United States Department of the Interior

FISH AND WILDLIFE SERVICE

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March 7, 2018

Kimberly Bose
Secretary Federal Energy Regulatory Commission
888 First Street, NE
Washington, DC 20426

Re: Draft Application For Original License For Major Water Power Projects 5 Megawatts Or Less Scott's Mill Dam Hydroelectric Project, FERC P-14867-000

Dear Secretary Bose:

The U.S. Fish and Wildlife Service (Service) is pleased to submit comments to the Federal Energy Regulatory Commission (Commission) on the enclosed Draft License Application (DLA) for Scott's Mill Hydro, LLC (Applicant) No. 14867 (Project). This letter is submitted under the following statutory authorities; Fish and Wildlife Coordination Act as amended; Federal Power Act as amended; and Endangered Species Act as amended.

GENERAL COMMENTS

Project Description

The Applicant owns the Scott's Mill Dam on the James River along the borders of Amherst and Bedford Counties, Virginia. The Applicant also owns lands on both sides of the river necessary for constructing the power plant, fishway facilities and recreation enhancements. The Applicant proposes to install nine 54-inch turbine/generator units provided by Littoral Power Systems Inc. (LPS) and Rickly Hydrological Co., Inc. (Rickly). LPS is the provider of the Project's modular civil works and related subassemblies. The power plant will be constructed immediately downstream of the existing arch section of the dam on the right side of the river After construction of the power plant, a 2 to 3 foot high concrete cap was described in the studies that could be added to the existing dam. The turbines chosen for the proposed project includes nine 54-inch 0.5 MW LPS/Rickly axial flow turbine units (see photo of proposed turbines from DLA). The units rotate in the range of 60-400 revolutions per minute (rpm), where only the lowest rpm range would improve entrained fish survival.

Headpond water levels at a median flow of 2,000 cubic feet per second (cfs) are slightly greater than the normal 1-foot veil over the spillway crest, which is at elevation 514 feet. During low flows, the tail water elevation is approximately 499 feet, resulting in a potential gross head of about 15 feet. Construction of the Project is planned to start within 1 year of license issuance.

The proposed facilities would include the following: a new modular powerhouse containing nine generating units; a new 1,200-foot long underground transmission line; and three (3) appurtenant facilities, which include the addition of a 2 to 3 foot high concrete cap onto the existing spillway and raising the headpond elevation to about 517 feet.

Native American Tribe Consultation

On September 17, 2015, Jody Callihan, staff at the Commission, issued a letter initiating tribal consultation for the licensing process for the original Liberty Falls Hydroelectric Project No. 14425-000), and on December 20, 2017, Chelsea Hudock, from the Commission contacted Kimberly Penrod, the Director of Cultural Resources for the Delaware Nation (Nation). Ms. Penrod stated that the Nation would be interested in consulting on the project. In addition, the Tribal Historic Preservation Officers (THPO) at the Bureau of Indian Affairs comments on the draft license application are still pending. The Service supports the Applicant's efforts to contact the Native American tribes and the THPO as this can avoid any misunderstandings in the future.

The Service supports the early drafting of license articles regarding the "Protection of Previously Undiscovered Cultural Resources." If the Applicant discovers previously unidentified cultural resources during the course of maintaining or developing project works or other facilities at the Project, the Applicant would stop all land-clearing and land-disturbing activities in the vicinity of the resource and consult with the Virginia State Historic Preservation Officer (VA SHPO) and potentially affected Native American tribes to determine the need for any cultural resource studies or measures. If no studies or measures are needed, the Applicant must file with the Commission documentation of its consultation with the VA SHPO and potentially affected Native American tribes.

