

Cape Sharp Tidal Venture

In response to the letter, dated June 20, 2016, from Nova Scotia Environment (NSE) on the Cape Sharp Tidal Venture (CSTV) Environmental Effects Monitoring Plan (EEMP), CSTV has further developed a contingency plan as requested. This update addresses the specific request from the letter as follows:

- FORCE must provide additional details surrounding contingency planning for environmental effects monitoring in the event of equipment failure, data deficiency and/or loss of data.

All aspects of the current CSTV EEMP remain the same. As required in the same letter, CSTV will submit a revised EEMP on or before January 1st, 2017 that considers the other items outlined in the June 20th, 2016 letter.

The following table outlines the contingency plan for each component of the CSTV EEMP — operational sound, marine mammals, and fish. In the event that a contingency plan or plans need to be considered, options and a contingency action plan will be discussed and implemented in discussion with DFO and NSE.

EEMP Component	Method Summary	Potential Risk Scenario	Proposed Options for Contingency	Considerations for Proposed Contingency Options	Implementation Times for Proposed Contingency Options ¹
Operational Sound	Use of two acoustic recorders independent of the turbines: one placed in close proximity to the turbines, and a second one at a control site.	<ul style="list-style-type: none"> • Sensor malfunction • Loss of instrument(s) 	<ul style="list-style-type: none"> • Recovery and redeployment of lost instruments may be possible. 	Recovery may be possible if location known.	1-2 days for vessel acquisition. 1-2 days for to recover instruments (weather dependent). 4 weeks for maintenance and redeployment.
			<ul style="list-style-type: none"> • Incorporate data recorded from passive sonar (icListen) mounted on turbine base. 	Linked with data acquisition (hard drive to be changed out at FORCE and provided to technical experts).	Can be implemented almost immediately as turbine mounted hydrophones will already be operating and recording.
			<ul style="list-style-type: none"> • Deployment of drifting instrumentation. 	This would require several instruments with multiple measurement campaigns to capture the full operational cycle of turbine. Deployment could be achieved using a vessel similar to the <i>Nova Endeavor</i> or <i>Fundy Spray</i> .	2 months to acquire instruments. 1-2 days for vessel acquisition. 1-2 days for each measurement campaign.

¹ It is assumed that the time to analyze the data and obtain results is the same as the originally planned monitoring methodology.

EEMP Component	Method Summary	Potential Risk Scenario	Proposed Options for Contingency	Considerations for Proposed Contingency Options	Implementation Times for Proposed Contingency Options ¹
			<ul style="list-style-type: none"> Acquire additional instrument(s) to replace lost or malfunctioning units and deploy independently. 	New units to be obtained from Jasco.	Time to acquire new units will be dependent on availability. Immediate, if units are on-hand. Minimum 2 months to plan and conduct additional deployments of moored acoustic recorders.
			<ul style="list-style-type: none"> Acquire alternative instrument(s) to replace lost or malfunctioning units and mount units on a FAST² platform. 	FAST-3 (Fundy Advanced Sensor Technology Platform 3) can be used for this purpose and is deployed using a small, local vessel (e.g. <i>Tide Runner</i>) which allows for a faster deployment time (FAST-1 requires <i>Dominion Victory</i> , which is based in Halifax. FAST-1 would also require significant changes to layout in order to direct battery power to acoustic recorders instead of the Vectron which uses a lot of power). FAST-3 is also autonomous but if required can be cabled. Use of the FAST-3 platform would be coordinated with FORCE activities.	2 months to acquire instruments. 1 week to prepare FAST-3 with new instruments (dependent on FAST-3 availability). 1-2 days for deployment of FAST-3 as an autonomous option. *If deemed necessary (i.e., battery power insufficient for useful lengths of data collection), cabling (fibre optic) for this platform can be considered: cable acquisition requires about 4-6 weeks.
				If the need to have a FAST platform becomes a long-term option CSTV will need to return FAST 3 to FORCE and consider building a new platform.	Design time: 4 weeks to consider design options with OpenHydro engineers and other experts. Time to build: 4 weeks. *If deemed necessary (i.e., battery power insufficient for useful lengths of data collection), cabling (fibre optic) for this platform can be considered: cable acquisition requires about 4-6 weeks.

