxygen, at a minimal additional cost.[55] Based on the additional information Appalachian provides in its rehearing request, we acknowledge that the instrument Appalachian would need to use for continuous turbidity monitoring would increase the cost beyond the Director's estimate. While we find continuous turbidity monitoring to be justified, as discussed above, given the additional level of effort and cost, we will reevaluate whether a refined scope and timing of turbidity monitoring would be sufficient to meet our information needs, as discussed below.

B. Alternative Water Quality Study Proposed by Appalachian

24. In its rehearing request, Appalachian proposes to conduct turbidity monitoring at five-minute intervals over a two-day period under relatively low-flow conditions using continuously-recording Hydrolab sondes deployed at five locations: (1) in the upstream extent of the Byllesby reservoir to characterize background turbidity levels; (2) in the Byllesby forebay at mid-depth; (3) in the Byllesby powerhouse tailrace; (4) in the Buck forebay at mid-depth; and (5) in the Buck powerhouse tailrace. Appalachian indicates the two-day monitoring effort would occur under a "predetermined range of normal operating regimes" for the drag rakes and generating units.[56] Appalachian estimates this modification will add $20,000 to the cost of the water quality study.[57]

25. We conclude that Appalachian's proposal for continuous turbidity monitoring is generally sufficient to provide information on the potential effects of drag rake operation on downstream turbidity and inform potential license conditions, except in the following respects. First, Appalachian does not specify what constitutes a "predetermined range of normal operating regimes." For instance, the effects of the drag rake on downstream

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[54] Some brands of multiparameter sondes include extra ports to which additional optical sensors, including those for turbidity, can be added. *See* https://www.ysi.com/products/multiparameter-sondes.

[55] *Appalachian Power Co*., Study Plan Determination for the Byllesby-Buck Hydroelectric Project at B-8 (Nov. 18, 2019). This determination was based on Appalachian's statements in its study plans that it would use "multiparameter water quality instrumentation (i.e., sondes)" to continuously monitor water temperature and dissolved oxygen. *See* Appalachian June 21, 2019 Proposed Study Plan at 7.6.1; Appalachian October 18, 2019 Revised Study Plan at 5.6.1.

[56] Appalachian Rehearing Request at Appendix A, 5.6.3.

[57] *Id.* at Appendix A, 5.8.

turbidity may depend on how far the drag rake extends into the forebay and scrapes along its bed, as turbidity values would be expected to increase with raking distance because more sediment would be disturbed. Second, it is unclear if the "relatively low flow conditions" under which Appalachian proposes to assess the potential effects of drag rake operation on turbidity would be representative of environmental conditions (background turbidity levels, river flows, etc.) under which the drag rake would still be operated. For instance, there may be some conditions (e.g., low flow and low background turbidity levels during mid-summer) under which the drag rake may otherwise have a measurable effect on downstream turbidity but would not typically operate under such conditions. Finally, it is unclear whether the two-day sampling window chosen would coincide with times and conditions under which both the drag rake would be operating and anglers would be fishing in the project's tailraces. Given that the potential negative effect of project (drag rake) operation on angling and recreational use in the project tailraces is an environmental concern raised in the proceeding, as indicated above, any turbidity monitoring should occur during the primary fishing season.

26. To address these concerns, we accept Appalachian's proposed alternative water quality study plan (alternative plan) with the following modifications. Rather than specifically limiting the continuous sampling window to two days, Appalachian must consult with the resource agencies (Virginia DGIF and FWS) to identify a sampling window that occurs: (1) during the fishing season; (2) when there is drag rake operation for the purposes of raking both the forebay bed and the trash rack; and (3) when flows and background turbidity are at levels such that drag rake operation would be expected to be representative of a worst-case scenario (i.e., low flows and low background turbidity levels) causing an effect on downstream turbidity. Regarding the second criterion, the drag rake should be extended various distances into the forebay up to the maximum distance and include a minimal distance scenario in which the drag rake would only clean the trash racks and not extend into the forebay. If one sampling window cannot accomplish all three criteria, then Appalachian should propose multiple sampling windows, as needed. Appalachian must file, in its study report, documentation of consultation with the agencies regarding the sampling window, as noted above.

27. The scope of this modified study is reduced relative to the prior determination (now, only five turbidity monitoring locations versus ten).[58] The expected sampling window would be on the order of about ten days, rather than continuously over a five-month period as previously required. Therefore, the expected cost to continuously monitor turbidity as specified in this modified study would be considerably less than that

[58] Continuous turbidity monitoring would occur at five-minute intervals at the five stations proposed by Appalachian in its Task 3 under 5.6.3 of the alternative plan.

required by the determination. Furthermore, the shorter sampling time frame reduces the likelihood that the Hydrolab instruments would be lost to high flows or vandalized.

III. Conclusion

28. Accordingly, we grant rehearing in part and approve Appalachian's proposed alternative plan, as modified above.

The Commission orders:

(A) The request for rehearing filed by Appalachian on December 18, 2019 is denied in part and granted in part.

(B) Appalachian's December 18, 2019 proposed Alternative Water Quality Study Plan is approved as modified by ordering paragraphs (C) and (D) of this order and replaces the Water Quality Study turbidity monitoring modifications in the Director's November 18, 2019 Study Plan Determination.

(C) The following recommendation, which was adopted in the Director's November 18, 2019 Study Plan Determination and which modified 5.6.1 Task 1 – Continuous Water Temperature and [Dissolved Oxygen] Monitoring of Appalachian's October 19, 2019 Revised Study Plan, is struck:

Accordingly, we recommend that Appalachian install continuously-recording turbidity sensors (with 15-minute measurement intervals) on each of the 10 multiparameter data sondes that would be deployed across the eight sampling sites described above. We also recommend that Appalachian maintain, and provide in the study report, a log of daily drag rake operations (e.g., daily start and stop times for the drag rakes).

(D) Appalachian will conduct a study to evaluate the potential effect of project operation (drag rake) on turbidity. During the study period, the timing of drag rake operation must be recorded and a Hydrolab or similar data sonde equipped with a turbidity sensor will be installed at each of the locations listed below to continuously record turbidity concentrations (in Nephelometric turbidity units) at 5-minute intervals:

- One location in the upstream extent of the Byllesby reservoir to characterize background turbidity levels
- One location in the Byllesby forebay at approximate mid-depth
- One location in the Byllesby powerhouse tailrace
- One location in the Buck forebay at approximate mid-depth
- One location in the Buck powerhouse tailrace

The study will be conducted during the study period identified by Appalachian, in consultation with Virginia DGIF and FWS, that meets the criteria set forth in the Commission's February 20, 2020 order.

By the Commission.

(S E A L)

Kimberly D. Bose,
Secretary.