SPECIFIC COMMENTS

Project Operations

The Applicant proposes to place a 2 to 3 foot high concrete cap on the existing dam to maintain approximately the same water elevation as occurs during flow conditions comparable to the hydraulic capacity of the turbines (4,500 cfs). It is asserted that "the Project will not have any appreciable effect on pre- vs. post-construction water levels during a 100-year flood; this is because at very high flow rates, the Scott's Mill Dam is no longer a control point" (FEMA, 2008). There are no formal hydraulic studies that support this conclusion, as the increase in water

elevation will likely have an effect on the entire area in the impoundment. The islands located within the Scott's Mill Dam headpond include Daniel Island, Treasure Island and Woodruff Island. Harris Creek enters the James River from the north near Treasure Island, which will be partially or totally submerged. Native species noted in the DLA along the James River include canopy trees such as hackberry, red maple, tulip tree, American beech, eastern cottonwood, American sycamore, river birch, black walnut, box elder and silver maple. Vegetation in understory strata are shrubs, herbs, and vines that include spicebush, paw paw, pokeweed, sunflower, wood nettle, trumpet creeper, poison ivy, round leaf greenbrier, muscadine and Virginia creeper. These islands provide a diverse plant species mix and habitat for mammal, avian and invertebrate species. In addition, once the powerhouse is completed, portions of the islands upstream and downstream of the powerhouse section will be removed without coffer dams. These impacts on wetland and island habitats could amount to 100 acres or more in the total project area and potentially affect sensitive species in the area.

Recreational Fishing

The Service commends the Applicant for proposing to create additional recreational fishing opportunities by creating a canoe portage around Scott's Mill Dam on the left side of the James River and a fishing pier on the left side of the river downstream of the dam. In addition to these two items, if a nature-like fishway was created in the canal near the U.S. Pipe Company, this would also enhance recreational fishing, as well as provide ecological benefits and an educational opportunity. In the DLA, it is noted the Scott's Mill headpond offers little public opportunity for boating and fishing, because of the limited access and lack of public boat ramps. Limited angling takes place in the 316-acre headpond due to the lack of public access. To improve public boating access to the Scott's Mill headpond, the Service supports the Applicant's plan to work with the private boat ramp owner to determine how they could assist in providing additional public use of their boat ramps.

The DLA notes that fishing opportunities are available in the high quality habitat downstream of Scott's Mill Dam, near the Middle River and is characterized by high catfish abundance and migratory species that includes American eel, American shad and largemouth and spotted bass. Flathead and channel catfish abundance are also high. In October 2011, Virginia Department of Game and Inland Fisheries sampled the fish community in the James River at six locations between Columbia and Watkins Landings. Twenty-three species were collected. American eel was the most abundant species collected, followed by smallmouth bass, sunfish and channel catfish. Smallmouth bass were present at all six sampling sites. Redbreast sunfish and bluegill comprised the bulk of sunfish collected. Fish passage for American eel, sea lamprey and all other riverine fish will enhance fishing opportunities and improve river ecology.
The existing recreational fishing opportunities should be maintained and enhanced in the Scott's Mill headpond. The DLA states the project will continue to be run-of-river, with a possible future option to operate Scott's Mill in conjunction upstream with the Reusens Dam hydroelectric project with peaking operation. This condition would reduce or eliminate any natural downstream flows in Scott's Mill headpond. The Scott's Mill headpond would be controlled by the peaking flows from Reusens and only during power demand would water flow

through the Scott's Mill headpond. These low flow conditions can reduce the fishing opportunities to local anglers, as fish are less likely to feed during low flow periods. In addition, the DLA states a water level veil of least 0.5 inches will provide water quality benefits, so more analysis is likely needed regarding water level conditions in the headpond. If the veil is not properly calculated, dissolved oxygen could decrease by more than 0.5 mg/l, because of the reduced flows and reduced aeration. In addition, the DLA states the low flow effects will be more pronounced for the 50 to 100 feet immediately downstream from the dam. The DLA states, "downstream of the Scotts Mill Dam during certain low flow periods the velocities may decrease during project operations and it is difficult to predict exactly what effect the reduction in flows over the dam will be on fish habitat." In an effort to avoid and minimize the impacts to fishing and fish habitat, additional analysis is needed to better predict the flow conditions at the dam.

