United States Department of the Interior

FISH AND WILDLIFE SERVICE

New England Field Office
70 Commercial Street, Suite 300
Concord, New Hampshire 03301-5087

REF: FERC No. 2489
Central Vermont Public Service Corporation

April 17, 2002

Mr. Michael Scarzello
Central Vermont Public Service Corporation
77 Grove Street
Rutland, VT 05701

Dear Mr. Scarzello:

We have completed our review of the reports on the 2000 and 2001 Downstream Smolt Bypass System Evaluation studies and the 2000 Assessment of Smolt Safety for the Cavendish Hydroelectric Project, located on the Black River in Vermont. These reports were transmitted by your letter dated February 4, 2002.

2000 Assessment

The evaluation in 2000 tested the FishPath flow inducer, along with an oil boom used to assist guidance to the bypass. Bypass flows of 5 cfs and 7 cfs were evaluated.

The test results were confounded by spill conditions during the testing periods, whereby passage efficiencies were reduced as tagged smolts spilled over the dam. Bypass efficiencies were better for later releases when spill subsided.

2001 Assessment

The 2001 evaluation tested the same system as in 2000, with a 7 cfs discharge. Once again, spill confounded results. However, despite spill, overall bypass efficiency over the course of the study was 57%.

Smolt Safety Study

In order to assure that bypassed smolts are safely conveyed downstream, the bypass chute and plunge pool were evaluated at the 7 cfs bypass test flows. During initial tests, fish survived passage into the plunge pool but a significant percentage of the fish were found to remain in

the plunge pool and not leave. In all cases, smolts survived and appeared in good shape. Delayed mortality was assessed for a 72 hour period with only one delayed mortality.

In order to address the failure of smolts to exit the plunge pool, a submerged orifice and pipe was installed in lieu of the overflow weir. CVPS thought that the smolts were reluctant to exit via the weir given the surface turbulence and air entrainment since smolts in the plunge pool remained in deeper in a quieter area of the plunge pool. Three tests of the modified plunge pool exit were conducted. Egress was vastly improved by the modification.

Discussion

The 2000 and 2001 bypass evaluations tested a bypass configuration with the flow inducers and oil boom and a bypass discharge of 5 to 7 cfs. Evaluations in 1999 also tested these lower bypass discharges, which are significantly below a standard bypass passing 20 cfs. Although the reduction in bypass size and discharge likely reduces bypass efficiency, this reduction was needed in order to protect a rare bryophyte species that inhabits the Cavendish Gorge below the dam. In addition, the bypass plunge pool proved to be an unsafe passage route at a 20 cfs discharge.

The 1999, 2000 and 2001 evaluations of the FishPath system with reduced fish bypass discharges demonstrated reasonable passage efficiency, given the periodic spill that occurred during the evaluations. Smolts likely use a downed or overtopped rubber dam section when spill occurred. Therefore, overall safe passage at the project is likely higher than the bypass monitoring alone indicated. Since periodic spill is common during the smolt migration period, we would expect that on average, safe passage past the project to be acceptable.

The plunge pool safety evaluations demonstrated that the bypass and plunge pool, when operated at a reduced 7 cfs, flow provided a safe passage route. The modification to the plunge pool of an orifice in place of a overflow weir proved effective in speeding egress. On a conference call on April 11, 2002, your consultant, Jeff Wallin, suggested that further improvements in egress from the plunge pool could be achieved if the orifice location were moved to the upstream portion of the plunge pool. This would provide for egress from the quiet area smolts congregated in and would assist in transition from the plunge pool to the natural spill pool area below the dam apron. A pipe would be attached to the orifice if this was deemed necessary to convey fish to the natural pool. We concur with this proposed modification.

With the proposed plunge pool modifications we recommend that CVPS implement the current bypass systems with a 7 cfs bypass flow as the project's permanent smolt passage system.

We appreciate this opportunity to comment. If you have any questions, please contact John Warner of this office at (603) 223-2541 or e-mail at john_warner@fws.gov.

Sincerely,

William J. Neidermyer

William J. Neidermyer
Assistant Supervisor Federal Projects
New England Field Office

cc: FERC -OHL
RO-ENG - Curt Orvis
CT River Coord. - Jan Rowan
VDFW-Springfield - Jay McMenemy
VDFW - Rod Wentworth

ES: JWarner:dw:4-17-02 :603-223-2541

Central Vermont Public Service Corporation

February 4, 2002

Mr. John Warner
US Fish & Wildlife Service
70 Commercial St., Suite 300
Concord, NH 03301-5087

RE: FERC No. 2489
Cavendish Project - Downstream Fish Passage

Dear John:

Enclosed please find the downstream passage test results for the years 2000 and 2001. Appended to the 2000 report are the results of the passage system mortality test and the system retention time test.

As you are aware, this study is complicated by extraneous site factors that influence results of our testing. Protection of the bryophytes limits attraction flows, the amount of head coupled with the configuration of the gorge makes it difficult to test a permanent passage system, and, perhaps most importantly, the narrow width of river and low hydraulic capacity of the project results in frequent spillage over the dam during the spring testing period.

A typical spring rain event generally results in dam spillage. Such events have plagued us each year and is evident in the temporal results of the yearly studies. Our best recapture rates always come from the releases made late in the season when river flow has subsided. Recaptures in 1999 jumped from 49% and 37% for the early releases to 66% and 72% for the late releases; in 2000 (a very wet spring) recaptures went from 8% and 2% to 28% and 31%; and for 2001 recaptures of the five releases increased chronologically from 36% to 54% to 60% to 72% to 91%.

