
British Columbia Ferry Services Inc.

Supplemental Filing with the
British Columbia Ferries Commissioner

Pursuant to
Orders 14-03 and 14-03A

For
Spirit Class Vessels Mid-Life Upgrades

Pursuant to Section 55 (2) of the *Coastal Ferry Act*

January 15, 2016



**NOTE: IN THIS COPY OF THE FILING, INFORMATION OF A CONFIDENTIAL AND
COMMERCIALY SENSITIVE NATURE HAS BEEN REDACTED.**

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Section 1 - Introduction

On September 22, 2014, British Columbia Ferry Services Inc. (“BC Ferries” or the “Company”) submitted an application (the “Application”) under section 55(2) of the *Coastal Ferry Act* (the “Act”) seeking the approval of the British Columbia Ferries Commissioner (the “Commissioner”) for the proposed major capital expenditures for the mid-life upgrades (the “MLUs”) of the two Spirit Class (“S Class”) vessels, the *Spirit of British Columbia* and the *Spirit of Vancouver Island*, that both operate on Route 1, connecting Tsawwassen with Swartz Bay (the “Project”).

The Application indicated that the Request for Proposals (“RFP”) process for the MLUs could only proceed *after* Project approval by the Commissioner, thus a further filing in respect of the Application may be required should pricing received through the RFP process be higher than forecast. BC Ferries explained in the Application that:

To maintain credibility with potential proponents, the RFP process can be initiated only if and when this Application is approved by the Commissioner. With key design elements yet to be determined through the procurement process, there is a risk that certain assumptions BC Ferries has made in this Application may require subsequent amendment, with a commensurate change in the projected capital expenditures for the Project.

Among the key design elements yet to be finalized are those respecting conversion of the vessels to operate on LNG as the primary fuel source. BC Ferries’ present intent is to employ DF engine technology in the Project, which permits the engines to be switched between LNG and diesel fuel. Further technical and financial analyses will be required, however, before a final decision is made. These analyses depend, in large part, on the responses to the RFP. BC Ferries brings this matter to the attention of the Commissioner, as a subsequent application may be required as the procurement process for this vessel upgrade project proceeds.¹

...

Pricing for the MLUs has been derived based on supplier and shipyard preliminary estimates, historical ship repair and construction costs, consultants’ reports and internal estimations. While it represents the best available information at this time, final pricing will not be known until the RFP process is completed. The Company has included a contingency in the Project budget to address unforeseen cost pressures. However, should pricing received through the RFP process be significantly higher than forecast, a supplemental Application to the Commissioner may be required.

¹ Application, p. 9

Depending on the magnitude of the cost variance, scope changes to the Project may also be considered.²

[Emphasis added.]

On November 24, 2014, the British Columbia Ferry Commission (the "Commission") issued Order 14-03 approving the Application. The Commission set a maximum amount of capital expenditure for the Project (the "Cost Cap"), as stated in confidential Order 14-03A.

Clause 1(b)(i) of Order 14-03 provides that prior to signing a final contract with a shipyard for the MLUs, BC Ferries must return to the Commission to address whether the Project can be completed within the maximum amount set out in Order 14-03A. Clauses 1(b)(ii) and (iii) set out further conditions. The Application and Order 14-03 thus contemplate the Commission issuing a further order should the results of the RFP dictate the need for an adjustment to the Cost Cap for the Project.

Following the issuance of Orders 14-03 and 14-03A, BC Ferries issued a RFP for a prime contractor for the MLUs. The pricing received through the RFP process is higher than forecast, and as such, an adjustment to the Cost Cap will be required in order for BC Ferries to proceed with the Project.

The higher forecast cost of the Project has not changed BC Ferries' views on the merits of proceeding with the MLUs. The Company continues to believe that the Project, with some modest amendments in scope, is reasonable, affordable and prudent, and meets the requirements of section 55 of the Act. The Company remains of the view that pursuance of the Project is in the best interests of taxpayers and fare payers, as the proposed investments will help ensure the continued reliability of service on Route 1, and will enable further advances in efficient and effective service delivery, which will contribute positively to the financial performance of this route and reduce upward pressure on fares across all routes in the coastal ferry system.

This filing is intended to address and meet the conditions set out in provisions 1(b)(i), 1(b)(ii) and 1(b)(iii) of Order 14-03. In particular, this filing confirms that:

- the scope of the MLUs is as generally described in the Application;
- there has been no substantial change to the scope of any of the work packages and the business rationale justifying each work package has not substantially changed; and
- BC Ferries has a contingency plan which addresses the concerns of commercial ferry users during the out of service period and in the event of a potential delay in the re-entry of service of the vessels.

² Application, p. 56

In summary, BC Ferries seeks an order permitting it to proceed with the Project based on a revised total budget for the Project (two ships) of \$<> million, of which \$<> million is for operating costs for feasibility analysis, crew training and other non-capital costs.

As this filing is part and parcel of the original Application process, it should be considered in conjunction with the evidence filed as part of the original Application. This filing focusses principally on the differences that have resulted from the results of the RFP process. In particular, this filing provides updated analysis, based on the RFP results, that demonstrates that the Project continues to be reasonable, affordable, prudent and meets the other requirements of section 55 of the Act.

Section 2 - Background

An MLU is a major scheduled maintenance event within BC Ferries' fleet maintenance strategy. It is the largest single maintenance event in a vessel's life and permits the Company to extract maximum economic performance from its assets. It marks the mid-point of the life cycle and typically occurs between 20 and 25 years after building.

As described in the Application, the Company intends to invest in the sustainability of Route 1 by performing MLUs of the *Spirit of Vancouver Island* and the *Spirit of British Columbia*, the primary vessels on the route. These vessels were commissioned in 1993/1994. At their current planned MLU dates, the vessels will each be 24 years old.

In the Application, the Company noted that the MLUs are expected to reduce operating costs, enhance revenues and ensure continued reliability of the S Class vessels in the second half of their 40 to 50 year life cycle. The Project will standardise bridge, engine room and safety layouts to improve flexibility in crew deployment and maintain state-of-the-industry safety. It will reduce fuel costs by converting propulsion systems to enable operation on lower-cost liquefied natural gas ("LNG") fuel, while maintaining the ability to operate on diesel fuel should the need arise, and enhance ancillary revenue by expanding catering and retail services. The expected savings and revenue enhancements from the Project will help keep fares affordable for customers across the ferry system. Using LNG to fuel the vessels will also have the added benefit of cleaner exhaust emissions for reduced environmental impact.

This Project presents an opportunity to reduce the operating costs of the S Class vessels to below that of the Coastal Class vessels, primarily through the adoption of LNG as fuel. This will allow the S Class vessels to resume their traditional role as the primary year-round vessels on Route 1. As described in the Application, BC Ferries is making or is planning to make substantial investments in its reservation, pricing and yield management capabilities. This will allow BC Ferries to use yield management techniques to improve capacity utilization, potentially reducing the overall number of round trips³ to carry the same or increased level of traffic. BC Ferries' modelling indicates this approach generates greater operational savings than high frequency sailings using smaller vessels. The larger S Class vessels with operating costs below those of the smaller Coastal Class vessels will improve the feasibility of this high load factor approach.

³ Subject to appropriate regulatory, contractual and Company approvals.

In summary, the Company believes that the planned investments in the MLUs of the *Spirit of Vancouver Island* and *Spirit of British Columbia* will help ensure that service on Route 1 remains safe and reliable for many years to come, and will enable further advances in operational efficiency, which will moderate upward pressure on fares across the coastal ferry system.