Fish Passage

In the DLA, the Applicant pledges to cooperate with resource agencies to expedite diadromous and resident fish restoration. The resource agencies, including the Service and VDGIF agree the priority is for American eel and sea lamprey passage into Scott's Mill headpond. This can be achieved by several methods and the agencies agree that passage is needed on both sides of the river. On the right side of the river in the former water canal system, the opportunity exists for a by-pass or nature-like fishway that would provide multi-species passage. Even though the DLA states the area is heavily impacted by U.S. Pipe Company, this option would likely be a low cost alternative. If the canal is used for fish passage, any discharge from the turbines should be directed to the downstream entrance to the canal as attraction flow. If a nature-like fishway is constructed using the water works canal, it is noted in the DLA that the Applicant will consult with the SHPO to determine the best approach for adaptive reuse of the historic canal.

The safe, timely and effective downstream migration of silver eels is the most important life stage for the American eel. The silver eel phase includes only female eels that carry an average of 9 million eggs. During downstream river migration, silver eels typically move at night during the darker moon phases, high water flows and decreasing water temperatures. The Service embraces the Applicant's vision to place guide vanes, as appropriate upstream of the turbine entrances to guide all fish to an overflow area where they can safely pass downstream.

The anadromous sea lamprey is among the 20 species of fish passed downstream at Bosher Dam. Adults can reach up to 4 feet in length and weigh up to 5 pounds. Sea lamprey migrate up rivers to spawn. After several years in freshwater habitats, the larvae undergo a metamorphosis that allows young lampreys to migrate to the ocean. After attaching on larger fish at sea, the adult lampreys migrate up the rivers to spawn, where they quickly die of natural causes and decompose, thus providing a food source for the native freshwater fish species.

Fish passage conditions and flows for upstream and downstream fish migration at the Scott's Mill Dam was reviewed by the Service's Fish Passage Engineers. Their initial comments are provided in the bullets below:

Upstream Fish Passage

- The zone of passage (ZOP) for upstream migration encompasses a far-field attraction zone, a near-field attraction zone, the fish passage facility and the impoundment upstream of the barrier. A calibrated computational fluid dynamics (CFD) model can be used to inform fish passage solutions with a specific focus on assessing tailrace hydraulics to inform the design of a fish passage facility. It is recommended at this site that focus is placed on the tailrace (downstream of the proposed turbine units) as well as the bypass reach (downstream of the spillway) to ensure there is a fully connected (i.e., provides the appropriate depth and velocity) zone that allows fish passage to the toe of the dam post alterations. This information is critical to siting the fishway location in an area with the highest probability of functioning effectively.
- A siting study to identify the location of highest density of migrating American eels and Sea lamprey is recommended for the proper site placement once project is constructed.
- For hydropower sites, Engineering expresses the attraction flow requirement as a fraction of the competing flows (e.g., turbine discharge). Specifically, engineering recommends that fishways be designed for a minimum attraction flow per fishway equal to 5 percent of the total station hydraulic capacity. In addition, Engineering's preference is that the entirety of the attraction flow be discharged through, or at, the fishway entrance(s). While adjacent turbine units can often be sequenced to attract fish to the fishway entrance, the discharge from the turbine is not generally used to meet, in whole or in part, the Service's attraction flow requirement. For the proposed Scott's Mill Dam hydropower facility, the Applicant states there will be a station hydraulic capacity of 4,500 cfs. Therefore, Engineering recommends a minimum of 225 cfs for attraction water flow. The location of the attraction flow, allocation (i.e., entirety through the fishway or partitioned differently) and orientation relative to the river is recommended to be integrated within the CFD model in order to determine the ideal means of supplying the attraction water flow. The Applicant anticipates approximately 25 to 50 cfs needed to operate such a facility, but as described above, additional attraction flow will be needed to meet current fish passage criteria.