Though perhaps anecdotal, we need to assess what is being accomplished within the complex parameters surrounding the project and what is the most practical direction to head. We believe that controlling factors are outside of our influence and our time and money would be better spent correcting physical impairments within our reach. We would like to move forward and make the necessary refinements to the plunge pool to get the smolts safely into the streambed below.

After review of the enclosed reports, I would suggest that we confer by phone to map out a productive strategy to finalize this challenging effort. I will contact you shortly to set up a conference call with the parties involved.

Sincerely,

Michael Scarzello, P.E.
Principal Engineer

C: A. Sidoti, FERC, NYRO
R. Wentworth, VDFW

BC JG
Hollon
Truebe

MJS

FEDERAL ENERGY REGULATORY COMMISSION
WASHINGTON, D. C. 20426

Project No. 2489-031 & 032–Vermont
Cavendish Hydroelectric Project
Central Vermont Public Service
Corporation

FEB 17 2000

Mr. John C. Greenan
Central Vermont Public
Service Corporation
77 Grove Street
Rutland, VT 05701

Dear Mr. Greenan:

This acknowledges receipt of *Progress Report 3 - Report of the Results of the 1998 Study of the Effectiveness of the Downstream Fish Passage Facility at the Cavendish Hydroelectric Project* and a 1999 fish passage summary, filed on December 27, 1999.

On June 15, 1998, the Commission issued its Order Approving Downstream Fish Passage Facility Effectiveness Monitoring Plan. In that order, we reviewed the results of the 1997 fish passage monitoring, agency comments, and licensee recommendations. The order approved your proposal to conduct further monitoring in 1998 and to send the final report to the Commission by November 15, 1998. In addition, via the June 1998 order, we reserved the right to the Commission to require modifications to the passage facility or additional monitoring.

In January 1999, you forwarded a draft report of your 1998 monitoring to the U.S. Fish and Wildlife Service (FWS) and the Vermont Department of Fish and Wildlife (VDFW). The draft report concluded: 1) fishway efficiencies of 55.3 and 75.0 percent equal or approach efficiencies that can be expected at passage retrofits such as Cavendish and, therefore, further monitoring would be terminated; and 2) modifications to the plunge pool is needed and would be completed during 1999.

By letter dated February 19, 1999, the FWS disagreed with the conclusions regarding fishway efficiencies and outlined several modifications or alternatives that could increase passage efficiency. The FWS also noted that increased bypass flow would not be an option because increased flows in the bypassed reach may have an adverse effect on a rare bryophyte (*Scapania umbrosa*).

In response to the FWS comments, you stated that you would pursue FWS recommendations and test a flow inducer device during 1999. Emphasis would be on improving passage efficiency while reducing the fish passage flow requirement in an effort to increase smolt survivability of the plunge pool and lower bypass flow impacts on the rare bryophyte in the bypassed reach.

In your downstream fish bypass system evaluation summary for 1999, you reported recovery rates as high as 72 percent. In your cover letter to the FWS accompanying your December 1999 filing, you stated that you would install the flow inducer if the FWS concludes that the system creates acceptable passage efficiencies. You also stated in your cover letter to us that you would continue to evaluate the relationship between operation of the fish passageway and the bryophyte of concern in the bypassed reach. You would also continue to consult with the FWS and the VDFW and keep the Commission apprised of your progress.

After review of the 1998 report and the FWS' February 19, 1999 letter, we concur with the FWS' comments and recommendations. We would also have required additional modifications and additional fishway effectiveness monitoring during 1999 if you had filed the report with us by November 15, 1998 as required by our June 1998 order. Therefore, we request that by March 10, 2000, you provide us with the final report of modifications to the downstream fish passage facility and fish passage effectiveness monitoring completed during 1999, to include agency comments and recommendations, and your recommendations for fish passage modifications and/or monitoring during 2000.

Please file an original and seven copies of the materials requested with:

The Secretary
Federal Energy Regulatory Commission
Mail Code: DLC, HL-11.2
888 First Street, NE
Washington, DC 20426

Thank you for your attention to this matter. If you have any questions, please contact Robert Grieve at (202) 219-2655.

Sincerely,

for George H. Taylor

Lon R. Crow
Chief
Environmental Compliance Branch

Central Vermont Public Service

70 YEARS OF SERVICE TO VERMONT

December 17, 1999

Mr. John Warner
US Fish & Wildlife Service
22 Bridge Street, Unit #1
Concord, NH 03301-4986

RE: Central Vermont Public Service Corporation
Cavendish Station, FERC Project #2489
1999 Downstream Fish Passage

Dear Mr. Warner:

CVPS has yet to formally report on the results of fish passage testing and experimental fishway enhancements completed at the Cavendish Station project earlier this year. I regret the delay in our formal report, however, I am pleased with our overall progress on fish passage and other issues at the project. Enclosed is a summary from Current Solutions, L.L.C. on the FishPath system that CVPS voluntarily evaluated. These results appear quite favorable and CVPS, with your endorsement, will continue to evaluate the possibility of installing a permanent FishPath system at the site. This submittal also includes two other documents, namely Progress Report 3 (results of the 1998 effectiveness testing) and the 1999 bryophyte survey of the Cavendish Gorge.