Section 3 - Procurement Update

BC Ferries explained in the Application that, by necessity, initial Commissioner approval had to precede the procurement processes for the MLUs in order to obtain meaningful and responsive proposals, and that the results of the RFP process might necessitate further process with the Commission.

3.1 Procurement Overview

At the time of Application, the Company envisaged there being two main procurement processes for the Project. These were described in the Application. They were:

- a. Procurement of the integrated dual fuel (“DF”) propulsion and fuel system equipment. Separating out the procurement of this equipment from the other elements of the Project was identified as a potential means of mitigating schedule risk due to the expected long lead times for acquisition of this equipment.
- b. Procurement of the services of a prime contractor. The prime contractor would be responsible for detailed design, engineering, procurement of equipment and services, and conversion of the vessels to DF. It was envisaged in the Application that the DF equipment supply contract would be novated to the prime contractor once selected. In this way, the majority of design and construction risk would be placed on the prime contractor.

In the Application, the Company described its intent to follow a three stage process for each of the two planned procurement processes, comprised of:

- Request for Expression of Interest (“RFEOI”)
- Request for Pre-Qualification (“RFPO”)
- RFP.

The procurement processes undertaken to the date of this filing and the outcomes are summarized below.

3.2 Equipment Supply Procurement

The RFEOI and RFPO stages of the procurement process for the supply of the integrated DF propulsion and fuel system equipment were completed in November 2014 and December 2014, respectively. Based on the RFPO submissions received, it was determined that equipment lead time did not pose a risk of the magnitude originally envisaged. Accordingly, the procurement process was terminated, and equipment supply was added to the scope of the services to be provided by the prime contractor.

3.3 Prime Contractor Procurement

RFEOI

The RFEOI stage of the procurement process for the prime contractor was issued in November 2014. BC Ferries engaged international ship brokers Barry Rogliano Salles to assist with the procurement process. The RFEOI was issued to 44 shipyards, and 22 non-binding responses were received at this stage. At the conclusion of this stage in December 2014, nine proponents were short listed to proceed to the RFPO stage.

RFPO

Informed by the results of the RFEOI, the Company commenced the RFPO stage in December 2014. The RFPO was issued to the proponents who had been shortlisted at the RFEOI stage. Each of the nine proponents responded with non-binding detailed technical and commercial proposals. Proponent meetings, exchanges of technical information and proposal evaluations occurred in this stage. At the conclusion of the RFPO stage in February 2015, five proponents were short listed to proceed to the RFP stage.

RFP

The RFP was issued in February 2015 to the proponents shortlisted at the RFPO stage. Binding RFP submissions were received from each of the five proponents. Proponent meetings, exchanges of technical information, site visits by BC Ferries to the proponent shipyards, and proposal evaluations occurred, following which it was identified that more work was required by all of the proponents to review technical and contractual issues, such as guaranteed vessel performance and vessel redelivery dates, in their respective proposals.

To address this, the RFP process included a project development phase, in which three proponents - one local and two international shipyards - were shortlisted to develop their proposals further. As an incentive to ensure that the three proponents each produced a comprehensive and timely submission, they were each offered an honorarium to help offset their costs in undertaking further technical design and other work, in the event they are not selected as the preferred proponent.⁴

The local shipyard subsequently withdrew from the RFP process. The two international shipyards remaining in the process further developed technical and other aspects of their proposals. This enabled the Company, working with key stakeholders, external sub-contractors and equipment suppliers, to more accurately validate the technical feasibility and assess the risks associated with each of the work packages ("WP") of the Project, and to

⁴ Only one shipyard ultimately required the honorarium in order to continue in the RFP process.

further refine the associated cost estimates. The forecast cost estimates for the Project presented in this filing reflect the pricing received through this phase of the RFP process.

As part of the evaluation of the proposals received in the development phase of the RFP process, BC Ferries reviewed key technical issues, shipyard capabilities, ship repair and DF conversion methodologies, and schedule proposals with each of the two proponents. Non-binding contract negotiations with each proponent were also conducted.

The Company has now selected a preferred proponent and is of the view that in proceeding with that proponent, all the key objectives that were part of the overall Project construct are achievable. BC Ferries' intent is to finalize contract negotiations and enter into a contract with the preferred proponent once approval to proceed with the Project, inclusive of the required adjustment in the Cost Cap, is received from the Commission.

Section 4 - Revised Project Schedule

4.1. Project Timeline

As a result of further due diligence on the Project undertaken by the Company, including the extension of the RFP to provide further opportunity for clarification by the proponents on technical and other aspects of their proposals, the overall Project timeline has been extended, but the duration of the out-of-service periods for the vessels remain the same. The planned out of service dates for the vessels are now one year later than envisaged at the time of the Application. The first vessel, the *Spirit of British Columbia*, will be removed from service in September 2017 and will re-enter service in May 2018. The *Spirit of Vancouver Island* will follow one year later.

4.2. Mitigation Strategies for Out-of-Service Periods

As described in the Application, the MLUs of the S Class vessels cannot be conducted in peak season as every vessel in the fleet, save one minor vessel, is required to carry traffic. The end of peak traffic in September guides the start date of the Project and the spring build-up of traffic demand in May guides the end date of the Project.

A contingency service delivery plan has been developed for use during the out of service period in which smaller vessels will operate extra sailings to compensate for the reduced lift-off capacity. The replacement ships during the out of service period will be operating in a period of lower demand, and it is expected that the capacity they provide will be sufficient to carry the overall traffic demand, including that of the Company's commercial customers. BC Ferries is committed to adding additional sailings if necessary to ensure that traffic demand is met. With respect to commercial customers specifically, it is important to note that insofar as vessel type is concerned, there is little to no material difference between the S Class and Coastal Class ships in terms of capacity available for that customer segment. Further, while it is expected that sufficient capacity will be available for the commercial customers during the period the S Class vessels are out of service, there does exist some flexibility in the scheduling of the drop trailer operations (sailing to sailing) should that be necessary in response to capacity pressures.

A delay in the vessels' return to service beyond mid-May will have a negative impact on service delivery. This could potentially result in sailing overloads, customer dissatisfaction, and passengers and vehicles not carried at the end of the scheduled operating day. The Company recognizes this as a major risk and has several mitigation measures in place. This matter is discussed more fully in a later section of this filing (see Section 6 - Risk Mitigation Update). The Company is confident, based on the negotiated contract terms and the strength of its

project management structure, that the in-service schedule for the vessels is achievable. In the unlikely event of a schedule delay during the shoulder season (middle of May to the end of June), the primary mitigation would be planned additional sailings during the regular scheduled day with discretionary sailings during early morning or late night to meet the demand. This would be tailored to ensure both the needs of the general public and the commercial traffic are met. In the highly unlikely event the vessel is delayed into the summer season (July and beyond), the above measures would continue to be enacted and, as well, the Company would look to potentially moving ships and changing schedules on the other major routes to distribute the demand as best as possible.

Section 5 - Updated Project Analysis

The scope of the Project was divided into four WPs in the Application to assist presentation and analysis. This approach remains unchanged in this filing.

Each WP has been evaluated as a stand-alone business case for each of the four work areas. Each included options for which scope, schedule and financial analyses were provided. The technical, financial and non-financial implications of each option were also presented in the Application.

