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Title - Sujet EREP:RFI-Self-propelled Advancing S	
Solicitation No. - N° de l'invitation F7047-160032/C	Date 2018-12-07
Client Reference No. - N° de référence du client F7047-160032	GETS Ref. No. - N° de réf. de SEAG PW-\$ERD-005-27095
File No. - N° de dossier 005erd.F7047-160032	CCC No./N° CCC - FMS No./N° VME
Solicitation Closes - L'invitation prend fin at - à 02:00 PM on - le 2018-12-21	
Time Zone Fuseau horaire Eastern Standard Time EST	
F.O.B. - F.A.B. Specified Herein - Précisé dans les présentes	
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Telephone No. - N° de téléphone (613) 614-2383 ()	FAX No. - N° de FAX () -
Destination - of Goods, Services, and Construction: Destination - des biens, services et construction: See herein	

Instructions: See Herein

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Name and title of person authorized to sign on behalf of Vendor/Firm (type or print) Nom et titre de la personne autorisée à signer au nom du fournisseur/ de l'entrepreneur (taper ou écrire en caractères d'imprimerie)	
Signature	Date

Self-Propelled Advancing Skimmer (SPAS) Request for Information (RFI)

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PART 1 – PURPOSE AND NATURE OF THE RFI

1.1 Purpose of the RFI

Public Services and Procurement Canada (PSPC) is launching this Request for Information (RFI) in order to provide Industry with an early opportunity to become familiar with Canada's technical and operational requirements for the Self-Propelled Advancing Skimmer (SPAS), and the opportunity to give Canada any remarks Industry may have regarding these requirements.

1.2 Background Information

The Government of Canada introduced the Oceans Protection Plan's initiatives to enhance marine safety and to protect Canada's marine environment in November 2016. The Canadian Coast Guard (CCG) is responsible for providing goods and services to support the Environmental Response Equipment (ERE) Program, under the Oceans Protection Plan (OPP). Part of this initiative is to ensure that CCG is response ready when oil spills occur. The Self-Propelled Advancing Skimmers (SPAS) represents a vital part of CCG's new Environmental Response capability. Presently, CCG is completely reliant on small portable skimmers for on-water oil skimming, which require external pumps and storage tanks as well as a vessel to transport the complete system. A SPAS is an autonomous piece of equipment, operated by only a few personnel, which can rapidly advance and recover spilled oil from the water using a built-in oil recovery and storage capability without relying on the use of any additional equipment. This system will greatly increase the response time for spills, stemming the dispersal of the slick and resulting in greater amounts of oil recovered.

1.3 Nature of the RFI

Participation in this RFI is encouraged, but is not mandatory. **This is not a bid solicitation.** This RFI will not result in the award of any contract. No agreement or contract will be entered into based on this RFI. The issuance of this RFI is not to be considered in any way a commitment by the Government of Canada, nor as authority to potential respondents to undertake any work that could be charged to Canada. As a result, potential suppliers of any goods or services described in this RFI should not reserve stock or facilities, nor allocate resources, as a result of any information contained in this RFI.

There will be no short-listing of potential suppliers for the purposes of undertaking any future work as a result of this RFI. This RFI will not result in the creation of any source list. Therefore, whether or not any potential supplier responds to this RFI, this will not preclude that supplier from participating in any future procurement. Participation in this RFI is not a condition or prerequisite for the participation in any potential subsequent solicitation.

This RFI is neither a call for tender nor a Request for Proposal (RFP). This RFI is not to be considered as a commitment to issue a subsequent solicitation or award contract(s) for the work described herein. This RFI is simply intended to solicit information and feedback from industry with respect to the matters described in this RFI.

Canada will not be bound by anything stated herein and reserves the right to change at any time, any or all parts of the requirement, as it deems necessary. Canada also reserves the right to revise its procurement approach, as it considers appropriate, either based upon information submitted in response to this RFI or for any other reason it deems appropriate.

Canada may use non-proprietary information provided in this review and/or in the preparation of any formal solicitation document.

Changes to this RFI may occur and will be advertised on the BuyAndSell.gc.ca website. Canada asks Respondents to visit BuyAndSell.gc.ca regularly to check for changes, if any.

PART 2 – RESPONSE INSTRUCTIONS AND INFORMATION

2.1 Nature and Format of Responses Requested

Canada's technical and operational requirements are provided in Part 3 of this RFI (specifically, the Technical Statement of Requirement, and the Evaluation Criteria that would be included in follow-on RFP, should Canada choose to move forward with the procurement).

Respondents are invited to provide their remarks regarding the content of Part 3 by written response. Respondents should explain any assumptions they make in their interpretation of the requirements.