Fish passage through the gorge and bryophyte populations in the gorge continue to present conflicting requirements. As you may be aware, Dr. McQueen, the bryologist who monitored bryophytes in the gorge since 1990, died last April. With the help of VANR, we hired Dr. Norton Miller, curator of the Bryophyte Herbarium and Quaternary Paleobotany Collection at the New York State Museum, to perform the final annual review of the five-year study in the gorge. His report states that he could not find any *Scarpania umbrosa*, however, two other rare bryophytes were found growing at the 10 cfs water level. His recommendation is to limit bypass flows to 5 cfs. I mention this only to refresh the concept of the complexity of the gorge with particular consideration of downstream fish passage flows.

Throughout the 1999 fish passage study, CVPS' consultant team made minor adjustments to the system with each study group of smolts released. Our recapture rate increased to 72% with only a 7 cfs passage flow. In light of the competing requirements, CVPS feels that with the addition of the FishPath system to permanently enhance downstream smolt movement we could balance all concerns. CVPS is willing to permanently install a FishPath if the results from this year's work allows you to conclude the FishPath system creates acceptable passage efficiencies.

I would appreciate an opportunity to discuss where we stand after you review the enclosed material. I will call you in a few days to schedule a convenient time to discuss the project. Thank you for your assistance and patience with this project.

Sincerely,

John C Greenan

John Greenan, P.E.
Project Coordinator

Cc: R. Wentworth VDFW
A. Sidoti FERC NYRO
J. Wallin MRM w.o. enclosures
T. Tarpey Current Solutions w.o. enclosures
M. Scarzello CVPS

Cavendish Hydroelectric Project
1999 Downstream Fish Bypass System and Evaluation
July 1999 Revision 2

Background

The Central Vermont Public Service Corporation (CVPSC) Cavendish Hydroelectric Project is located in Vermont on the Black River, a tributary to the Connecticut River. CVPSC completed the relicensing of this project for the Federal Energy Regulatory Commission in November of 1994. Articles pursuant to this license required that CVPSC install downstream fish passage facilities for Atlantic salmon smolts. These facilities were completed for the 1996 smolt run. The facilities consisted of a downstream fish passage entrance on the left side of the dam, with a sluiceway down to a plunge pool and trap for evaluation of the fish passage. Initial results from the evaluation of the system showed recapture rates between 4.7% and 9.0%, with fish bypass flows at 20 cfs and 10 cfs, respectively. Since that testing, a rare bryophyte has been found in the bypass channel. Experts believe that the fish bypass flow should be further reduced to 5 cfs to limit damage done to this bryophyte.

Project Description

The Cavendish Project consists of five main components:

Cavendish Dam: An 111-foot-long, 25-foot-high concrete gravity dam with a 90-foot-long north spillway section topped with a 6-foot-high inflatable rubber dam, and a 21-foot-long south spillway section with 2 ½ foot flashboards. This dam diverts water from the Black River to the project powerhouse via an intake structure and 1,250-foot-long penstock.

Bypass Channel: The approximately 1,600-foot-long channel between the Cavendish Dam and the project powerhouse tailrace.

Penstock Intake Structure: A submerged entrance concrete structure (on the north bank) with an electrically operated headgate and inclined trashracks. The top of the intake is 12.5 feet below normal water level and the invert is 21.5 feet below normal water level. The trashracks are 16 feet wide by 27 feet deep with clear bar spacing of 1.5 inches. A power tunnel extends 180 feet from the trashrack to the 6 foot diameter penstock.

Powerhouse: The powerhouse houses three horizontal shaft Francis turbine generators with a combined hydraulic range of 19 to 226 cfs. Turbine rotation speed is 600 rpm. The approximate gross head of the project is 120 feet.

Powerhouse Tailrace: The powerhouse tailrace and the Bypass Channel join immediately below the powerhouse.

Installation of the FishPath System

In April of 1999, Current Solutions, L.L.C. was contacted about the possibility of installing a FishPath system to improve the fish bypass effectiveness at the Cavendish project. The FishPath system is a mechanically generated current and turbulence lead to divert downstream migrating fish to the bypass entrance area. Upon inspection of the site, this appeared to be a good candidate for a FishPath. The target species, Atlantic salmon smolts, typically move near the top of the water column. There was little existing surface current directed toward the bypass entrance, or any discernable surface currents in the headpond. This may have disoriented migrating fish previously, but also meant there would be little competing current toward the turbines for the FishPath to compete with.

On April 30, Current Solutions delivered and installed a FishPath system on the left bank upstream of the turbine intake area. See Photos 1 and 2. The system consisted of a single, 2 HP submersible current inducer with 3-foot diameter blade mounted in a frame. The frame had floats on each end, as well as legs to hold the frame in position off the bank. A coarse trashrack was installed around the propeller, as well as a fine plastic mesh trashrack on the upstream side of the frame. The frame permitted adjustment of the tilt of the propeller, while adjustment of the leg length changed the orientation of the current plume. After installation, the current plume was adjusted such that it was tilted upward slightly, and angled so the edge of the plume would just reach the area of the bypass entrance.

Modifications were also made to the bypass entrance area. To allow passage of the smaller bypass flows while maintaining the depth in the bypass entrance, a picture-frame-style restrictor plate was installed. This reduced the gate width to 18" while having a minimum water depth of 1'. The edges of this were made of pipe to reduce the edge turbulence at the bypass entrance. Also installed was a video monitoring system for evaluation of the addition of the current inducer. To obtain clear images of the fish passing into the trap, an additional weir with counting board on the weir invert was placed near the entrance to the fish trap.

