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Chief Review Services Chef - Service d'examen

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Internal Audit of
Joint Support Ship (JSS) Project

November 2011

7050-45 (CRS)



Canada 

Caveat

The audit included the review of contract tendering documentation but not the design contractors' performance. Only the Assistant Deputy Minister (Materiel) (ADM(Mat)) controls within the JSS contracting process were within the audit scope.



Table of Contents

Acronyms and Abbreviations	i
Results in Brief.....	iii
Introduction	1
Background	1
Objective	2
Scope	2
Methodology.....	2
Audit Criteria	2
Findings and Recommendations.....	3
Capability Cost Trade-off.....	3
Project Schedule	6
Contract Management.....	9
Human Resources Management.....	12
In-Service Support Strategy	14
Risk Management	16
Annex A—Management Action Plan	A-1
Annex B—Audit Criteria	B-1
Annex C—Sample Risk Map Based on ADM(Mat) KNet Web Site	C-1



Acronyms and Abbreviations

ADM(Mat)	Assistant Deputy Minister (Materiel)
AOPS	Arctic Offshore Patrol Ships
AOR	Auxiliary Oiler Replenishment
CCG	Canadian Coast Guard
CMS	Chief of the Maritime Staff
CRS	Chief Review Services
DDFP	Director Defence Force Planning
DGMPD	Director General Major Project Delivery
DID	Data Item Description
DMGOR AST	Director Materiel Group Operational Research Acquisition Support Team
DND	Department of National Defence
DWP	Docking Work Period
ELMS	Engineering, Logistics and Management Support
EMV	Expected Monetary Value
EPA	Effective Project Approval
FAA	<i>Financial Administration Act</i>
FELEX	Frigate Equipment Life Extension
FY	Fiscal Year
HMCS	Her Majesty's Canadian Ship
HR	Human Resources
IP	Investment Plan
IRM	Integrated Risk Management
ISS	In-Service Support
JSS	Joint Support Ship
KNet	Knowledge Network
MCP-IOC	Major Crown Project – Interdepartmental Oversight Committee
MOTS	Military off the Shelf
NSPS	National Shipbuilding and Procurement Strategy
NTG	Naval Task Group
O&M	Operations and Maintenance



OPI	Office of Primary Interest
PMB	Program Management Board
PMBOK	Project Management Body of Knowledge
PMO	Project Management Office
PMP	Project Management Plan
PMPR	Project Management Personnel Resources
PMS	Project Master Schedule
PMSO	Project Management Support Office
P, O&M	Personnel, Operations and Maintenance
PPRA	Project Profile and Risk Assessment
PWGSC	Public Works and Government Services Canada
RCN	Royal Canadian Navy
RFP	Request for Proposal
RMP	Risk Management Plan
SOR	Statement of Requirements
SOW	Statement of Work
SRB	Senior Review Board
VCDS	Vice Chief of the Defence Staff
WBS	Work Breakdown Structure



Results in Brief

A JSS project worth \$1.99 billion was approved in November 2004 to provide the Royal Canadian Navy (RCN) logistic support for Naval Task Groups (NTG).¹ In a 2007 risk analysis of equipment projects,² Chief Review Services (CRS) identified the JSS project as warranting an audit due to the high value of the project and the schedule delay resulting from an unsuccessful procurement strategy.³

Overall Assessment

To mitigate a potential loss of operational capability and to ensure the timely delivery of ships, the project office needs to implement better control processes to manage scheduling, human resources (HR), contracts and risks.

A revised JSS project budget of \$2.33 billion⁴ was approved in June 2010 for two ships with an option for a third ship. Now in the project definition phase, the current procurement strategy includes consideration of two allied Military off the Shelf (MOTS) designs, as well as a third developmental design. Once a design is selected, a Canadian shipyard is to commence construction of the first ship in 2013, with delivery to the RCN in May 2018, and is expected to deliver a second fully operational ship in November 2019.

Findings and Recommendations

Capability Cost Trade-off. The information regarding the JSS fleet size operational risks is insufficient for decision making should the funding become available to exercise the option for a third ship. The Statement of Requirements (SOR) does not clearly identify the operational impact if a fleet of two JSS is acquired.

Although there are considerable financial pressures in the capital acquisition and sustainment programs, it is recommended the SOR be amended to specify the operational risks associated with the JSS fleet size to ensure sufficient information is available should it become possible to exercise the contract option.