BC Ferries has performed updated analyses of the four WPs in light of the new information provided through the RFP process, and in response to market-driven changes in fuel and other input costs. The key financial assumptions articulated in section 3.1 of the Application have remained unchanged. The result of the updated analysis of the four WPs is that BC Ferries has concluded that the Project remains reasonable, prudent, and consistent with the current Coastal Ferry Services Contract ("CFSC") and the long-term capital plan established by BC Ferries.

5.1 Updated Work Packages

5.1.1 WP1 – Carry Out Regulatory Requirements

WP1 Options

As described in the Application, the primary driver for WP 1 is compliance with compulsory regulations in order that the S Class vessels can continue to operate and provide ferry service to customers on Route 1 in accordance with the terms of the CFSC.

WP 1 covers modifications and survey items required to maintain statutory and regulatory compliance. This work addresses requirements of, for example, Transport Canada, WorkSafe BC, BC Safety Authority, Health Canada, Department of Fisheries and Oceans, provincial Ministry and federal Department of Environment, American Bureau of Shipping ("ABS") and local governments.

As presented in the Application, WP 1 comprises two options:

Option 1A – Do not carry out regulatory scope

Option 1B – Carry out regulatory scope

As explained in the Application, Option 1A (do not carry out regulatory scope) is not considered a viable option, as the vessels' operating certificates will expire and the Company will be prevented by law from continuing to operate them. In this situation, the Company

would have insufficient vessel capacity to meet Route 1 traffic demand, which would place BC Ferries in breach of the CFSC.

WP1 Preferred Option: Option 1B (carry out regulatory scope) remains the preferred option.

Option 1B Scope, Schedule, Technical and Non-Financial Implications

The scope of work for the preferred option as described in the Application is unchanged, as are the technical and non-financial implications of the option.

An adjustment to the schedule for Option 1B as set out in the Application has been made to reflect vessel transit time to an international shipyard. The work is now expected to be conducted from late October to early December. The overall duration of the work to complete WP1 remains unchanged at 6 weeks.

Option 1B Capital and Operating Costs

Based on pricing received through the RFP process, the capital cost for Option 1B is now forecast to be significantly less than estimated in the Application. A modest increase in forecast operating costs is projected to reflect an increase in feasibility costs. The updated cost projections for Option 1B are set out below in Table 1.

Table 1: WP 1 - Option 1B (Carry Out Regulatory Scope)

Capital Budget and Financial Analysis (\$M) - Updated

	Capital Project Costs		Refit Project Costs (MOI)	Other Costs	Total Project Costs (incl. IDC)	Net Present Value	Simple Payback (years)	Discounted Payback (years)
	Capital	Operating	Capital	Operating				
Application	\$ <>	\$ <>	\$ <>	\$ <>	\$ <>	(\$8.44)	N/A	N/A
Current Forecast	\$ <>	\$ <>	\$ <>	\$ <>	\$ <>	(\$4.11)	N/A	N/A

5.1.2 WP2 – Convert Propulsion to DF

WP2 Options

As described in the Application, the primary driver of WP 2 is to reduce upward pressure on fares through reducing operating costs. The preferred option under this WP envisages the conversion of the main propulsion system for the S Class vessels to use LNG as their primary fuel. LNG is less costly and much cleaner-burning than the ultra-low sulphur diesel (“ULSD”) fuel the S Class vessels use at present.

The design objective of WP 2 is to maintain current vessel performance while achieving lower fuel cost and emissions. Under the preferred option, DF engines will be selected to minimize fuel costs consistent with the safe operation of the vessel in all authorized weather conditions. Since the existing engines meet operational and regulatory requirements, the driver to convert to DF is economic. The financial analysis shows there is positive payback in terms of reduced operating costs if the conversion is carried out.

As explained in the Application, it is important to note that while BC Ferries considers fuel efficiency to be vital, the main benefit of DF engines comes not from reduced fuel consumption but from the lower cost of the fuel. The Company has included liquidated damages provisions in the negotiated contract with the two RFP proponents in regard to the fuel efficiency of the propulsion systems.

As presented in the Application, WP 2 comprises three options:

- Option 2A – Do Minimum Regulatory Work; Retain Existing Diesel Engines
- Option 2B – Modernize and Retain Existing Diesel Engines
- Option 2C – Convert Propulsion to DF

As explained in the Application, Options 2A and Option 2B, which involve the retention of the existing diesel engines, are feasible from a technical and regulatory perspective. The existing engines comply with pending NOx regulations, while BC Ferries’ use of ULSD fuel means they also comply with existing and pending SOx regulations. A condition assessment of the existing engines indicates they are capable and suitable for use to the end of each vessel’s life; however, significant overhauls, as well as ongoing maintenance, would be required.

Preferred Option: Option 2C (convert propulsion to DF) remains the preferred option.

Option 2C Scope, Schedule, Technical and Non-Financial Implications

The scope of work for the preferred option, as described in the Application, is unchanged, as are the technical and non-financial implications of the option.

An adjustment to the schedule for Option 2C as set out in the Application has been made to reflect transit time to an international shipyard. The work to complete WP2 is now expected to be conducted from late October to early May. The incremental duration in schedule of WP2 to WP1 (carry out regulatory requirements) has been reduced to 21 weeks from the estimate of 30 weeks in the Application. An incremental one week (as opposed to an estimate of six weeks in the Application) of extra dry docking time is projected to complete the removal of the existing propulsion equipment and installation of LNG propulsion equipment. As well, an incremental 16 weeks (as opposed to an estimate of 20 weeks in the Application) is projected as being required to complete installation and commissioning of the DF propulsion system while the vessel is afloat in the shipyard and to redeliver the vessel to BC Ferries' home port. The schedule continues to reflect four weeks of employee training at the BC Ferries home port for vessel familiarization and crew clearance.

Option 2C Capital and Operating Costs

Key Assumptions:

- Fuel Cost

The average savings in fuel cost from the conversion of the *Spirit of British Columbia* and the *Spirit of Vancouver Island* combined, including inflation, was estimated at the time of the Application to be in the order of \$8.5 million in the first year both ships are in operation, and an average of approximately \$12 million per year over the remaining 27-year life of the vessels. These savings reflected:

 - The forecast price differential between ULSD and LNG;
 - The difference in consumption related to the energy burn between ULSD and LNG;
 - The consumption related to a single fuel versus DF engine; and
 - The expectation that the current volume discount on ULSD fuel purchases would be reduced due to the reduction in corporate diesel consumption.

This filing projects average savings in fuel cost from the conversion to DF to be in the order of \$6.9 million in the first year both ships are in operation and an average of approximately \$9.6 million per year over the remaining 27-year life of the vessels. This change principally reflects the narrowing that has occurred since the Application was filed in the forecast price differential between LNG and ULSD (further

discussed below). In terms of the volume discount currently received on ULSD purchases, the Company now believes that this discount will be unaffected by the reduction in the amount of diesel fuel consumed by the S Class vessels. The Company takes this position based on a lowered risk assessment. The assumptions related to fuel consumption set out in the Application remain unchanged in this filing.

The forecast price differential between LNG and ULSD has a material impact on the economics of the conversion to DF. While the analysis in this filing supports the expectation of continued positive payback, the economics are less favourable than originally envisaged. The prospect of an oversupplied crude oil market, coupled with declines in demand and economic growth in emerging markets continue to weigh on fuel prices in the near term. It is BC Ferries' view that current historical low ULSD prices cannot be expected to continue long term; BC Ferries takes a long term view in making the proposal to proceed with the DF conversion.