Evaluation of the Downstream Fish Passage with the FishPath

In order to evaluate the downstream fish passage, 375 Atlantic salmon smolts were obtained from the White River National Fish Hatchery. At the hatchery, the smolts were divided into lots of 125 fish and tagged with Floy T-Bar tags. Each lot was tagged with white, orange, or green tags. The tagging was done to identify the hatchery smolts versus the wild smolts when trapped, distinguish between lots released on different dates, and facilitate observations of the fish movements in the impoundment. Before trucking to the Cavendish project, one green tagged smolt died at the hatchery holding tank and one white tagged smolt died in the live car on site. Before each release, 25 fish from each lot were held as controls. All controls were eventually released as a fourth study lot.

The green tagged smolts were released in two batches, 10 on April 30th after installation of the FishPath and the remaining 89 on May 3rd. Only 2 of the original 10 were captured after two days, consequently the fish bypass flow release was increased from 5 cfs to 7 cfs before the second batch of green tags were released. The target fish

passage attraction flow was then maintained at 7 cfs for the remainder of the study. Of the 99 green tagged fish released, 49 were recovered in the trap for a 49% recovery rate. The majority of these smolts were recovered between 4 and 6 days after their release.

On May 10th, a speed controller was added to the current inducer. Confusion for the migrating fish created by induced current reflecting off the wall adjacent to the bypass opening could now be reduced by matching the speed of the current inducer to the varying river flow. Field measurements and adjustments were made to establish a gradual acceleration into the bypass of approximately 1 ft/s^2. On this date the orange-tagged lot of fish was also released. Of the 100 released, 37 were recaptured for a 37% recovery rate. The majority of these fish were recovered the day after release.

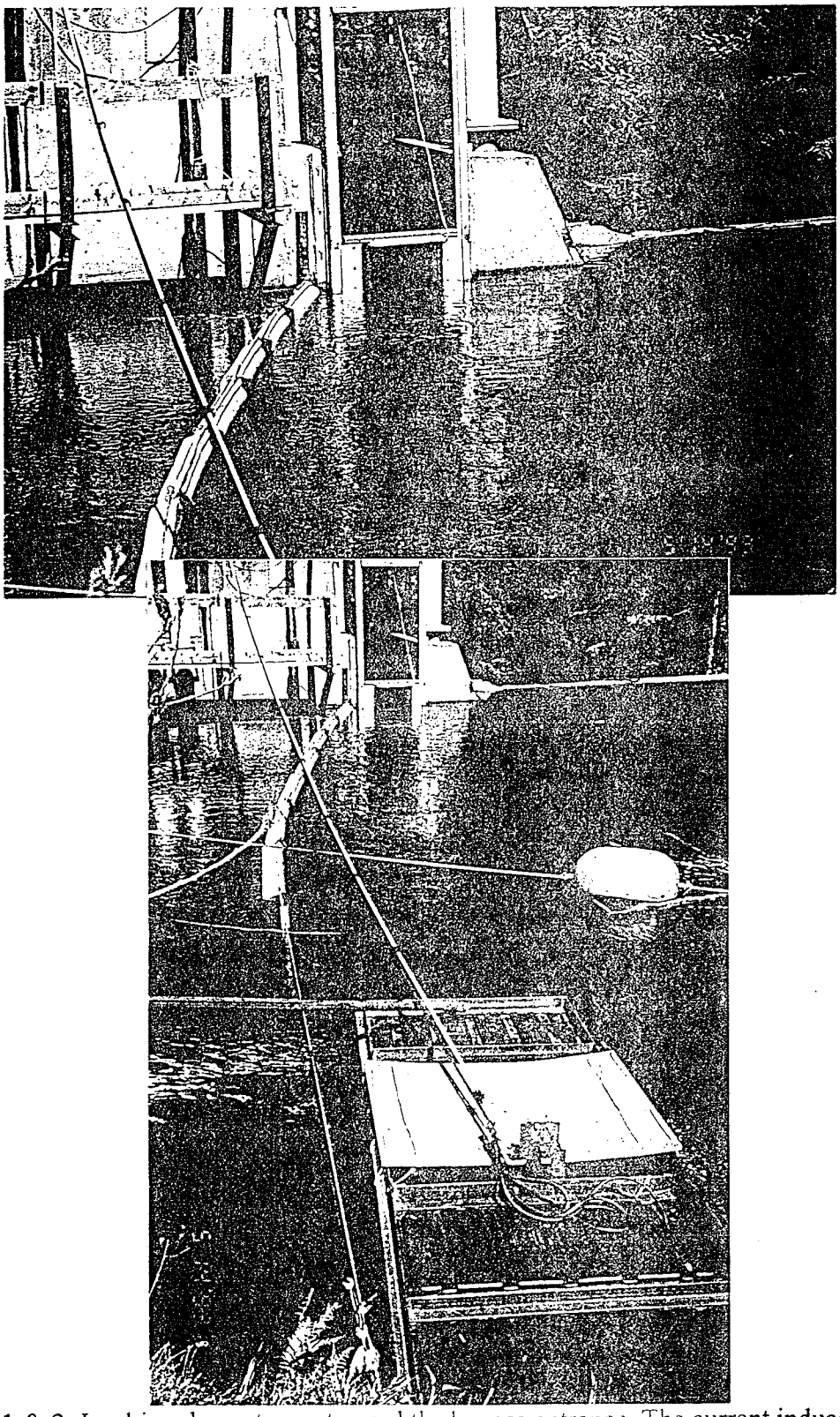
An oil boom used as a floating fish lead was installed on May 14. This lead extended from the edge of the current inducer to the edge of the bypass. See Photos 1 and 2. It consisted of a long, narrow float on top, with an impermeable membrane stretching down 3'. The lead had a cable through the float and along the bottom of the membrane to keep it taught. The purpose of this lead was to ensure the surface current could be carried from the current inducer to the bypass entrance, as well as to provide a visual cue to the fish. The video camera and a fluorescent light were moved from the plunge pool to the bypass entrance area. The white-tagged lot of fish was also released on May 14. Of the 99 fish released, 66 were recaptured for a 66% recovery rate. Visual observations showed, when the fish were initially released, they schooled deep and crossed under the fish lead to the intake area. They were also swimming head into the current generated by the FishPath. As time went by, however, the fish began to swim with the generated current as they would in a river situation, and they did not pass under the fish lead. See Photos 3 and 4. Review of the videotape confirmed that the fish followed the lead because the majority of fish entering the bypass did so from the left side of the entrance, near the termination of the fish lead.