Project Schedule. Improvements are needed in HR allocation and productivity assumptions in the Project Master Schedule (PMS) for the definition phase. JSS project tasks did not always have Project Management Office (PMO) resources assigned and some of the resources were over-allocated. The productivity of each PMO resource was set at 100 percent as opposed to a more realistic setting. This may result in an unattainable schedule that will cause contract award delays.

¹ A NTG includes four combatants (frigates or submarines) and a support ship.

² CRS Risk Analysis of Capital Projects, April 2007 (<http://www.crs-csex.forces.gc.ca/reports-rapports/rp-eng.aspx#y2007>).

³ Two design/build bidders were awarded a design to requirement contract with a cap of \$1.57 billion for three JSS.

⁴ This is an indicative project cost excluding taxes. Expenditure authority was given for definition funds amounting to



There are external schedule risks as a result of the National Shipbuilding Procurement Strategy (NSPS) which involves construction of 29 ships by two selected Canadian shipyards. The NSPS secretariat is

To improve the PMS, it is recommended that the JSS PMO allocation of HR be completed with appropriate productivity settings. As well, ADM(Mat) should take the necessary steps to ensure the optimum scheduling of JSS within the NSPS.

Contract Management. Improvements in the Request for Proposals (RFP) related to the JSS design and construction would increase value for money for Canada. Increased subcontract visibility would Linking terms of payment to milestones for key design deliverables would provide additional leverage to help ensure their timely delivery. Requiring more information in vendor-provided reports would allow for better cost estimates and increased schedule oversight by the Crown. Greater clarity of mandatory requirements and their priority in the design Statement of Work (SOW) will

It is recommended that the NSPS contract negotiations for the JSS build include contract terms and conditions that address the CRS observations. The JSS PMO should revise the design RFPs to improve terms of payment, vendor report content, and the SOW and consider similar improvements to other contracts in the project.

HR Management. Improvements in the planning for Project Management Personnel Resources (PMPR) are needed. There was no information available on the methodology used to determine the requirement for 80 PMPRs during the implementation phase of the JSS project. As well, a plan to rapidly address short-term staffing pressures during peak workloads and a succession plan would mitigate HR risks for the remaining ten years of the JSS project.

It is recommended that PMO JSS better define future PMPR needs, succession within the PMO, and surge requirements.

In-Service Support (ISS) Strategy. Although the ISS procurement strategy is still under review, the length of the ISS contract will necessitate good performance measures and incentives for success. The performance incentives could tie One of the key ISS performance measures is

It is recommended that the JSS PMO consider using incentives tied to ||| when assessing vendor performance.

Note: For a more detailed list of CRS recommendations and management response, please refer to [Annex A](#)—Management Action Plan.



Introduction

Background



The RCN Auxiliary Oiler Replenishment (AOR) vessels support several ships or submarines at sea for up to 30 days of operations. The AORs resupply other ships with fuel, water, rations, and spares and carry three maritime helicopters. The two AORs currently in service are approximately 40 years old, well beyond their original equipment lifecycle expectancy. A third AOR, seven years older than the other two, was taken out of service in 1998.⁵

Figure 1. Her Majesty's Canadian Ship (HMCS) Protecteur.

This AOR was commissioned in 1969.

Source: Department of National Defence

To replace the AOR fleet, the definition phase of the JSS project was originally approved in November 2004 with a total project indicative cost⁶ of \$1.99 billion for the purchase of three JSS. The contracted definition phase commenced in December 2006 and two vendors produced offers for the construction of three JSS and the related ISS.⁷

The vendors' proposals, received in March 2008, were found to be non-compliant. In August 2008, Public Works and Government Services Canada (PWGSC) terminated the contracted definition phase since neither proposal could deliver the required capability within the allotted project budget.⁸ The project costs had been underestimated for a number of reasons:⁹

- The last RCN major ship construction experience was in 1996;
- The JSS design was developmental in nature;
- An unrealistic cost escalation factor of 2.0 percent per year was used versus the 3.5 to 5.0 percent factor acknowledged to be prevalent in the ship building industry;¹⁰
- An unprecedented global material and marine labour cost escalation (200 to 300 percent) had occurred;

⁵ The oldest AOR, HMCS Provider, was launched in 1962 with an equipment life expectancy of 30 years. HMCS Protecteur and HMCS Preserver were launched in 1968 and 1969, respectively.

⁶ The confidence level of indicative cost estimates range from 70 to 80 percent in accordance with ADM(Fin CS) Director Strategic Finance and Costing Costing Handbook, page 11-12.