2.2 Response Costs

Respondents will not be reimbursed for any cost incurred by participating in this RFI.

2.3 Treatment of Responses

2.3.1 Use of Responses

Responses will not be formally evaluated. However, Canada may use the remarks received from Industry in planning a potential solicitation for the Work described herein. Canada will review all responses received by the RFI closing date. Canada may, at its discretion, review responses received after the RFI closing date.

2.3.2 Review Team

A review team composed of representatives of the Government of Canada will review the responses. Canada reserves the right to hire any independent consultant, or use any Government resources that it considers necessary to review any response. Not all members of the review team will necessarily review all responses.

2.3.3 Confidentiality

Respondents are encouraged to identify, in the information they share with Canada, any information that they feel is proprietary, third party or personal information. Please note that Canada may be obligated by law (e.g. in response to a request under the Access to Information and Privacy Acts) to disclose proprietary or commercially-sensitive information concerning a respondent (for more information: <http://laws-lois.justice.gc.ca/eng/acts/a-1/>).

Respondents are asked to identify if their response, or any part of their response, is subject to the Controlled Goods Regulations.

2.3.4 Follow-up Activity

Canada may, at its discretion, contact any Respondent to follow up with additional questions or for clarification of any aspect of a response. Canada may also publish further RFIs related to this initiative.

Responses will not be returned to the Respondents.

2.3.5 Schedule

In providing responses, the following schedule may be utilized as a baseline:

- a) This RFI: December 2018
- b) Potential Solicitation (RFP): Winter 2019
- c) Potential Contract Award: Spring 2019

2.4 Contents of this RFI

This RFI contains Canada's technical and operational requirements for the SPAS. Respondents should anticipate that clauses or requirements may be added to or deleted from any resulting bid solicitation that may be published by Canada in the future.

2.5 Format of Responses

2.5.1 Response preparation

Respondents are asked to provide their remarks electronically as a PDF document that is unprotected (no password required), or in MS Word format. Responses provided via email are preferred (please send the email to the Contracting Authority identified at 2.5.3, below).

2.5.2 Response content

Responses should include a cover page that contains:

- a) The RFI number
- b) The full legal name of the company that the respondent is representing;
- c) The title, the name and the contact information of the respondent; and,
- d) The date of submission of the documents.

All pages should be identified the company's name along with page numbers.

Respondents are requested to clearly indicate the specific document and section being referenced (i.e., 3.1 Technical Statement of Requirements; M2 Technical Bid Evaluation Plan; etc.).

2.5.3 Submitting a Response

Interested Respondents may submit their responses to the PSPC Contracting Authority, identified below:

Shazia K. Richards
Supply Specialist
Environmental Response Equipment Program
200 Kent Street, office 7S003
Ottawa, ON K1A 0E6
E-mail address: shazia.richards@pwgsc-tpsgc.gc.ca

Canada prefers to receive responses by email (no more than 5MB).

2.6 Closing date for the LOI/RFI:

Responses to this RFI are to be submitted to the PSPC Contracting Authority identified above, on or before December 21, 2018.

Each respondent should ensure its response is delivered on time to the correct email address or location.

2.7 Official Languages

Responses to this RFI are requested to be presented in either of the Official Languages of Canada.

Part 3.1
Technical Statement of Requirements

**Environmental Response Equipment Modernization/
Mobile Incident Command Equipment Project**

Self-Propelled Advancing Skimmer

TECHNICAL STATEMENT OF REQUIREMENTS (TSOR)
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LIST OF ACRONYMS AND ABBREVIATIONS

ABYC	American Boat and Yacht Council
AFT	Assigned formal tonnage
AIS	Automatic identification system
ANBCC	Authorized National Body for Company Certification
ASME	American Society of Mechanical Engineers
ASTM	Formerly known as the American Society for Testing and Materials
BOA	Beam overall
BPVC	Boiler and Pressure Vessel Code
CCA	Cold cranking amperage
CCG	Canadian Coast Guard
CGSB	Canadian General Standards Board
ConOps	Concept of Operations
C.R.C	Consolidated Regulations of Canada
CSA	Canadian Standards Association
CWB	Canadian Welding Bureau
DC	Direct current
DWL	Design waterline
EMI	Electromagnetic interference
EPIRB	Emergency position indicating radio beacon
ER	Environmental response
GFE	Government furnished equipment
GPS	Global position system
GSA	General Services Administration
GVWR	Gross vehicle weight rating
HID	High-intensity discharge
HPU	Hydraulic power unit
IEC	International Electrotechnical Commission
IIW	International Institute of Welding
ISO	International Organization for Standardization
LED	Light-emitting diode
LOA	Length overall
MBS	Minimum breaking strength
MMSI	Marine Mobile Service Identity
NACM	National Association of Chain Manufacturers
NDT	Non-destructive testing
NMEA	National Marine Electronics Association
NRCan	Natural Resources Canada