Fuel Cost Assumptions

As indicated in the Application, there are a number of yet-to-be-tested pricing assumptions about the delivered cost of LNG. The fuel cost assumptions underlying the analysis presented in this filing are as follows:

- The estimated future costs of LNG and ULSD are based on the futures market price plus processing, delivery, taxes, and other applicable costs at January 8, 2016.
- Fuel prices at the time of re-entry into service⁵ are assumed to be:
2018 – *Spirit of British Columbia*: Diesel - \$0.845/litre; LNG - \$0.433/DLE⁶
2019 – *Spirit of Vancouver Island*: Diesel - \$0.861/litre; LNG - \$0.441/DLE

While these updated fuel price assumptions reflect the current movement in the market, ULSD is currently at the lowest price it has been since March 2009. Between March 2009 and June 2014, ULSD prices increased steadily before dropping significantly.

- At the time of the Application, discussions on the Company's eligibility for incentive funding for LNG supply were not advanced to the stage where it was considered prudent to include an estimate of such funding in the analysis. This filing reflects the fact that BC Ferries and <> have now reached an

⁵ ULSD and LNG 2017 prices based on futures market quotes; 2018 ULSD and LNG are 2017 prices escalated 2 percent. Future market quotes used in the Application: 2017 *Spirit of Vancouver Island*: Diesel - \$1.035/litre; LNG - \$0.454/DLE. 2018 - *Spirit of British Columbia*: Diesel \$1.056/litre; LNG - \$0.463/DLE.

⁶ "DLE" – diesel litre equivalent. LNG thermal energy content per litre differs from that of ULSD. To allow direct comparison of prices, the LNG suppliers quote in DLE.

agreement in principle, whereby <> will provide up to \$<> in incentive funding in support of the two S Class vessels being converted to operate principally on LNG. An associated contribution agreement is expected to be finalized with <> shortly.

- An annual escalation for inflation of 2 percent has been applied to fuel price.
- A price increase to future corporate diesel consumption of other vessels due to an expected reduction of volume discount was included in the analysis in the Application. The Company views the likelihood of this risk to have significantly diminished and, as such, has assumed no such price increase in this filing.

- **Maintenance Costs**

To be conservative, the Company has continued to assume in this filing that the anticipated reductions in engine maintenance costs under the DF conversion option are offset by higher costs to maintain two fuel systems (ULSD and LNG).

- **Bunkering Method**

In the Application, the Company explained that the bunkering methodology established for the Company's three new Salish Class vessels, now under construction, will be adopted for this Project. That methodology has now been fully specified and submitted for regulatory approval. Due to Canadian regulatory requirements, full regulatory approval for the Salish Class vessels will only be determined after vessel delivery and re-flagging to the Canadian flag. While this represents some risk to the regulatory approval, the engagement of all stakeholders, including the Recognized Organization (Lloyd's Register of Canada) and Transport Canada in the risk-based design approach suggests that full compliance with regulations, and hence approval, is expected with minimal risk. Consequently, the same approach is being followed for the S Class MLUs, utilizing the project's Recognized Organization (ABS), to emulate the same design in order to gain the same regulatory approval from Transport Canada.

- **Vessel Deployment**

Consistent with the Application, the payback calculations for the DF conversion option continue to assume that the S Class vessels will be utilized as the primary vessels year round on Route 1 (other than during annual recertification), thereby increasing the total number of round trips that they currently provide on an annual basis.

Updated Results:

Based on the pricing received through the RFP process, the capital cost for Option 2C is now forecast to be higher than projected in the Application. A modest increase in forecast

operating costs is also projected, reflecting updated feasibility costs. The updated cost projections for Option 2C are set out below in Table 2. For comparative purposes, the current cost projections for Options 2A and 2B, reflecting the updated fuel price assumptions, are provided in Tables 3 and 4, respectively.

Despite higher forecast costs, Option 2C continues to generate a positive NPV.

At the time of the Application, a conversion to DF resulted in a positive NPV of \$42 million with a discounted payback of 12 years. With the foregone diesel engine overhaul costs (\$<> million) taken into account, the DF conversion NPV improved to \$62 million with a discounted payback of 7 years.

Reflective of the higher forecast capital expenditures for the DF conversion derived from the RFP process, the updated fuel price assumptions for both LNG and ULSD, and the expected receipt of incentive funding, a conversion to DF now results in a lower, but positive, NPV of \$13.1 million, with a discounted payback of 19 years. If the foregone diesel engine overhaul costs (\$<> million) are taken into account, the NPV for the DF conversion improves to \$32.7 million, with a discounted payback of 11 years. While the economics of the conversion to DF are presently less than envisaged at the time of the Application, the analysis continues to show there is positive payback in terms of reduced operating costs if the conversion is carried out.

Table 2: WP 2 - Option 2C (Convert Propulsion to DF)

Capital Budget and Financial Analysis (\$M) - Updated

	Capital Project Costs		Refit Project Costs (MOI)	Other Costs	Total Project Costs (incl. IDC)	Net Present Value	Simple Payback (years)	Discounted Payback (years)
	Capital	Operating	Capital	Operating				
Application	\$<>	\$<>			\$<>	\$42.05	8	12
Current Forecast	\$<>	\$<>			\$<>	\$13.13	11	19

The current forecast and NPV of Option 2A and 2B as presented in Tables 3 and 4 below, reflect the one year Project extension and the corresponding deferral of capital expenditures. All other assumptions remain consistent with the Application.

Table 3: WP 2 - Option 2A (Do Minimum Regulatory Work; Retain Existing Diesel Engines)

Capital Budget and Financial Analysis (\$M) - Updated

	Capital Project Costs		Refit Project Costs (MOI)	Other Costs	Total Project Costs (incl. IDC)	Net Present Value	Simple Payback (years)	Discounted Payback (years)
	Capital	Operating	Capital	Operating				
Application			\$ <>		\$ <>	(\$1.81)	N/A	N/A
Current Forecast			\$ <>		\$ <>	(\$1.69)	N/A	N/A

Table 4: WP 2 - Option 2B (Modernize and Retain Existing Diesel Engines)

Capital Budget and Financial Analysis (\$M) - Updated

	Capital Project Costs		Refit Project Costs (MOI)	Other Costs	Total Project Costs (incl. IDC)	Net Present Value	Simple Payback (years)	Discounted Payback (years)
	Capital	Operating	Capital	Operating				
Application	\$ <>	\$ <>	\$ <>		\$ <>	(\$20.15)	N/A	N/A
Current Forecast	\$ <>	\$ <>	\$ <>		\$ <>	(\$19.57)	N/A	N/A

5.1.3 WP3 – Other Payback Projects

WP3 Options

As described in the Application, the Company sees several opportunities other than the DF conversion which have positive payback potential. The returns are smaller but are nonetheless positive. Through reducing operating costs or increasing revenue, these initiatives ultimately benefit fare payers across the ferry system through reducing the upward pressure on fares. The initiatives were presented in two categories:

WP 3.1 – Energy Efficiency Initiatives

WP 3.2 – Ancillary Revenue Initiatives

The Company continues to see merit in proceeding with the initiatives as set out in the Application, with two exceptions in regard to the initiatives originally proposed as part of WP 3.1.

As presented in the Application, WP 3 comprises two options:

Option 3A – Do Not Implement Payback Projects

Option 3B – Implement Payback Projects

Preferred Option: Option 3B (Implement Payback Projects) remains the preferred option.