⁷ In 2005, four pre-qualified vendors were identified to bid on the project design contract.

⁸ The design contract specified a cap of \$1.57 billion for three JSS. The SOW required the contractors to meet the performance specifications within the cost cap.

⁹ 29 March 2009 brief by the Chief of the Maritime Staff (CMS) to the Deputy Minister.

¹⁰ Currently the Project Office is using 2.7 percent as the escalation factor and have requested a tailored escalation model specific to JSS from ADM(Fin CS).

- Canadian shipyards required infrastructure upgrades and had lower productivity rates than international counterparts; and
- |||

After a new options analysis phase and de-scoping of the JSS SOR,¹¹ a revised definition phase was approved in June 2010 with an indicative project cost of \$2.33 billion¹² for two JSS with an option for a third. The aim of the project is to complete the construction of the lead JSS by May 2017 and achieve full operational capability of the JSS fleet by November 2019.

Objective

The objective of the audit was to assess the adequacy of the governance processes, risk management practices and management controls in place in the JSS project to ensure delivery of a cost-effective and timely operational capability.

Scope

The audit scope included the JSS project from inception, but with a focus on current and future planned activities. The scope did not include the design contractors' performance, as this is the audit responsibility of PWGSC. The audit conduct phase was performed between October 2010 and April 2011.

Methodology

- Interviews with staff at CMS, Vice Chief of the Defence Staff (VCDS) and ADM(Mat);
- Examination of project documents—SOR, Project Profile Risk Assessment (PPRA), Major Crown Project – Interdepartmental Oversight Committee (MCP-IOC) report, project charter, etc.;
- Review of ADM(Mat) and VCDS policies and procedures;
- Review of contract management practices that relate to the *Financial Administration Act* (FAA) Section 34 payment certification;
- Schedule comparisons with six allied support vessel projects;
- Data Analysis—using data from the Financial Managerial Accounting System, the Defence Resource Management Information System, the Dynamic Object Oriented Requirements System, the Resource Data Information Management System and the Canadian Forces Supply System; and
- Site visit with end users on the HMCS Protecteur AOR.

Audit Criteria

Please refer to [Annex B](#) for the audit criteria.

¹¹ The original May 2004 JSS SOR included 1,000 internal lane meters for vehicles, 100 sea containers, and a joint task force headquarters. These requirements were reduced in the revised November 2009 SOR.

¹² The revised cost of \$2.33 billion excludes taxes.



- Although the maintenance periods will be reduced for the JSS, Table 1 illustrates projected vessel availability over a five year period when mandatory refit time is taken into account.

	Year 1	Year 2	Year 3	Year 4	Year 5
Scenario 1—with three JSS					
Ship 1					
Ship 2					
Ship 3					
Ships available					
Scenario 2—with two JSS					
Ship 1					
Ship 2					
Ships available					

Table 1. Vessel Availability over a Five-Year Maintenance Cycle. In the first scenario, with three JSS vessels, ||||| In the second scenario with only two JSS vessels, |||||

- |||||¹⁹
- |||||²⁰
- |||||²¹

Affordability. |||||²² However, the Department is under considerable funding pressures due to the current economic environment.

¹⁹ 29 March 2009 brief to the Deputy Minister.
²⁰ 25 November 2009 JSS SOR, page 2.
²¹ May 2009 AOPS SOR, page 16.
²² Significant productivity improvement was achieved in the Canadian Patrol Frigate Project in the 1990s when the shipyard upgrade reduced the number of modules by 50 percent. The lead ship took 63 months to build, but the 3rd ship took only 51 months. Government supplied materiel for the third JSS will amount to at least |||||

The Strategic and Operating Review and the Strategic Review budget reductions could result in the identification of some unaffordable fleet acquisitions²³ as the Department rebalances the four Investment Plan (IP) pillars (personnel, equipment, sustainment and infrastructure).

²⁴

Should the funding become available to acquire the third ship option, the sustainment and personnel targets within the IP must also be taken into consideration.

- ²⁵
²⁶
- The current AOR ships require a crew of 250, whereas the JSS must not exceed 165 personnel.²⁷ Assuming that other new capability demands for military personnel can be met, such as crew for the six AOPS, the total crew of three JSS could be accommodated with the current crew of the two AORs which would remain within the IP military personnel ceiling. However, some additional staff will be necessary for leadership and management structure for a third JSS.

Recommendation

1. In consultation with ADM(Mat), amend the SOR to specify the operational risks associated with the JSS fleet size to ensure sufficient information is available should it become possible to exercise the contract option.