On May 18, the tags on the 75 remaining control fish were clipped shorter to distinguish them from those previously tagged, and then released. Of the 75 released, 54 were recaptured for a 72% recovery rate.

As outlined on the accompanying table, a total of 187 wild smolts were captured in the fish trap during the period the trap was operated for study purposes.

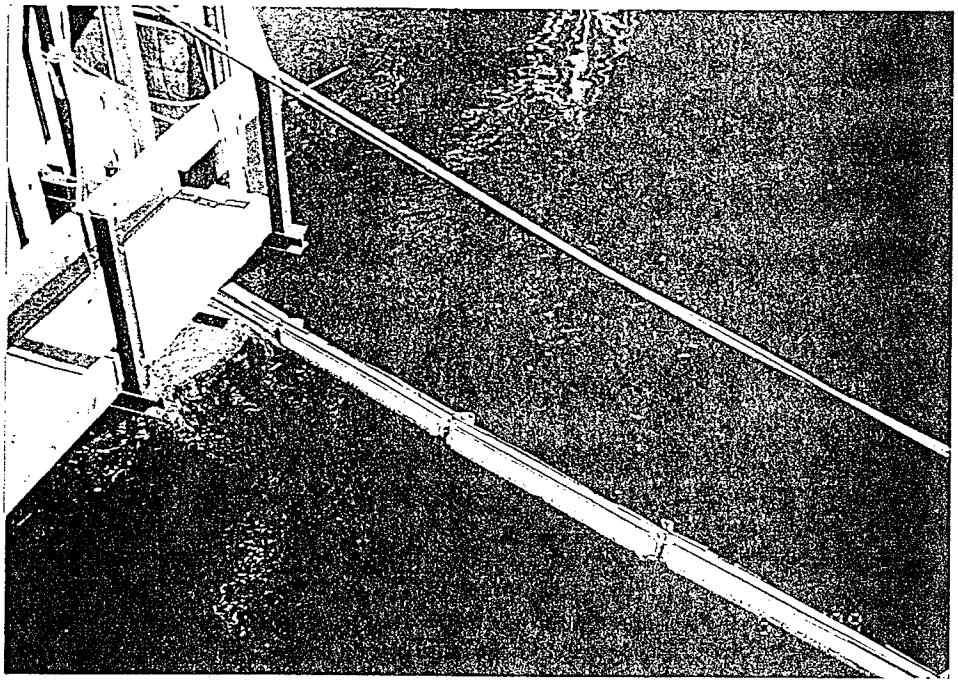
1999 Downstream Fish Bypass Summary												
Date	Turbine Output (MW)	Turbine Flow (cfs)	Water Temp. (F)	Green Release	Green Recapture	Orange Release	Orange Recapture	White Recapture	White Recapture	Control Release	Control Recapture	Wild Recapture
4/30/99	0.647	101		10								
5/1/99	0.964	146	48		1							
5/2/99	0.84	129	50		1							
5/3/99	0.679	106	52	89								
5/4/99	0.441	72	56		13							
5/5/99	1.13	170	55		10							10
5/6/99	0.95	144	55		18							9
5/7/99	0.631	99	58									17
5/8/99	0.838	128	58		3							11
5/9/99	1.566	231	56		2							34
5/10/99	1.587	234	55		1	100						5
5/11/99	0.587	93	52				31					14
5/12/99	0.868	133	52				1					6
5/13/99	0.546	87					3					6
5/14/99	0.906	138	48				1	99				13
5/15/99	0.57	91	53						58			11
5/16/99	0.457	75	56				1		5			8
5/17/99	0.549	88	57						1			13
5/18/99	0.499	80	59						2	75	2	12
5/19/99	0.461	75	63								52	5
5/22/99	1.563	231	54									4
5/23/99	1.362	202	56									2
5/24/99	1.531	226	57									2
5/25/99	1.594	235	53									5
Total				99	49	100	37	99	66	75	54	187
% Recapture					49%		37%		66%		72%	