Option 3B Scope

WP 3.1 – Energy Efficiency Initiatives

Four energy efficiency initiatives were proposed in the Application: the installation of low friction hull coating, installation of energy-efficient lighting, modifications to the bulbous bow, and installation of a flow intercept at the stern. These initiatives have each been further reviewed from a cost perspective, based on pricing received from the RFP and updated fuel price assumptions, as well as from a technical perspective. Based on the results of these reviews, the Company now proposes to implement only the following two initiatives as part of the Project:

- *Replace Underwater Hull Coating with Low Friction Coating to Reduce Fuel Consumption*

As described in the Application, the replacement of the underwater hull coating with low friction coating is expected to reduce hull drag by 5 percent, thereby reducing total fuel consumption by approximately 2.9 percent (based on a 5 percent reduction on fuel consumed for propulsion). The projected annual fuel cost savings from this initiative, updated to reflect the revised fuel price assumptions for LNG, are \$0.34 million and remain comparable to those estimated in the Application (\$0.35 million).

- *Replace Lighting with Energy-Efficient LED Fixtures*

The Company described in the Application its plan to replace a range of conventional fixtures with modern LED lighting, which consume less power and have a longer service life. Reflective of the updated fuel price assumptions for LNG, the projected impact on annual fuel costs from this initiative has weakened, but remains positive at \$0.013 million in savings (as compared to \$0.09 million estimated in the Application).

The following two initiatives were proposed in the Application. Based on the results of further analysis conducted, the Company now proposes that they be excluded from the scope of the Project.

- *Modify Bow and Stern Configuration to Reduce Hull Resistance and Fuel Consumption*
The existing hull design of the S Class vessels is based on hydrodynamic principles from the 1980s. In the Application, the Company identified that new computer modelling and tank testing at the Institute for Ocean Technology in Newfoundland indicated that measurable drag reductions would be possible from relatively minor modifications to the bow and stern geometry. The Company has now completed further evaluation of the proposed design of the bow and stern modifications through the review of existing hydrodynamic reports and completion of new computer modelling on the impacts and benefits of the modifications. Although a low-cost solution was developed, the Company's analysis has revealed there to be unquantifiable hull efficiency gains or fuel consumption savings from the modifications. Completing the modifications as currently envisaged would also introduce a high degree of uncertainty in the post MLU vessel performance guarantee trials. Due to the prospect of limited payback from the investment and increased risk in terms of not achieving a satisfactory guarantee of vessel performance from the prime contractor, the decision has been made to exclude these modifications from the scope of the Project. The modifications may be able to be accomplished at future refits if the business case at that time so merits.

WP 3.2 – Ancillary Revenue Initiatives

Initiatives in this category focus on improving ancillary revenue, as measured by average passenger spend and net margin onboard the vessels. As described in the Application, increased net margin helps cover operating costs and reduces upward pressure on fares.

The initiatives in this category comprise:

- Expanding the gift shop and relocating the coffee bar, and
- Potential enhancements to crew levels for ancillary revenue generation.

The scope of work for these initiatives, as described in the Application, remains unchanged.

Option 3B Schedule, Technical and Non-Financial Implications

The technical and non-financial implications of Option 3B, as described in the Application, are unchanged.

An adjustment to the schedule for Option 3B as set out in the Application has been made to reflect vessel transit time to an international shipyard. The work to complete WP 3 is now expected to be conducted from late October to late December. The incremental duration of WP3 to WP1 (carry out regulatory requirements) remains unchanged at 3 weeks, and all work

within WP 3 continues to fit within the schedule required to complete WP 2 (convert propulsion to DF).

Option 3B Capital and Operating Costs

WP 3.1 – Energy Efficiency Initiatives

Based on the pricing received through the RFP process, the capital cost for WP 3.1 (with the reduced scope to include only the installation of low friction hull coating and energy efficient lighting) is now forecast to be significantly less than projected in the Application. Operating costs are also projected to be lower, reflecting updated feasibility costs. The updated cost projections for WP 3.1 are set out below in Table 5.

Reflecting the lower forecast expenditures and the updated fuel price assumptions, the proposed fuel efficiency initiatives comprising WP 3.1 now generate a positive NPV of \$2.81 million, with a discounted payback of 9 years. This is an improvement to the forecast NPV of \$1.84 million and discounted payback of 14 years at the time of the Application.

WP 3.2 – Ancillary Revenue Initiatives

Arising from the results of the RFP, the capital cost for WP 3.2 is forecast to be higher than projected in the Application. A modest increase in operating cost is also projected, reflecting updated feasibility costs. The updated cost projections for WP 3.2 are set out below in Table 5.

While the capital expenditures for WP 3.2 have increased, the NPV remains positive at \$4.99 million (as compared to \$5.26 million in the Application) with a discounted payback of 8 years (as compared to 6 years in the Application).

Table 5: WP 3 - Option 3B (Implement Payback Projects)

Capital Budget and Financial Analysis (\$M) - Updated

	Capital Project Costs		Refit Project Costs (MOI)	Other Costs	Total Project Costs (incl. IDC)	Net Present Value	Simple Payback (years)	Discounted Payback (years)
	Capital	Operating	Capital	Operating				
WP 3.1 Energy Efficiency Initiatives								
Application (all initiatives)	\$<>		\$<>		\$<>	\$3.36	7	11
Application (excluding bow and stern modifications)	\$<>		\$<>		\$<>	\$1.84	9	14
Current Forecast (excluding bow and stern modifications)	\$<>		\$<>		\$<>	\$2.81	7	9
WP 3.2 Ancillary Revenue Initiatives								
Application	\$<>	\$<>			\$<>	\$5.26	5	6
Current Forecast	\$<>	\$<>			\$<>	\$4.99	6	8

5.1.4 WP 4 – Implement Condition Based Requirements

WP 4 Options

As described in the Application, the primary driver of WP 4 is to carry out essential maintenance which helps ensure the reliability of the S Class vessels by completing work that is essential to vessel performance and that maintains customer satisfaction. WP 4 encompasses the consolidation of the maintenance of major systems and components on the S Class vessels as part of the MLUs, as well as an upgrade of the interior design of the passenger accommodation spaces on decks 5 and 6, into a single carefully-planned project.

As was indicated in the Application, this WP does not have a positive financial payback. At the time of Application, the Company expected that it would be more favourable from a financial perspective to proceed with WP4 than to defer the work for completion after the dedicated MLU window. The expectation was that by consolidating multiple required maintenance events

into a single large MLU project, BC Ferries would be able to reduce maintenance expense and time compared to performing the work in multiple, smaller maintenance projects.

In addition, through the planned design refresh of passenger accommodation spaces, BC Ferries expected that it would be able to prevent decay in ancillary revenue from onboard passenger spending.

As was noted by the Commission's consultant, PricewaterhouseCoopers LLB, in its report of November 20, 2014 on its review of the Application, the financial advantage of proceeding with WP 4 was highly dependent on the cost assumptions behind the components of the WP. Based on the pricing received through the RFP process, proceeding with WP 4 is no longer expected to provide a financial advantage. However, the Company continues to believe that proceeding with this WP is reasonable and prudent. It is expected that WP 4 will help minimize the risk of maintenance-driven service interruptions, thereby helping to avoid unplanned repairs and the need to schedule multiple out of service periods which would require some degree of fleet re-deployment with commensurate cost and customer service implications. In addition, the planned design refresh of passenger accommodation spaces is expected to enhance customer satisfaction and preserve or enhance ancillary revenue.