OPI: CMS

²³ Departmental Directive 2011-2016 04 October 2011 page 4.
²⁴ Program Management Board 14 June 2011.
²⁵ National Procurement Oversight Committee 24 October 2011.
²⁶ Department Directive for 2011-2016 page 4.
²⁷ SOR 25 November 2009 page 22. A range of 30 to 50 percent reduction in also specified in the SOR on page 3.

Project Schedule

Measures are needed to improve internal schedule controls and to mitigate external schedule risks.

Project Master Schedule

Although the JSS PMO has developed a PMS in Microsoft Project to monitor the project’s progress, the schedule requires improved HR allocation and productivity assumptions for the definition phase.

- Of the 398 tasks in the definition phase, 288 tasks (72 percent) did not have PMO resources assigned to them.
- Some PMO management resources were over-allocated in the PMS by as much as 193 percent, as the work had not been allocated to subordinates. While the difficulty of estimating the duration of some tasks with inexperienced project staff is acknowledged, without detailed HR allocation, task durations could be under or overstated. To develop the overall schedule, detailed allocation of resources is necessary to determine interdependencies and concurrent work.
- The productivity of each resource was set at 100 percent as opposed to a more realistic setting of 75 percent which is commonly used in many industries and organizations.²⁸ In order to develop a realistic schedule, the productivity of individuals should be based on the complexity of the task and experience level of the staff. Otherwise, the schedule will be too optimistic and result in unexpected project delays.

Good Practice

The PMO has established a reasonable four year construction and testing schedule for the lead ship. A comparison with six allied support ship projects found the average to be 3.3 years for lead ship construction.

External Schedule Risks

Currently, the NSPS involves the construction of 29 ships, and will result in approximately ||| of ship building work at two Canadian shipyards. A shipyard for combat ships and another for non-combat ships will be selected in August 2011 following the bid evaluation of the proposals from five contenders.

||||| This may result in the delay of some non-combat ship projects.

²⁸ Project Management Intermediate Course, ESI International Unit 2, Reference Material 2-5.

Recommendation

2. It is recommended that the JSS PMO allocation of HR be completed with appropriate productivity settings and that ADM(Mat) take the necessary steps to ensure the optimum scheduling of JSS within the NSPS.

OPI: ADM(Mat)



Contract Management

RFPs require improvement to ensure design and implementation contracts result in optimal value for money.

National Shipbuilding and Procurement Strategy Solicitation

The shipyard material and labour costs for the construction of two JSS are estimated to be ||||| Some improvements to the NSPS RFP were necessary to optimize the value for money in the proposed contract terms and conditions with the selected non-combat shipyard. As the NSPS solicitation closure date was 21 July 2011, a CRS management letter was signed on 24 March 2011 with suggested improvements to the NSPS RFP.

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³¹ The RFP requires the vendor to provide open book access to the Crown.
³² The Cost Factors Manual P, O&M costs for AORs were compared to the June 2010 Preliminary Project Approval P, O&M estimate for the JSS.

Terms of Payment MOTS Design

At the time of audit, two allied MOTS designs were being considered by the JSS PMO. For the risk reduction studies, costing ||| the MOTS RFPs could be improved in two key areas:

- |||
- |||

Vendor Reporting

For the two MOTS risk reduction study RFPs and a third design task RFP worth |||³³ vendor reporting requirements could be improved. More detailed information is needed by the project office to determine the ship costs and monitor the vendor’s schedule. Although PMO staff will co-locate with the design contractors, required improvements for vendor reports should include the following:

Good Practice

The MOTS RFP requires the contractors to report on historical resource scheduling to assist the project office in forecasting the JSS construction schedule.

- |||
- |||
- |||³⁴

Design Contracts SOW

SOWs should clearly define whether each requirement is mandatory or optional. The SOW in the ELMS design task RFP did not explicitly define whether terms such as “shall”, “should”, and “must” designate a task as optional or mandatory. There have been costly disputes in other projects where there was a disagreement over whether a requirement was mandatory or optional.³⁵

³³ As part of an Engineering, Logistics and Management Support (ELMS) contract.
³⁴ A float represents the amount of time a scheduled activity may be delayed without delaying the project completion date.
³⁵ CRS Audit Report Halifax Class Modernization/Frigate Equipment Life Extension Project, March 2010.