² FORCE has three FAST platforms: FAST-1 is autonomous so need to consider that deployment time will be short because batteries are quickly depleted. Deployment for this platform requires the *Dominion Victory*, which is docked in Halifax and therefore requires a longer time to reach the FORCE site. FAST-2 is a cabled platform so limited with regards to distance. FAST-3 is also autonomous but can be deployed with specific instrumentation thereby decreasing the load on the batteries and extending deployment time. This platform can also be deployed using a local vessel, the *Tidal Runner*, which therefore decreases the time to deployment/retrieval.

EEMP Component	Method Summary	Potential Risk Scenario	Proposed Options for Contingency	Considerations for Proposed Contingency Options	Implementation Times for Proposed Contingency Options ¹
Marine Mammals/Fish	Passive and acoustic sonars mounted on a turbine.	<ul style="list-style-type: none"> • Sensor malfunction • Loss of instrument³ 	<ul style="list-style-type: none"> • Vessel and shore-based observation program for marine mammals. 	CSTV would apply a similar methodology as the FORCE marine mammal baseline study, but with modifications to suit near-field observations at Berth D.	Confirmation of survey scope with FORCE, EMAC, fishers, DFO and other stakeholders: 2 weeks Discussions with consultant: 1 month to confirm scope and costs. Vessel acquisition: There are a few vessels that could do this work. Expect 2 weeks to confirm.
			<ul style="list-style-type: none"> • Deployment of C-POD units within Berth D for marine mammals. 	CSTV would apply a similar methodology to the FORCE CPOD study. Locations would be closer to Berth D and include 2-3 units.	Confirmation of survey scope and unit locations with FORCE, EMAC, fishers, DFO and other stakeholders: 2 weeks Time to contract marine activities: 1 month. Time to acquire CPOD units: 2 weeks (done concurrently with discussions on the survey scope).
			<ul style="list-style-type: none"> • Hydro-acoustic echosounder for near field fish movements. 	CSTV would apply a similar scope as the FORCE fish monitoring component, but transects would involve multiple passes concentrated over Berth D.	Confirmation of survey scope with FORCE, EMAC, fishers, DFO and other stakeholders: 2 weeks Time to contract marine activities: 1 month. Time to acquire echosounder: 2 weeks Vessel acquisition: There are a few vessels that could do this work.
			<ul style="list-style-type: none"> • Independent deployments or use of FORCE FAST platforms for sonar units. 	Although the icListen units (hydrophones) have been deployed successfully on individual platforms, the Trittech sonar has not been used with a battery and would suffer from limited data storage. It is therefore recommended that if this contingency option is considered for the Trittech unit that the unit be deployed on a cabled FAST platform in the vicinity of Berth D or that a cabled platform be considered for any long-term use. Hydrophones can be deployed with battery/storage on an independent platform	2 months to acquire instruments 1 week to prepare FAST-3 with new instruments (dependent on FAST-3 availability). 1-2 days for deployment of FAST-3 as an autonomous option. *If deemed necessary (i.e., battery power insufficient for useful lengths of data collection) cabling (fibre optic) for this platform can be considered: cable acquisition requires about 4-6 weeks. Time to acquire Trittech unit: 11 weeks (rent or purchase).

³ Redundancy has been provided for the icListen units. Four of these units are mounted on the subsea base – allowing for the failure of three units before data is compromised.

EEMP Component	Method Summary	Potential Risk Scenario	Proposed Options for Contingency	Considerations for Proposed Contingency Options	Implementation Times for Proposed Contingency Options ¹
				<p>(i.e. non-cabled FAST platform). FAST-3 is the best <u>immediate</u> option for deploying the hydrophones. The platform is available, can be deployed using a small, local vessel (e.g. <i>Tidal Runner</i>), which allows for a faster deployment time (FAST-1 requires <i>Dominion Victory</i>, which is based in Halifax). FAST-1 would also require more changes to layout in order to direct battery power to acoustic recorders instead of the Vectron which uses a lot of power). FAST-3 is also autonomous but if required can be cabled. Use of the FAST-3 platform would be coordinated with FORCE activities.</p>	<p>Time to acquire iListen unit: 9 weeks (rent or purchase)</p>
				<p>If the need to have a FAST platform becomes a long-term option CSTV will need to return FAST-3 to FORCE and consider building a platform.</p>	<p>Design time: 4 weeks to consider design options with OpenHydro engineers and other experts. Time to build: 4 weeks. *If deemed necessary (i.e., battery power insufficient for useful lengths of data collection) cabling (fibre optic) for this platform can be considered: cable acquisition requires about 4-6 weeks.</p>