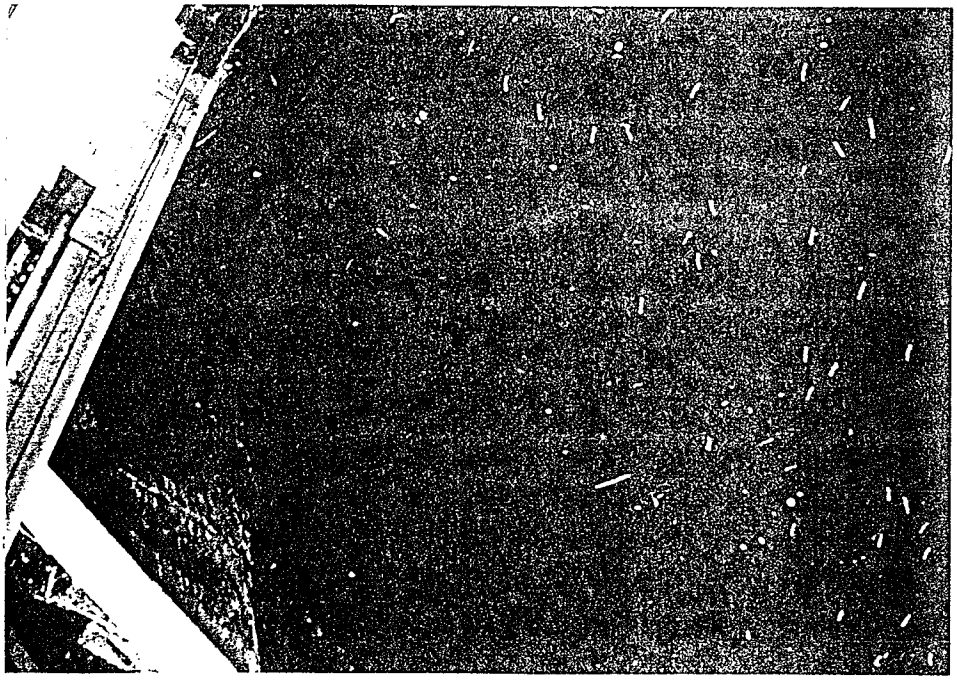
Current Inducer Installation
at the Cavendish Hydroelectric Project - 1999



Photos 1 & 2: Looking downstream toward the bypass entrance. The current inducer is in the foreground while the oil boom surface lead extends to the fish bypass entrance in the background. The turbine intake is on the left and the spillway is to the right.

Current Inducer Installation
at the Cavendish Hydroelectric Project - 1999





Photos 3 & 4: Tagged fish in the forebay at Cavendish. Oil boom leads to the fish bypass entrance in the upper left corner of the photos. The turbine intake is in the lower left.

MJS

United States Department of the Interior

FISH AND WILDLIFE SERVICE
New England Field Office
22 Bridge Street, Unit #1
Concord, New Hampshire 03301-4986

REF: FERC No. 2489
Central Vermont Public Service Corporation

February 19, 1999

Mr. John C. Greenan
Central Vermont Public Service Corporation
77 Grove Street
Rutland, VT 05701

Dear Mr. Greenan:

We have completed our review of the "Draft Report of the Results of the 1998 Study of the Effectiveness of the Downstream Passage Facility at the Cavendish Hydroelectric Project (FERC No. 2489), Black River, Vermont", dated January 1999.

The Draft Report is generally complete and provides a good summary of smolt bypass studies from 1996 through 1998. Due to the poor results of the 1996 evaluation and questionable behavior of smolts of landlocked stock used in 1997, the evaluation was repeated again in 1998 using smolts of Connecticut River sea-run stock.

We have the following comments and recommendations.

3.2 Status of Restoration

To complete the entries in your table on fry stocking, 91,120 salmon fry were stocked upstream from the Cavendish Project in 1998.

5.3 Study Results

On page 33 the report lists the numbers of wild salmon smolts recorded at the bypass on specific days. We are somewhat surprised at the number of salmon smolts passing the project in June under high water temperature conditions and are concerned that some of these fish may have been misidentified as salmon smolts. Depending upon the experience of the monitoring staff and the condition of any dead fish that were trapped, misidentification of salmon parr or trout as smolts is possible. If photographs were taken or if any mortalities from the trap were saved and frozen, we recommend that they be checked by an experienced consultant and provided to Jay McMenemy of the VDFW office in Springfield for identification. The data summary in Table 3 does not identify the size of individual wild smolts. This data would help in evaluating whether these are true smolts or parr.

Although in various places in the report, river temperatures and river flows, including the amount of spill flow was identified, the data is not presented in a manner that allows for adequate review of these data. We request that you provide a daily tally sheet that includes number of smolts, river flow, amount of spill and river temperature for the entire study period. This information is important in assessing smolt passage timing at this and other projects.

5.4 Discussion and Conclusions

This section includes the statement: "It would appear that these efficiencies may equal or approach those that can be expected for fish passage retrofits such as Cavendish." We strongly disagree with this statement. First, there are many projects where proven technology (angled screens and bypasses) have been retrofitted to existing projects. In this case, screening was opposed by CVPS due to cost considerations and the lack of screening may explain the low bypass efficiency. However, screening or other measures could be installed that could improve passage effectiveness at the project.

This section also cites the increase in enumerated wild smolts over the last two years and suggests that this increase may indicate an increased efficiency of the bypass in recent years. We think that it is more likely that given the limited number of captured smolts, minor differences in spill conditions or trapping effectiveness can explain the increases.

CVPS Conclusions

CVPS concludes that:

- the efficiency of the fishway is adequate and as good as can be achieved, so that further effectiveness testing should be terminated;

- modifications to the fishway plunge pool are needed to improve survival of fish using the bypass; and

- plunge pool modifications should take place in 1999

Conclusions and Recommendations

Based on our review of the report, we reach the following conclusions and recommendations.

Bypass Efficiencies

As stated above, we do not agree that the efficiency of the existing bypass facility is the best that could be attained at the project. Under such circumstances where tested facilities do not produce acceptable efficiencies, various alternatives should be considered. Bypass flow could be increased, the bypass entrance could be modified or screens or guidance louvers could be

added to the project. Alternatively, operational changes that spill water during key migration periods could be considered.