It is important to prioritize required capabilities in a project with a limited budget to ensure that if trade-offs occur later in the project, critical requirements are retained. In the two MOTS RFPs the JSS PMO did not assign the same priority to required capabilities as outlined in the SOR. Overall, the main criteria will be to optimize the combat capability within the design to cost framework.

Good Practice

The JSS PMO plans to place individual weight factors on over 100 capability specifications for the bid evaluation to ensure the best value is achieved in the design selection.

Recommendations

3. The NSPS contract negotiations for the JSS build include contract terms and conditions that address the CRS observations.
4. The JSS PMO revise the design RFPs to improve terms of payment, vendor report content, the SOW, and consider similar improvements to other contracts in the project.

OPI: ADM(Mat)



Human Resources Management

PMPR planning needs improvement with regards to determining the size of the project office, succession planning and fluctuating workload.

Project Management Personnel Resources

The revised June 2010 PPRA identified the risk of insufficient HR during the project definition phase to carry out the work plan according to schedule.³⁶ Although a shortfall of PMPRs could increase project costs due to schedule slippage, there was no available information on the methodology used to identify the requirement for 80 PMPRs during the project implementation phase. As well, there was no evidence that departmental guidance³⁷ in that regard was followed. There are 52 PMPRs currently established for the definition phase. Substantiation for the additional 28 PMPRs for the implementation phase will be necessary.

Good Practices

- The Project Charter was developed early on.
- Detailed Service Level Agreement with the Director Quality Assurance is in place for the construction contract.
- Roles and responsibilities are well documented in the Charter, PPRA, and in detailed work descriptions.

From November 2006 to February 2007, the Australian Defence Materiel Organisation (DMO) conducted a benchmarking study of approximately 100 Project Teams and developed a Project Office Staffing Model. The resulting algorithm³⁸ is used to estimate the required size and composition of a Project Team. Although the model has yet to be validated, it is suggested that a similar approach, specific to DND, be developed as an additional instrument to support the Department's current methodology.

Succession Planning

The PMO primarily relies on Director General Major Project Delivery (DGMPD) Divisional Succession Planning for executive levels and ADM(Mat) qualification pools for other succession planning. There is no JSS project office Succession Plan to ensure key section head positions are not left vacant over the remaining ten years of the project. Such a plan would support the PMO in identifying key positions and expected vacancies that could impact on the project in order to identify, develop and retain competent personnel for succession shortfalls. As a result, the impact of vacancies in key positions on project schedule and cost would be minimized.

³⁶ The vacancy rate was 15 percent at the time of the audit (positions embedded within the Director General Maritime Equipment Program Management were taken into account).

³⁷ Mat KNet, Project Management, Method-PMO Organization Designing.

³⁸ $\text{Staff} = 35.34 - [8.28 \times \text{ACAT Level}] + [0.0119 \times \text{Project Cost (millions \$)}]$. The ACAT Level refers to the Acquisition Category, which is used to classify a project's complexity. There are four ACAT levels decreasing in project complexity—the opposite of the four DND Project Complexity and Risk Assessment levels that increase in complexity for each level.



Surge Requirements

The PMO would benefit by developing a plan to rapidly address short-term PMPRs shortfalls during peak workloads. A plan to address surge requirements could help reduce the impact of insufficient HR on project schedule and cost.

Discussions are under way for the development of a DGMPD talent management initiative to support the growth and retention of staff during lulls in project intensity and to re-direct underemployed staff to projects that have a surge in their workload. The JSS HR plan put more emphasis on the movement of underemployed resources than on acquiring resources during surge periods. The JSS project is in the process of establishing the timing and number of PMPRs that will be required for the design review process. Once this step is completed, the PMO will be in a better position to establish a plan.

Recommendation

5. JSS PMO improve HR planning to better define future PMPR needs, succession planning and surge requirements within the PMO.

OPI: ADM(Mat)



In-Service Support Strategy

The proposed performance incentives in the ISS strategy could be improved in order to encourage optimal service levels.

ISS Transition

Under the ISS Contracting Framework,³⁹ normally the JSS shipbuilding and ISS would be combined in the same competition as a single procurement. As a consequence, the shipbuilder would be accountable for warranty issues and the maintenance plan, while providing the life cycle support. NSPS encompasses shipbuilding only and does not include ISS. Therefore, the shipbuilder is not responsible for ISS costs resulting from the JSS design. As well, due to the short lead time to determine ISS requirements before the shipbuilding contract award, it has been decided to compete the ISS contract separately. While the shipbuilder will be able to compete for the ISS contract, the ISS may be awarded to a different vendor. The ISS contract will be for

Good Practice

After the initial five year time period, the JSS PMO

Performance Metrics

The ISS contract will be performance-based. Incentives will be based on the four metrics listed in Table 3 which, for the most part, have been assessed as good indicators.