Downstream Fish Passage

- The ZOP for downstream migration encompasses a far-field attraction zone, a near-field attraction zone (within the impoundment and/or power canal), the fish bypass system and the tailrace (or surrounding river channel) downstream of the barrier. The islands located upstream of Scott's Mill Dam, including Daniel Island, Treasure Island and Woodruff Island, will have to be considered in the design of downstream passage in relation to ZOP. The current configuration does not allow downstream migrating fish to traverse the entirety of the length of the existing dam due to the island, which connects to the dam near the proposed turbine units.
- The Service's Engineering Fish Passage Design Criteria does not consider fish moving through a turbine as an acceptable route, hence the need to prevent entrainment. The Applicant proposed 2 inch trash rack spacing. This spacing will not prevent downstream migrating American eel from traveling through the turbine units. Service Criteria recommends 3/4 inch spacing for full exclusion. Engineering also recommends that normal velocities should not exceed 2 feet per second (fps) measured at an upstream location where velocities are not influenced by the local acceleration around the guidance structural

members. Ancillary to the normal velocity, it is critical to the safe, timely and effective operation of the downstream bypass that the sweeping velocity (parallel to the intake racks) is equal to or greater than the normal velocity in order to guide the downstream migrants to the entrance of the downstream bypass.

- Engineering recommends the downstream bypass should be designed to pass a minimum of 5 percent of station capacity. Therefore, Engineering recommends a minimum downstream bypass flow of at least 225 cfs.
- Nine 54-inch 0.5 MW Littoral Power Systems Inc. (originally manufactured by Rickly Hydrological Co., Inc.) axial flow turbine units that operate 60-400 rpm are proposed but not finalized. Engineering recommends a study be conducted to determine survival through the selected turbines, if full exclusion is not the chosen solution. A desktop analysis is not adequate.

Additional comments

- Reference is made to multiple vertical datums throughout the draft license application including Mean Sea Level (MSL), which is an obsolete datum and no longer supported. Engineering recommends that all elevations are referenced to North American Vertical Datum of 1988 (NAVD 88).
- The Scott's Mill flow duration curve was developed using 89 years of streamflow data (1927-2016). Engineering recommends that the period of record be no longer than 30 years and post-1970 due to climate change as stated in the Service's Fish Passage Engineering Design Criteria.
- The target species biological goals (sustained population) are to be determined by the resource agencies and will have a direct effect on the recommended fishway type as well as numerous design features.
- The operating range for which safe, timely and effective passage can be achieved is bounded by the low and high design flows. Engineering defines the design low and high flow as the mean daily average river flow that is equaled or exceeded 95 percent and 5 percent, respectively, of the time during the migratory period of record (MPOR) for target species normally present in the river basin and at the fish passage site. The MPOR is to be determined by resource agencies.
- Engineering recommends that adjustable spillway gates be considered rather than the permanent 2 foot high concrete cap that is proposed. Adjustable gates offer many advantages for fish passage, including independent operation of gate sections, which would offer a potential downstream passage route and allow for adaptive management.
- The study plan reports should be separated and clearly labeled. The report titles and numbers do not match.

Endangered Species Act and Species of State Concern

The DLA lists the protected species that occur within the Project area that includes the threatened northern long-eared bat (*Myotis septentrionalis*) and the James River spinymussel (*Pleurobema collina*). The Applicant conducted a mussel survey upstream and downstream of the dam and no federally endangered or State listed species were found.

The Applicant stated the proposed action will not result in clearing or damage to existing forested habitat. The Applicant intended to conduct a bat study, but following the Terrestrial Habitat Assessment determined that raising the dam height to 3 feet would essentially maintain existing water levels, and no bat habitat would be affected by the dam alteration and abandoned plans for the bat study. The Applicant concluded no further Section 7 consultation under the Endangered Species Act is required, even though the Terrestrial Habitat Assessment lacks any hydrologic study or modeling, and relies only on visual determinations and estimates of inundation impacts to the nearly 2.5 miles of island habitats that includes wetlands. The habitat loss from raising the dam and flooding could amount to a significant amount of wetland and forested acres. The Service generally agrees with the Applicant's northern long-eared bat assessment. While the flooding may slowly kill trees on the islands, this is not likely to affect northern long-eared bats, because no felling of trees will occur during the breeding season.