TECHNICAL STATEMENT OF REQUIREMENTS (TSOR)

NSM	National Safety Mark
OEM	Original equipment manufacturer
PA	Public announcement
PT	Penetrant testing
RT	Radiographic testing
SAE	Society of Automotive Engineers
SOR	Statutory Orders and Regulations
SPAS	Self-Propelled Advancing Skimmer
SS	Stainless steel
TP	Transport Publications (Transport Canada)
TSOR	Technical Statement of Requirements
UHF	Ultra-high frequency
UHMW	Ultra-high molecular weight
US	United States
USB	Universal serial bus
USCG	United States Coast Guard
UV	Ultraviolet
VHF	Very-high frequency

1 INTRODUCTION

1.1. PURPOSE

The Canadian Coast Guard (CCG) requires a proven, purpose-built vessel, whose integrated design allows the independent recovery, temporary storage, and offloading of spilled oil. Fulfillment of this requirement will help to augment the existing response capability in calm and protected waters, as well as support the CCG Environmental Response (ER) Concept of Operations (ConOps). This Technical Statement of Requirements (TSOR) document defines the functional- and performance-based requirements for the Self-Propelled Advancing Skimmer (hereinafter referred to as the “SPAS”).

1.2. DOCUMENT CONVENTION

The following conventions apply to this TSOR:

- a) The term **MUST** is used to identify mandatory requirements that are to be satisfied by the Contractor and approved by Canada.
- b) The term **SHOULD** is used to identify a requirement that is not mandatory; however, the fulfillment of such a requirement will augment the overall fit, form, function, quality, or any combination thereof of the overall SPAS.

1.3. DEFINITIONS

The following definitions apply to this TSOR:

Dissimilar metals	Two metal specimens electrically connected to each other in a conductive solution, and capable of generating an electric current.
Heavy-duty	A quality of a product designed to withstand the stresses of demanding or abnormal use.
Lightship displacement	Vessel complete and ready for service in all respects, including outfit and liquids in machinery at operating levels, less crew and items of variable load.
Marine-grade	A quality of a product specially formulated or treated to withstand use at sea.
Normal load (road transport)	Lightship displacement of the vessel, full gasoline and diesel fuel tanks, 50 kilograms (kg) of deck gear, empty recovered oil storage tanks, and a 10% margin for growth.
Normal load (skimming)	Lightship displacement of the vessel, in addition to full gasoline and diesel fuel tanks, four personnel on board (400 kg total), 50 kg of deck gear, and 4.0 m ³ of recovered product, with a specific gravity of 1.0, in the recovered oil storage tanks.

Normal load (transit)	Lightship displacement of the vessel, in addition to full gasoline and diesel fuel tanks, four personnel on board (400 kg total), 50 kg of deck gear, and empty recovered oil storage tanks.
Parent Skimmer	A design that is currently in satisfactory operation, with a minimum of 1,000 cumulative operating hours, whose hull is built around (or comprises) the oil recovery, storage, and offloading systems.
Proven	Demonstrated operational efficacy through both iterative design testing and repeated, successful deployment in real-world, oil spill recovery events.
Recovery rate	Volume of oil recovered per unit of time.
Safety factor	Number of times that a load can be increased before failure occurs.
Stowage	A dedicated location, mount, or bracket, complete with securing device, that provides optimum safety for both the vessel and the cargo, and facilitates access to the cargo.

2 REFERENCE DOCUMENTATION

2.1. CANADIAN REGULATIONS AND TRANSPORT CANADA PUBLICATIONS

The following Canadian Acts, Regulations, and Transport Canada Publications (TP) apply to the SPAS:

- a) Canadian Shipping Act, 2001;
- b) Consolidated Regulations of Canada (C.R.C.), c. 1038, Motor Vehicle Safety Regulations;
- c) C.R.C., c. 1416, Collision Regulations;
- d) Statutory Orders and Regulations (SOR)/2005-32, Off-Road Compression Ignition Engine Emission Regulations;
- e) SOR/2007-128, Cargo, Fumigation, and Tackle Regulations;
- f) SOR/2010-91, Small Vessel Regulations;
- g) SOR/2010-120, Maritime Occupational Health and Safety Regulations;
- h) SOR/2011-10, Marine Spark Ignition Engine, Vessel, and Off Road Recreational Vehicle Emission Regulations;
- i) TP 1332, Construction Standards for Small Vessels (04/2010);
- j) TP 13430, Standard for the Tonnage Measurement of Vessels (10/2012); and
- k) TP 14117, Trailers: Federal Lighting Equipment Location Requirements (2007).