Ser	Performance Metrics	CRS Assessment
1.		Good Indicator
2.		Needs Improvement
3.		Good Indicator
4.		Good Indicator

Table 3. Performance Metrics. Three of the performance metrics are assessed as good indicators of the vendor performance.

All four of the performance metrics are measurable outputs that the ISS contractor is solely responsible for.

³⁹ The ISS Contracting Framework for CF Platforms during the Initial Acquisition Stage, July 2009 (ADM(Mat) KNet).

Option Years

The ISS contract will allow Canada to exercise | | | | | at the end of the initial contract period, if satisfied with the contractor’s performance, until the vessels are retired from service. | | | | |

The Tactical Armoured Patrol Vehicle project’s ISS plan calls for an annual evaluation where the Crown can add one-year options to the existing term if contractor performance is satisfactory. For example, after the first year of a seven-year guaranteed ISS period, the Crown can award a one-year option that would guarantee the contractor seven years of service (the six previously remaining years and an additional year for good performance). Superior performance could merit the award of two or more additional years. This process motivates the contractor to consistently perform well, | | | | |

Recommendation

6. JSS PMO consider using incentives tied to | | | | | when assessing vendor performance.
OPI: ADM(Mat)

Risk Management

The PMO risk management is not aligned with the DND Integrated Risk Management (IRM) framework and does not reflect best ADM(Mat) and Project Management Body of Knowledge (PMBOK) practices.

Probability and Impact Threshold

Although the JSS Project Risk Management Plan (RMP) includes five threshold levels for risk impact and probability, the criteria are insufficiently developed to determine which level should be assigned to each risk. The levels of risk probability should be clearly defined numerically as portrayed in the risk radar application format in the ADM(Mat) Knowledge Network (KNet) website⁴⁰ and the PMBOK.⁴¹ The five risk impact threshold levels should also have clearly defined cost, schedule and performance criteria as portrayed in the ADM(Mat) KNet.⁴² More specific definition of the risk and probability thresholds will lead to more consistent risk assessment and ranking by the PMO.

Risk Ranking

The PMO risk ranking methodology does not comply with the five levels of risk severity specified in the DND ADM(Mat) KNet and VCDS IRM risk map which is portrayed in [Annex C](#). Although the PMO impact and probability of a risk is based on five levels, the severity of the risk is assessed at only three levels. The reduction of the five levels of impact and probability to three levels of severity in the PMO risk map does not provide the granularity to rank risks appropriately.

Good Practices

- The PMO has a detailed risk database with current information on each risk.
- A weighted timeframe factor for each risk is considered when the risk severity is determined.
- Monthly Risk Management Board meetings are held for risk prioritization and analysis across the PMO.

Risk Reporting

Severity of the risks reported to the MCP-IOC has changed from month to month with little rationale. Even though the risk mitigation remained the same for some risks, the risk severity was reduced from high to medium. Also, MCP-IOC reports do not sufficiently rank and include all higher risks. Rather, risks are reported by the PMO based on judgment and the IOC audience. For example, the PMO reported only three of the 15 high risks and two medium risks in the May 2010 report. For many of the high risks, the mitigation plans had reduced the risk severity to significant or medium. Therefore, it may be more appropriate to report on the residual risk severity once mitigation plans have been developed.

⁴⁰ ADM(Mat) KNet: Risk Tool kit – Risk Radar.

⁴¹ PMBOK 2004: Severity Matrix, Chapter 11 – Project Risk Management, page 252.

⁴² ADM(Mat) KNet: Method – Risk Information Analysis.



Only one of the seven project briefings at SRB meetings between 2004 and 2010 listed specific risks. Two SRB briefings had no information on risk, while others contained only a list of risk areas with no specific information. Without specific risk information, the SRB is not able to endorse the risk mitigation plans.

Risk Quantification

||||| Although there is no formal departmental guidance in this area, there is a project management working group that will recommend a tool to be used for risk quantification by the projects. Until a quantification tool is selected by the Department, the JSS PMO could consider quantifying risk by using PMBOK Expected Monetary Value (EMV)⁴³ practices.

Recommendation

7. It is recommended that the JSS PMO revise the RMP to comply with the DND IRM and best practices in accordance with the PMBOK.
OPI: ADM(Mat)

⁴³ PMBOK 2004: (EMV = Risk Impact Value x Probability), Chapter 11 – Project Risk Management, page 257.