As presented in the Application, WP 4 comprises two options:

- Option 4A – Do Not Implement Condition-Based Requirements
- Option 4B – Implement Condition-Based Requirements

Preferred Option: Option 4B (implement condition-based requirements) remains the preferred option.

Option 4B Scope

Consolidating Maintenance

BC Ferries introduced a new process to compile the list of condition-based items to be included in the MLUs. It was predicated on benefit to the fare payer and was implemented in a series of review rounds where an initial long list of candidate items was culled down to priority items. The Company continues to believe that this has led to an appropriate list of expenditure items and, as such, the scope of work for the maintenance related components of WP 4, as described in the Application, remains unchanged.

The Company has carefully considered the merits of proceeding with the maintenance components of WP 4 in light of the higher pricing received through the RFP and the resultant outcome in terms of the loss of financial advantage as compared to deferring the work to

subsequent maintenance events. BC Ferries continues to be of the view that completing the maintenance-related components of WP 4 as part the Project is prudent, particularly in view of the opportunity it affords to mitigate risk in the following areas:

- *System Integration*

A primary advantage to conducting all of the condition-based work during the MLU is to ensure that inter-dependent activities are completed in an integrated manner. The majority of WP4, although non-regulatory in nature, involves key systems and ancillary services that greatly benefit from a systematic overhaul or renewal in a strongly-coordinated manner. This helps ensure the avoidance of re-work or backward incompatibility between the vessel's various critical systems, which can lead to extended out of service periods and service interruptions. These system interfaces are throughout the vessel, including machinery, piping, software, or other connects. The ability to coordinate such systems if they were to be conducted at independent and later windows of opportunity would be difficult and could have a significant impact on the vessel's systems and hence operations.

- *Project Management and Controls*

Executing all work in a single master project schedule ensures better overall project control, project management and by extension vessel quality.

Each future project would require its own project plan, approvals, mobilization / demobilization and implementation with the associated internal resources. These inefficiencies would put demand on internal resources to manage the projects effectively.

- *Service Disruptions*

Systems and components on the S Class vessels have been carefully managed to extract maximum economic performance in anticipation of replacement or overhaul at the MLU. Consequently, many assets have reached the end of their service life and are due to be refurbished. The Company believes that overall vessel reliability will be improved, as systems and sub-systems are refurbished at the same point in time. The propensity for mechanical breakdowns increases with age and usage, and completing all work at the mid-life timeline should alleviate potential failure of components and systems that would otherwise be deferred for replacement to a later time in the vessel's life and maintenance cycle.

There is also significant business risk created by limited dry dock availability in British Columbia. As described in the Application, only two facilities in British Columbia are capable of docking the S Class vessels. These docks are heavily used. There is no guarantee dry dock space will be available at the time of an unplanned docking. If it is not, the Company must seek dock space in Washington State at higher cost or wait until local space becomes available. In either case, the cost will be higher than a planned, scheduled docking of known scope and duration and there is a risk of there being an extended out-service period.

Passenger Accommodations Design Refresh

The Project includes a refresh of the interior design standard (the “look and feel”) of the accommodation spaces on decks 5 and 6. If this refresh does not occur as part of the MLUs, the next most probable opportunity would not be until fiscal 2033 and 2034 (approximately 15 years after each vessel’s MLU) which industry indicates is an excessively long life span for retail service design standards without their appearing dated or negatively impacting revenue.

There are no changes in the scope of work for the design refresh components of WP 4 to that described in the Application.

Option 4B Schedule, Technical and Non-Financial Implications

The technical and non-financial implications of Option 4B, as described in the Application, are unchanged.

An adjustment to the schedule for Option 4B as set out in the Application has been made to reflect vessel transit time to an international shipyard. The work is now expected to be conducted from late October to the end of January. The incremental duration of WP 4 to WP 1 (carry out regulatory requirements) remains unchanged at 8 weeks, an incremental duration of WP 4 to WP 3 (implement payback projects) remains unchanged at 5 weeks and all work within WP 4 continues to fit within the schedule required to complete WP 2 (convert propulsion to DF).

Option 4B Capital and Operating Costs

Based on pricing received through the RFP process, the capital cost for Option 4B is now forecast to be significantly more than estimated in the Application. When compared on an NPV basis to the option of deferring the proposed work to subsequent maintenance events, Option 4B is less attractive. However, for the reasons described above, BC Ferries believes that the continued inclusion of WP 4 in the Project scope is warranted as a means of mitigating

significant risks including helping to minimize unplanned maintenance driven service disruptions, as well as to avoid possible decay in ancillary revenue. The updated cost projections for Option 4B are set out below in Table 6. Table 7 summarizes the financial analysis for the two options in WP 4.

Table 6: WP 4 – Option 4B Condition Based Requirements (Maintenance & Design Refresh)

Capital Budget and Financial Analysis (\$M) – Updated

	Capital Project Costs		Refit Project Costs (MOI)	Other Costs	Total Project Costs (incl. IDC)	Net Present Value	Simple Payback (years)	Discounted Payback (years)
	Capital	Operating	Capital	Operating				
Application	\$<>	\$<>	\$<>	\$<>	\$<>	(\$69.42)	N/A	N/A
Current Forecast	\$<>	\$<>	\$<>	\$<>	\$<>	(\$92.88)	N/A	N/A

Table 7: WP 4 – Financial Summary (\$M) – Updated

Options		Total Project Cost (incl. IDC)	Increased Maintenance Cost	Revenue Loss	Net incremental Cost	Net Present Value
Application	Option 4A: Do not Implement Condition Based Requirements		\$<>	\$<>		(\$75.66)
	Option 4B: Implement Condition Based Requirements	\$<>				(\$69.42)
	Net impact of foregoing WP4	\$<>	\$<>	\$<>	\$<>	(\$6.23)
Current Forecast	Option 4A: Do not Implement Condition Based Requirements*		\$<>	\$<>		(\$84.73)
	Option 4B: Implement Condition Based Requirements	\$<>	\$<>	\$<>	\$<>	(\$92.88)
	Net impact of foregoing WP4	\$<>	\$<>	\$<>	\$<>	\$8.15

* Option 4A has been updated to reflect pricing consistent with proposals received through the RFP process respecting Option 4B.

5.2 Updated Financial Summary of Preferred Options

Table 8 provides a financial summary of the preferred options of each WP.

Table 8: Financial Summary of Preferred Options - Updated (\$M)

Preferred Options	Capital Project Costs		Refit Project Costs (MOI)	Other Costs	Total Project Cost (Incl. IDC)	Net Present Value	Simple Payback (Years)	Discounted Payback (Years)
	Capital	Operating	Capital	Operating				
WP 1 Option 1A - Carry Out Regulatory Requirements	\$<>	\$<>	\$<>	\$<>	\$<>	(\$4.11)	N/A	N/A
WP 2 Option 2C - Convert Propulsion to DF	\$<>	\$<>			\$<>	\$13.13	11	19
WP 3.1 Option 3B - Implement Energy Efficiency Initiatives	\$<>		\$<>		\$<>	\$2.81	7	9
WP3.2 Option 3B – Implement Ancillary Revenue Initiatives	\$<>	\$<>			\$<>	\$4.99	6	8
WP 4 Option 4B - Implement Condition Based Requirements	\$<>	\$<>	\$<>	\$<>	\$<>	(\$92.88)	N/A	N/A
TOTAL PROJECT	\$<>	\$<>	\$<>	\$<>	\$<>	(\$76.06)	N/A	N/A

5.3 Updated Total Project Costs

As set out in Table 8, the total cost of the Project, as proposed by BC Ferries in this filing, is as follows:

5.3.1 Capital Costs

The total capital cost (capital plus major overhaul and inspection (“MOI”)) is \$<> million of which \$<> million is Project contingency. This compares to a projected total capital cost of \$<> million in the Application, including \$<> million in Project contingency.