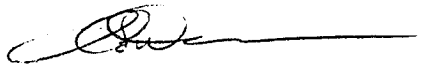
In the case of the Cavendish Project, increased bypass flow is not an acceptable alternative given concerns that even the 20 cfs bypass flow has contributed to the decline of the rare bryophyte (Scapania umbrosa) whose population in the bypass reach gorge has experienced a dramatic decline in recent years. If more water were to be used for passage, pumping back to the headpond from the bypass collection box would be needed in order to avoid increased bypass reach flows. Other alternatives we recommend that CVPS consider include programmed spill during peak passage periods and hours to augment passage success, or the installation of a flow inducer device, to create a flow field that guides fish to the bypass opening. Such a devise was developed by Lakeside Engineering and Essex Power Services, and has been tested on a limited scale on projects on the Contoocook and Ashuelot Rivers. The configuration of the Cavendish site may be conducive to such an device. We suggest you contact Lakeside Engineering for more information on this option.

Plunge Pool Improvements

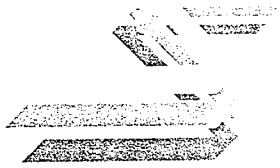
Despite our reservations about bypass effectiveness, we strongly agree that the safety of the bypass facility for salmon smolts needs substantial improvements and that these improvements should be implemented in 1999. There are two approaches that could be taken to achieve this improvement. The plunge pool itself could be modified. This will require a substantial increase in the plunge pool size by constructing higher side walls and/or by additional rock removal. Alternatively, the volume of flow for fish conveyance could be reduced, with some of the water used to attract fish to the bypass pumped back to the headpond. In this way, fish attraction flow to the bypass is not reduced, but the flow for conveying the fish is reduced. Fish could then be captured in a smaller plunge pool or transitioned to a pipe and conveyed downstream to a safer discharge area. Lastly, a dewatering mechanism such as wedge wire screening could be used to reduce the amount of flow conveying fish. With either approach to reduce conveyance flows, the size of the existing plunge pool may be adequate, or its expansion could be minimized.

We recommend that you consider the alternatives discussed above for improving bypass effectiveness and safety of salmon smolts using the bypass, and revise the report as recommended. A meeting or on-site inspection can be scheduled as needed. Thank you for this opportunity to comment. If you have any questions, please call me at (603) 225-1411.

Sincerely yours,



John P. Warner
Energy Coordinator
New England Field Office



Central Vermont Public Service Corporation

February 27, 1995

Ms. Lois Cashell, Secretary
Federal Energy Regulatory Commission
825 N. Capitol Street, N.E.
Washington D.C. 20426

RE: L.P. No. 2489-001, Cavendish
Interim Downstream Fish Passage Plans

Dear Ms. Cashell:

Pursuant to Article 405 of the license for the above referenced project, I am enclosing an original and 8 copies of the interim downstream fish passage plan, design drawing, and agency correspondence.

The plan utilizes the method by which we have been passing the required minimum flow since receipt of the new license in November 1994. As such, the fishway is operational now.

AGENCY CORRESPONDENCE

In a letter dated November 23, 1994, the U.S. Fish and Wildlife Service (USFWS) suggested that the interim downstream passage could be accomplished with our method for releasing minimum flow, without detailed designs or modifications.

By letters dated January 16, 1995, I requested comments on the draft plan based on the minimum flow release method from the USFWS and the Vermont Department of Fish and Wildlife (VDFW). The VDFW responded by letter dated February 14, 1995, requesting a design flow of 10 cfs to 25 cfs. By letter dated February 27, 1995, I responded that CVPS cannot increase minimum flow above 10 cfs, except during periods of high flow, without an order from the FERC following a study of the impact of higher flows on the rare bryophyte *Scapania umbrosa*, pursuant to article 409 of the license. No additional comments were received from the USFWS.

77 Grove Street,
Rutland, Vermont 05701
802-773-2711

Please call me at (802) 747-5463 if you should have any questions.

Sincerely,

Bruce M. Peacock
Manager of Production Engineering

Attachments

cc: A. Sidoti FERC NYRO
J. Cueto ANR
J. Warner USFWS
R. Wentworth VDFW
S. Sease ANR

Central Vermont Public Service Corp.

Cavendish Station L.P. # 2489

Interim Downstream Fish Passage Plan

Purpose

The purpose of this plan is to describe the interim measures for passing Atlantic Salmon smolt downstream of the Cavendish Dam.

Per the suggestion of USFWS personnel, the interim passage will be the existing sluiceway. The sluiceway is the northern most flashboard located adjacent to the headworks. This flashboard has been modified by cutting a rectangular hole three feet wide and installing stop logs as shown in the attached drawing. This flashboard is normally used to sluice surface debris away from the intake, but upon receipt of the new license, 3 stoplogs were removed and it has been used to pass the 10 cfs minimum flow to the bypassed reach.

The proposed passage was demonstrated to USFWS and Vermont Fish and Wildlife personnel on October 13, 1994. No additional modifications for interim fish passage are proposed.