Protected Species List

James River spinymussel (*Pleurobema collina*), federally Endangered (FE) and State Endangered (SE)
Northern long-eared bat (*Myotis septentrionalis*), federally Threatened (FT) and State Threatened (ST)
Little brown bat (*Myotis lucifugus lucifugus*), SE
Tri-colored bat (*Perimyotis subflavus*), SE
Peregrine falcon (*Falco peregrinus*), (ST
Loggerhead shrike (*Lanius ludovicianus*), ST
Atlantic pigtoe (*Fusconaia masoni*), ST
Green floater (*Lasmigona subviridis*), ST
Migrant loggerhead shrike (*Lanius ludovicianus migran*), ST

The mussel survey documented the presence of three freshwater mussel species; the eastern elliptio, northern lance, and eastern floater. The highest quality habitats and greatest relative abundances were observed in the lower tailrace reach near the John Lynch Bridge, and the upstream results indicated the Scott's Mill headpond supports a very low mussel density in the observed habitat data. The difference in mussel abundance between the downstream versus upstream sites was a startling 500 percent more abundant downstream, as calculated by catch per unit effort. The eastern elliptio mussel is the most abundant mussel on the East Coast and the American eel is believed to be the primary host fish of the eastern elliptio. In a unique interaction between eastern elliptio larvae and eels, the larvae attach to the eel gill arches for a few days during the eel migration. The host fish (eels) are responsible for the upstream distribution of larval mussels during the eel migrations. The lack of eel passage into the Scotts Mill Dam headpond is the likely cause for the low mussel abundance upstream. The restored natural mussel beds in the headpond could provide water quality benefits from the mussel filtration of the water column and improved habitat from the colonization of mussels.

The green floater was not found during these survey efforts or any live protected species of freshwater mussels. Project effects on the endangered James River spinymussel, as stated in the in the environmental assessment, that "...changes associated with inundation adversely affect both adult and juvenile mussels as well as fish community structure, which could eliminate possible fish hosts for glochidia (Fuller 1974)". The Applicant anticipates that the Service will issue a biological determination after the Commission has issued its draft environmental assessment and biological assessment. In anticipation of the draft environmental assessment, the Applicant should contact the U.S. Fish and Wildlife Service, Virginia Field Office for coordination on threatened and endangered species findings.

Cumulative Impacts

The DLA states, "Since the project is proposed to remain run-of-river, the Applicant proposes to exclude most lands around the shoreline and the three islands (Daniel, Treasure, and Woodruff) from the project boundary except for the southern tip of Daniel Island. Applicant proposes to include in the project boundary only those lands necessary for project construction, operations, maintenance, and environmental enhancements. The Applicant owns the lands on both sides of the river necessary for constructing the power plant, fishway facilities and recreation enhancements." The Service believes raising the headpond level 2 to 3 feet will likely inundate some or all of the island wetland habitats and accelerate the shoreline erosion along both the natural and armored headpond shorelines, as waves overtop the structures and erode from behind the structures.

The DLA does not quantify the cumulative impacts or how all the habitat impacts were avoided and/or minimized. In addition to the cap proposed for Scotts Mill Dam, there are no cumulative values provided to assess the entire project impacts. The Service suggests providing an estimate of total habitat impact that includes these actions:

- Applicant intends to dredge an existing channel at the southern end of Daniel Island just upstream of the dam to allow flow from the main channel to the powerhouse.
- Applicant plans to excavate about 5 feet of rock to elevation 493 feet at the power plant site and about 10 feet downstream. It may also be necessary to excavate the riffle area downstream of the arch dam and an area immediately downstream of the old fishway to the left of the arch section.

We appreciate the opportunity to provide comments and recommendations on the DLA. If you have any questions regarding this letter please contact David Sutherland at 410-573-4535 or david_sutherland@fws.gov.

Sincerely,

Genevieve LaRouche
Field Supervisor

cc: Scotts Mill Service List
Cindy Schultz, Virginia Field Office