5.3.2 Operating Costs

Project-related operating costs are projected to be \$<> million, as compared to the projection of \$<> million in the Application. The projected operating costs are composed of \$<> million for training associated with the conversion to DF propulsion, \$<> million for training associated with WP 1 (carry out regulatory requirements), WP 3 (other payback projects) and WP 4 (condition based requirements), \$<> million of feasibility work, \$<> million of contingency and \$<> million of other non-capital costs.

As explained in the Application, each vessel will also undergo a refit concurrent with the MLU at an operating cost of \$<> million per ship, which is not included in this Project.

5.3.3 Total Project Cost

The total Project cost is \$<> million. This compares to a projected total Project cost of \$<> million in the Application.

5.4 Consideration of New and Used Vessel Alternatives

While the projected Project cost has increased, the Company's analysis continues to support its view that upgrading the S Class vessels is a more prudent option than acquiring new or used vessels to replace them.

As explained in the Application, replacing each of the *Spirit of Vancouver Island* and *Spirit of British Columbia* with a new vessel at this point in their respective lives is not considered a reasonable option, given that the cost on a life cycle basis of replacing the vessels with new ones is expected to be significantly higher than the cost to upgrade them.

In terms of the opportunity to replace the S Class vessels with used vessels, as was explained in the Application, BC Ferries' experience with used vessel acquisitions, such as the *Northern Adventure* and *Queen of Chilliwack*, show the variability and risk that comes with used vessels. Only acquiring two mutually-identical ships of a type and capacity closely suited to Route 1 would reduce used vessel risk to an acceptable level. However, no such vessel duo is realistically available on the used market and, as such, the acquisition of used vessels continues to not be a realistic alternative option to upgrading the S Class vessels.

Under either scenario above, the financial position of the Company would also be negatively impacted through the requirement to recognize an asset impairment of the S Class vessels at the time of their replacement. The net book value remaining on the vessels at the time they

are planned to be taken out of service would be approximately \$29 million and \$43 million for the *Spirit of British Columbia* and the *Spirit of British Columbia*, respectively.

5.5 Project Financing

As described in the Application, BC Ferries plans to finance the Project, along with other forecast expenditures in the \$3.1 billion long term capital plan approved by the Commissioner, through a combination of cash flow generated from operations and issuance of incremental debt. The Company will not seek an extraordinary price increase under section 42 of the Act to accommodate the higher required capital expenditures to conduct the Project, nor will it seek an enhancement to the approved capital plan. The Company will take a risk-based approach in reviewing and reprioritizing the projects within the capital plan, including reducing scope and possibly cancelling of low priority projects.

5.6 Scenarios for Reducing Capital Expenditures

BC Ferries continues to believe that the proposed capital expenditure for the Project is reasonable and prudent. In light of the higher pricing received through the RFP process, the Company has carefully considered all scope assumptions of the Project. As described above, the Company has determined to reduce the scope of WP 3.1 (Energy Efficiency Initiatives) in view of the reduced prospect for payback associated with two initiatives originally proposed. There are no other obvious opportunities to reduce the proposed capital expenditure. WP 1 is required by statute and regulations. WP 2 (convert propulsion to DF) and WP 3 (other payback projects) are cost reduction and payback opportunities of net positive value to fare payers and, in the view of BC Ferries, should proceed. Only WP 4 (condition-based requirements), the principal objective of which is continued asset reliability, has scope which might be considered for reduction. However, for the reasons explained previously in this filing, the Company believes it is prudent to proceed with WP 4 as contemplated in the Application.

Section 6 - Risk Mitigation Update

As described in the Application, the Company has in place a rigorous process in place to identify, monitor and address the risks of the Project. A detailed Project risk matrix and methodology has been developed and updated as planning for the Project has proceeded.

The top risks facing the Project continue to fall within the four categories identified in the Application. They are:

- Schedule – the critical need to re-enter service on schedule upon Project completion;
- Technical – the technical complexity of the DF conversion;
- Regulatory – the regulatory environment for LNG-fuelled ships in Canada is still not fully settled; and
- Financial – estimates of project costs are not yet confirmed in fixed price contracts.

The risk matrix for the Project lists multiple detailed risks in each of these four risk categories. The risks considered highest as at the date of this filing continue to be those as described in the Application. The current and planned mitigation strategies to address these risks are set out below.

6.1 Update on Schedule Risk: Vessel is not ready for peak season

Both S Class vessels are scheduled to return to service prior to the May long weekend in 2018 and 2019. Delays in installation, commissioning, training and/or transit will delay the in-service day, and could result in loss of revenue and reputation, and possibly put the Company in breach of the CFSC. If the vessels are significantly delayed, impacts to the Company's bottom line could be severe.

Ongoing Mitigation Strategy:

- Schedule contingency of one month is built into the Project to buffer any delays in construction, commissioning and training.
- DF equipment is contractually required to be delivered at the conversion site prior to the vessel being removed from operational service in August of each year.
- A robust engineering, procurement and construction contracting strategy has been specified in the negotiated contract to ensure that any externally influenced delays, such as sub-contractor equipment delivery dates, are specifically the responsibility of the prime contractor. Inability to meet the contractual conditions is subject to specific liquidated damages.
- A fixed production and delivery schedule has been negotiated and included in the proposed contract with the prime contractor.

- The shipyard labour estimate has been evaluated during the proposal evaluation process, confirming the work can be completed within the pre-defined Project schedule.
- Development of a project training plan will continue, with focus on further clarifying training requirements and identifying opportunities to complete the training most efficiently. The plan will detail all logistical, schedule, and personnel specific requirements to ensure that crews are ready to be cleared on all new shipboard equipment and systems. In particular, the LNG training plan being implemented for the Salish Class vessels will be followed as closely as possible for this Project.

Planned Mitigation Strategy:

- Work scope and progress will be reviewed regularly to determine any adverse effect on the return to service schedule.
- Operationally-critical scope has been assigned a higher priority during Project implementation to mitigate risk and allow the vessels to meet summer contractual requirements.
- Contingency plans have been developed to help ensure the Project remains on schedule. In the unlikely event of a significant delay in the schedule, the contract option exists to complete the work to enable the vessel to operate in diesel mode for the summer period and to finish the DF conversion work at a later date.
- Monitor and implement training plans and lessons learned from the Salish Class project, tailored to this Project.
- Consider exploiting shipboard operational training opportunities during the vessel transit in the overall training plan.

6.1.1 Vessel Transit Risk

With the selection of two international shipyards to proceed the final stages of the RFP process, the risks associated with the transit of the vessels to and from an international shipyard have been reviewed specifically. BC Ferries has developed a vessel delivery plan with a reputable international ship delivery company, and has concluded that overall transit risk is low, given that the following risk mitigation measures have been confirmed:

- A ship delivery company can be contracted by BC Ferries for vessel transit from, and redelivery to, Victoria, British Columbia.
- Select interdisciplinary employees of BC Ferries would be available to accompany the vessel transit and advise the delivery company on vessel-specific operational characteristics.
- The vessels' design, in terms of seakeeping and transit capabilities, has been confirmed as fully compliant with regulatory authorities for international open ocean voyages.