Design Flow - 10 cfs[1]

Schedule

Construction - completed

Operational Period - April 1 - June 15, 1995[2]

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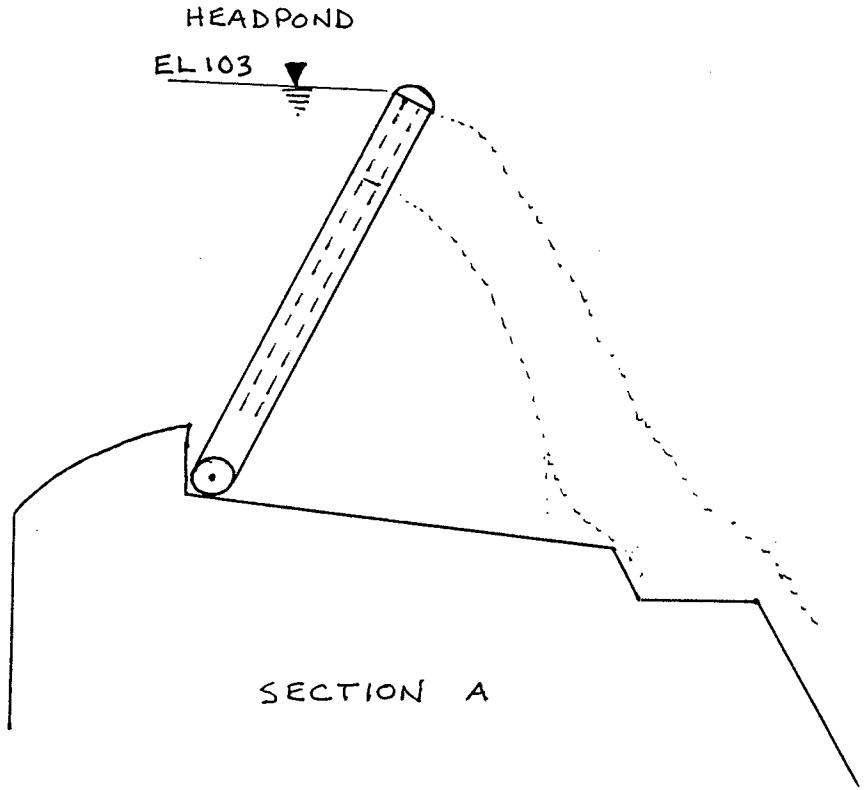
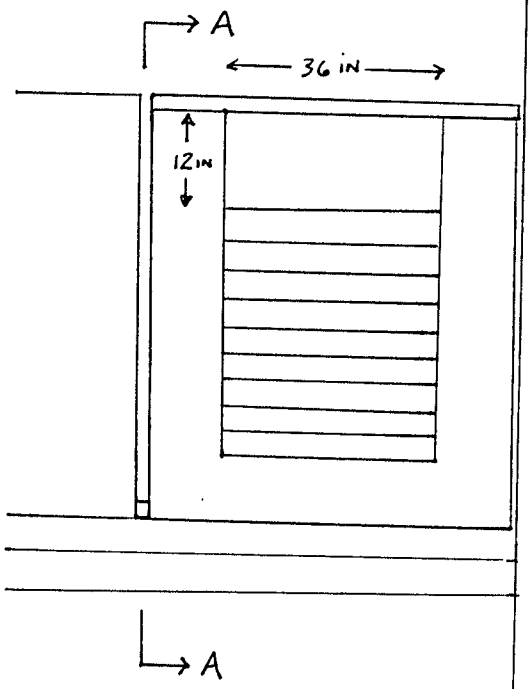
[1]During high flow periods when water is spilling over the flashboards, attraction flow will be increased to 20 - 25 cfs.

[2]The permanent downstream passage, submitted for approval to the FERC December 14, 1994, is scheduled to be operable by the fall 1995 migration season.

Central Vermont Public Service Corp.
Cavendish Station L.P. # 2489
Interim Downstream Fish Passage





ABUTMENT

SCALE 3/8" = 1'

United States Department of the Interior

FISH AND WILDLIFE SERVICE
New England Field Office
22 Bridge Street, Unit #1
Concord, New Hampshire 03301-4986

REF: FERC No. 2489
Central Vermont Public Service Corporation

October 27, 1995

Mr. Bruce M. Peacock
Central Vermont Public Service Corporation
77 Grove Street
Rutland, VT 05701

Dear Mr. Peacock:

We have completed our review of the "Plan for Evaluation of the Effectiveness of the Downstream Fish Passage Facility at the Cavendish Project", dated September 1995, and have the following comments.

You propose to conduct a mark-recapture study using hatchery-reared salmon smolts. Two lots of approximately 250 smolts each would be marked and released, and the plunge pool at the base of the downstream fishway would be modified to serve as a trapping facility.

The proposed plan is generally acceptable, and has included suggestions made by John Warner of this office in preliminary consultation on the effectiveness study. We do, however, note the following:

- We cannot emphasize enough the need to coordinate closely with the White River National Fish Hatchery and the Connecticut River Coordinator's office on smolt allocation, tagging and handling, and transport. This is especially important given the expected appointments in upcoming months of a new hatchery manager at White River and a new Coordinator.

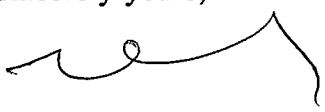
- The plan calls for the checking of the trap at least once per day depending on the number of fish captured. We recommend that you also be prepared to monitor the trap more frequently if necessary to prevent clogging of the trap screening by floating debris.

- The proposed schedule suggests that the report on the study results will be prepared as required by FERC. We recommend that a draft report be circulated for our review no later than 3 months following completion of the monitoring, or approximately mid-September, 1996.

- Depending upon the study results, the report should include proposals for modifications to the downstream fishway or for further monitoring, as appropriate.

Thank you for this opportunity to comment. If you have any questions, please call Mr. Warner at (603) 225-1411.

Sincerely yours,



Michael J. Bartlett
Supervisor
New England Field Office

cc: Director, DPCA, FERC
CRASC
WRNFH
RO/Engineering - Curt Orvis
VDFW-Springfield - Ken Cox
VDFW - Cheryl Kieffer
ES: JWarner:10-27-95:(603)225-1411