Annex A—Management Action Plan

Capability Cost Trade-off

CRS Recommendation

1. In consultation with ADM(Mat), amend the SOR to specify the operational risks associated with the JSS fleet size to ensure sufficient information is available should it become possible to exercise the contract option.

Management Action

The operational impact and availability of JSS in relation to the number of ships will be articulated in the next revision of the SOR to be presented and endorsed at the annual SRB in 2012.

OPI: CMS

Target Date: 30 November 2012

Project Schedule

CRS Recommendation

2. It is recommended that the JSS PMO allocation of HR be completed with appropriate productivity settings and that ADM(Mat) take the necessary steps to ensure the optimum scheduling of JSS within the NSPS.

Management Action

CRS project scheduling recommendations will be adopted. PMO JSS will update its Project Master Schedule to ensure that all identified Project Definition activities have appropriate resources assigned with realistic productivity considerations and levels.

OPI: ADM(Mat)/PMO JSS

Target Date: 30 November 2011



Management Action

PMO JSS will ensure the NSPS Secretariat maintains the issue of non-combat work package sequencing as an open action item within its DND/CCG Project Action Log. This will promote a regular dialogue on this schedule risk between NSPS, DND, Department of Fisheries, and the Canadian Coast Guard on the optimal scheduling of the affected projects. Finally, given the interdepartmental significance, visibility into this risk has been elevated to the MCP-IOC level.

OPI: ADM(Mat)/PMO JSS

Target Date: By Effective Project Approval (EPA)

Contract Management

CRS Recommendations

3. The NSPS contract negotiations for the JSS build include contract terms and conditions that address the CRS observations.
4. The JSS PMO revise the design RFPs to improve terms of payment, vendor report content, the SOW and consider similar improvements to other contracts in the project.

Management Action

The recommendations proposed by CRS in support of contract management will be taken into consideration when developing future contracts in support of JSS, specifically the build contract with the designated NSPS shipyard.

OPI: ADM(Mat)/PMO JSS

Target Date: By EPA



Management Action

CRS recommendations concerning vendor reporting and SOW clarity have been implemented in both the MOTS and New Design procurement documents. Terms of payment are presently being negotiated to ensure payments will be in line with actual work (milestones) completed.

OPI: ADM(Mat)/PMO JSS

Target Date: Completed. The required actions outlined in CRS recommendation 4 were completed by PMO JSS on 21 March 2011.

Human Resources Management

CRS Recommendation

5. The JSS PMO improve HR planning to better define future PMPR needs, succession planning and surge requirements within the PMO.

Management Action

Project Management Support Office (PMSO), in consultation with Director Materiel Group Operational Research Acquisition Support Team (DMGOR AST), will undertake to develop a PMO staffing model to supplement the existing departmental methodology and guidance.

OPI: ADM(Mat)/PMSO

Target Date: 31 December 2012

Management Action

The JSS PMO has drafted a HR Management Plan that reflects CRS recommendations to better address succession planning and surge requirements within the project. The HR plan is currently under review and will be promulgated when ready.

OPI: ADM(Mat)/PMO JSS

Target Date: 28 February 2012



In-Service Support Strategy

CRS Recommendation

6. JSS PMO consider using incentives tied to ||| when assessing vendor performance.

Management Action

Linking vendor performance to exercising an ISS contract option will be considered in the next ISS SOW and ISS Pro-Forma contract revisions. The criteria, metrics and associated penalties tied to ||| will also be considered and will be articulated in detail in the above-mentioned revised documents.

OPI: ADM(Mat)/PMO JSS

Target Date: 30 November 2013

Risk Management

CRS Recommendation

7. It is recommended that the JSS PMO revise the RMP to comply with the DND IRM and best practices in accordance with the PMBOK.

Management Action

CRS risk management recommendations have been incorporated into the project's draft RMP. This revision of the RMP is presently under review and will be promulgated in the fall of 2011. Updates include improved definitions for risk impact levels and the adoption of the five levels of risk severity, in accordance with the DND IRM.

OPI: ADM(Mat)/PMO JSS

Target Date: 31 December 2011

Management Action

PMO JSS will rescore all project risks in light of the new impact definitions and complete a risk quantification exercise using PMBOK's EMV practices to assess the adequacy of the project's existing risk mitigation and contingency levels.