- The vessels' maintenance and reliability has been assessed as fully suitable to meet the anticipated crossing conditions and duty cycle.
- Considerable time has been included in the project timeline to provide for the safe transit of the vessels to and from the shipyard.
- Planning for the selected voyages will include risk minimization, for factors such as weather, vessel endurance and provisioning, and any potential for corrective maintenance en route.
- Necessary insurance for the transit can be secured.

6.2 Update on Technical Risk: Convert propulsion to DF

Technical issues may cause project schedule delays, making the vessels unavailable for peak season. They may also cause performance issues with the vessels being unreliable or unable to maintain schedule. This may jeopardize the Company's ability to provide service in accordance with its requirements under the CFSC. Budget overruns caused by inexperience in converting propulsion to DF entail financial risk and may reduce the payback of converting to DF propulsion.

Ongoing Mitigation Strategy:

- An engineering consultant has been hired to provide schedules and budget data through feasibility studies, as well as contact with ship-owners who have completed or are in the planning phase of a DF propulsion conversion.
- Completion of detailed vessel performance sea trials on both S Class vessels has determined an expected performance baseline. This baseline includes speed, acceleration, rate of turn, noise and vibration measurements. Contractually, the shipyards are required to ensure that vessel performance is equal to or better than the performance baseline, thereby reducing post-conversion vessel performance risk.
- System design and operation regulatory requirements will be confirmed, and work with regulatory authorities at all levels will continue. 'Basic Design Review' by the Classification Society for the DF propulsion installation has been completed with comments. The comments indicate no major or unresolvable technical issues.
- Main subcontractors have provided engineering to further define the propulsive system power requirements, configuration and interfaces. Additionally, storage tank location, size, layout with ancillary system and bunkering station have been further defined.
- Provision for ongoing education regarding DF system conversion, regulations and operations for Project and operational teams will be developed.
- Operational training courses will be defined, planned, and implemented; BC Ferries will work with industry partners to develop a detailed training program.

- A thorough, bundled contracting process to acquire firm fixed prices early in the Project lifecycle will be pursued.
- The possibility of following the model used in the introduction to service of the DF Viking Grace, whereby the vessel would operate in diesel mode immediately after the installation until the end of summer peak season to allow extra time for training and commissioning, will be considered.
- Internal budget, payback and sensitivity assumptions will be defined and validated to ensure corporate consistency while leveraging other internal DF propulsion project work.
- A detailed budget and schedule will be developed with contingency mainly for the contracting process, equipment delivery schedule and conversion work scope.

Planned Mitigation Strategy:

- Internal specialists, contractors and shipyards will be engaged on proposed conversion plans and feedback on schedule will be requested.
- A contingency plan for installation and commissioning of the DF propulsion system will be developed.
- International information on conversions or new installations that can be correlated to this conversion Project will be gathered and reviewed.
- System design and operation regulatory requirements will be confirmed and work with regulatory authorities at all levels will continue.
- The possibility of operating the vessels in diesel mode until corporate familiarization and training level is adequate for DF propulsion will be considered.
- Internal resources will be used to provide a detailed 'shipyard' schedule and budget for the conversion (piping, electrical, other conversion related issues).
- Internal course material will be developed ahead of completion of shipyard installation.
- Training, audit and clearance procedures for all operational staff on new DF equipment and systems will be developed.

6.3 Update on Regulatory Risk: Changes in regulatory requirements

Any changes in regulatory requirements after the design is signed off will impact the budget and schedule. Regulatory agencies such as classification society, Transport Canada, provincial government, municipal governments and others may introduce regulations/legislation that will impact scope, schedule and budget. Changes to the CFSC or the Act may require changes to the planned project business outcomes.

Ongoing Mitigation Strategy:

- A clear Project governance model has been developed and implemented.

- Key areas of concern that may be subject to regulatory change (DF conversion, environmental, service schedules, etc.) have been identified.
- A robust contracting strategy has been implemented to reduce externally-influenced delays.
- Regulatory authorities will be consistently engaged within an acceptable timeframe to implement change within the Project.

Planned Mitigation Strategy:

- Communication to stakeholders of any potential new legal or regulatory compliance requirements will be done as soon as possible.
- Key areas with the greatest potential to impact the Project will be identified and scheduled for reviews.
- Assumptions within the Project business case of expected changes and impacts of regulatory requirements, service schedules and other Project assumptions will be clearly identified and monitored.

Note on Regulatory Risk

The Project assumes that the vessels will continue as primary vessels on Route 1, which is classed as a Near Coastal Voyage, Class 2 (Restricted Home Trade III) by Transport Canada Marine Safety ("TC MS"). The vessels are classed with the ABS, which has also acted as the Recognized Organization on the S Class vessels for TC MS since 2010. Under this system, ABS conducts drawing review and regular inspections on behalf of TC MS, as well as conducting its own surveys to ensure compliance with its class (technical) rules. TC MS retains an audit role and is responsible for determining safe manning levels. Transport Canada also retains a significant role in the form of the Marine Transportation Review Board, which is empowered to grant exemptions from regulatory requirements. As coastal vessels operating in a restricted area, the S Class vessels were constructed and operate with a number of exemptions related to the roll-on/roll-off operation, and for the safety systems appropriate to a short transit passenger ferry (versus a deep sea vessel).

BC Ferries has approached these exemptions as follows:

- Where compliance is subject to interpretation and there is reasonable likelihood of a MTRB approval for a variance, the scope has not been included in the Project. BC Ferries will seek a renewed MTRB exemption; the exemptions may require background risk assessment work before renewal.
- Where a MTRB approval is not likely, the Project incorporates the necessary modifications to bring the vessel into compliance with the new vessel construction & equipment regulations. These items are treated as compulsory and included in WP 1.

6.4 Update on Financial Risk

Shipyards pricing for the MLUs has been derived based on Canadian dollar pricing received through the latest phase of the RFP process. Should the decision to proceed with the Project be delayed, and if there is a material negative shift in the foreign exchange market, the shipyard could seek a higher price. The Company has included a contingency in the Project budget to address this and other unforeseen cost pressures. However, should pricing rise significantly higher than forecast, a further process with the Commissioner may be required in regard to the consideration of a further adjustment in the Cost Cap. Depending on the magnitude of the cost variance, scope changes to the Project may also be considered.

Section 7 - Conclusion and Order Sought

BC Ferries respectfully requests that the Commissioner issue an order supplemental to Order 14-03A approving a major capital expenditure for the Spirit Class Vessels Mid-Life Upgrades Project of up to \$<> million, inclusive of IDC, and supplemental Project expenditures of up to \$<> million, for total Project expenditures of up to \$<> million.

BC Ferries submits that the proposed capital expenditure is reasonable, affordable, prudent, and is consistent with the Company's current five-year and 12-year capital plans approved by BC Ferries' board of directors, and the current CFSC.

The Company continues to believe that pursuance of the Project is in the best interests of taxpayers and fare payers as the proposed investments will help ensure the continued reliability of service on Route 1 and will enable further advances in efficient and effective service delivery, which will contribute positively to the financial performance of this route and reduce upward pressure on fares across all routes in the coastal ferry system.