OPI: ADM(Mat)/PMO JSS

Target Date: 31 March 2012



Annex B—Audit Criteria

Objective

To assess the adequacy of the governance processes, risk management practices and management controls in place in the JSS project to ensure a cost-effective and timely operational capability.

Criteria Assessment

Level 1 (Satisfactory); Level 2 (Needs Minor Improvement); Level 3 (Needs Moderate Improvement); Level 4 (Needs Significant Improvement); Level 5 (Unsatisfactory)

Governance

1. **Criteria.** Roles and responsibilities are defined and necessary skills, staff and resources are available to govern the project.

Assessment. Level 3—No succession planning for the last 10 years of the project; surge PMPR requirements not identified; lack of evidence to support the number of PMPRs; deficiencies in the project HR plan (briefed); specified roles and responsibilities and performance metrics deliverables missing in Memoranda of Understanding between other projects/departments (briefed); training plan shortfalls (briefed).

2. **Criteria.** An adequate monitoring process is in place that utilizes high-quality, up-to-date and accurate information as the basis for decision-making.

Assessment. Level 2—Potential improvements in the Project Management Plan (PMP) (briefed); deficiencies in PMP Sub-Plan prioritization; communication plan shortfalls (briefed); need for performance measurement tool (briefed); Performance measurement reporting content redundancy (briefed); establishment of Shared Data Environment (briefed); no assigned owners for Work Breakdown Structure (WBS) (briefed); inconsistent basis for WBS structure in different systems (briefed).



Risk

- 3. **Criteria.** Risks are identified, assessed, ranked, mitigated, quantified cost impact and reported in accordance with relevant policy and best practices.

Assessment. Level 3—No clearly defined probability and impact thresholds; deficiencies in risk severity assessments; inconsistent ranking of risk in the MCP-IOC; risks not reported at SRBs; no quantification of risk; non-standardized reporting for MCP-IOC (briefed); deficiencies in the risk management practices (briefed); more detailed requirements on the risk management practices needed in the project definition contract data item descriptions (DID)/SOWs (briefed); ownership of risk management in the implementation phase (briefed).

Control

- 4. **Criteria.** Project schedule is achievable, and is managed to avoid impact on operational requirements.

Assessment. Level 4—No resources assigned in definition phase PMS; over-allocation of some individual resources; productivity default settings at 100 percent; |||||||||||||||||| high portion of cash outflow in the early stage of the implementation; lack of internal communication on critical tasks (briefed).

- 5. **Criteria.** Operational requirements are in accordance with defence policy, clearly defined, complete, prioritized, consistent and traceable throughout the project activities from SOR development to performance specifications test, evaluation and training plans.

Assessment. Level 4—Potential source of funds to be used for third ship; O&M costs of third ship already accounted for in IP; additional capability from the third ship; |||

Annex C—Sample Risk Map Based on ADM(Mat) KNet Web Site

Impact Risk	Probability Risk				
	Rare 0 – 0.15	Unlikely 0.16 – 0.30	Possible 0.31 – 0.45	Likely 0.46 – 0.60	Almost Certain 0.61 – 0.99
Severe 5	0.75 Medium	1.5 Significant	2.25 High	3 Very High	4.95 Very High
Major 4	0.6 Medium	1.2 Significant	1.8 Significant	2.4 High	3.96 Very High
Moderate 3	0.45 Low	0.9 Medium	1.35 Significant	1.8 Significant	2.97 High
Minor 2	0.3 Low	0.6 Low	0.9 Medium	1.2 Significant	1.98 High
Insignificant 1	0.15 Low	0.3 Low	0.45 Low	0.6 Medium	0.99 Medium

Table 4. Sample Risk Map. Risk severity equals impact risk multiplied by probability risk.

The numerical scale is similar to the Risk Radar application found at the ADM(Mat) KNet web site and recommended in the PMBOK. The illustrated adjustment to the probability scale was recommended in the CRS Chemical, Biological, Radiological and Nuclear (CBRN) audit report⁴⁴ in 2008.

The probability scale is divided into five levels with defined quantitative probabilities. The impact scale is also divided into five levels with a numerical score. The product of the risk and probability scores enables ranking of the risks that may have the same risk severity level (e.g., the four high-severity levels have different numerical products ranging from 1.98 to 2.97).

⁴⁴ CRS Audit of Chemical, Biological, Radiological and Nuclear (CBRN) Defence Omnibus Project, May 2008 (<http://www.crs-csex.forces.gc.ca/reports-rapports/2008/141P0809-eng.asp>).