Failure to list a Canadian Act, Regulation, or Transport Canada Publication herein does not relieve the Contractor of their responsibility to comply with any applicable legal requirement for a vessel operating in Canada under the role defined.

2.2. APPLICABLE STANDARDS AND SPECIFICATIONS

To the extent specified herein, the following standards and specifications apply to the vessel:

- a) American Boat and Yacht Council (ABYC) Standards, as applicable;
- b) American Society of Mechanical Engineers (ASME), B30.26-2015: Rigging Hardware;
- c) ASME, B30.9-2018: Slings;
- d) ASME, Boiler and Pressure Vessel Code (BPVC)-2017, Section V: Non-Destructive Examination;
- e) ASTM A153/A153M-16a, Standard Specification for Zinc Coating (Hot Dip) on Iron and Steel Hardware;

- f) ASTM A413/A413M-07 (2012), Standard Specification for Carbon Steel Chain;
- g) ASTM F625/F625M-94 (2017), Standard Practice for Classifying Water Bodies for Spill Control Systems;
- h) ASTM F631-15, Standard Guide for Collecting Skimmer Performance Data in Controlled Environments.
- i) ASTM F962-04 (2010), Standard Specification for Oil Spill Response Boom Connection: Z-Connector;
- j) ASTM F1166-07 (2013), Standard Practice for Human Engineering Design for Marine Systems, Equipment, and Facilities;
- k) Canadian Coast Guard (CCG), 30-000-000-EG-TE-001, Noise Measurement and Acceptance Criteria for Canadian Coast Guard Vessels (11/2003);
- l) CCG, 30-000-000-ES-TE-001, Colour Coding Standard for Piping Systems (07/2010);
- m) CCG, 70-000-000-EU-JA-001 (formerly DGTE-69), Specification for the Installation of Shipboard Electronic Equipment (08/2004);
- n) Canadian General Standards Board (CAN/CGSB)-48.9712-2014, Non-Destructive Testing (NDT): Qualification and Certification of Personnel;
- o) Canadian Standards Association (CSA) C22.2 No. 183.2-M1983 (R2013), Direct Current (DC) Electrical Installations on Boats;
- p) CSA W47.2-11 (R2015), Certification of Companies for Fusion Welding of Aluminium;
- q) CSA W59.2-18, Welded Aluminum Construction;
- r) CSA W178.2-2018, Certification of Welding Inspectors;
- s) International Organization of Standardization (ISO) 3834-2:2005, Quality Requirements for Fusion Welding of Metallic Materials, Part 2: Comprehensive Quality Requirements;
- t) ISO 12216:2002, Small Craft – Windows, Portlights, Hatches, Deadlights, and Doors: Strength and Watertightness Requirements;
- u) ISO 12217-1:2015, Small Craft – Stability and Buoyancy Assessment and Categorization, Part 1: Non-Sailing Boats of Hull Length Greater Than or Equal to 6 m;
- v) National Association of Chain Manufacturers (NACM), Welded Steel Chain Specifications (04/2010);
- w) Society of Automotive Engineers (SAE) J514, Hydraulic Tube Fittings (01/2012);
- x) SAE J1475, Hydraulic Hose Fitting for Marine Applications (06/2014);
- y) SAE J1527, Marine Fuel Hoses (02/2011);

- z) SAE J1942, Hose and Hose Assemblies for Marine Applications (06/2014);
- aa) United States (US) General Services Administration (GSA), Federal Specification A-A-59326D, General Specification for Coupling Halves, Quick Disconnect, Cam Locking Type; and
- bb) US GSA, Federal Specification RR-C-271F, Chains and Attachments, Carbon and Alloy Steel.

2.3. SUPERSEDEENCE

Unless otherwise specified by Canada, reference documents specified in 2.1 must reflect the version in effect on the date of Contract award.

2.4. ORDER OF PRECEDENCE

In the event of a discrepancy between this TSOR and the documents referenced herein, the Contractor must adhere to the following order of precedence:

- a) Canadian Acts, Regulations, and Transport Canada Publications (and any standards referenced directly therein);
- b) This TSOR; and
- c) Industry and other applicable standards and specifications not referenced directly in the identified Canadian Acts, Regulations, and Transport Canada Publications.

3 DELIVERABLES

The Contractor must provide the following deliverables for each SPAS:

a) Transport Canada compliant vessel, complete with.

- i. Four discharge hose assemblies, complete with cam-locking coupling halves;
- ii. One anchor and rope-chain anchor rode, complete with all attachments and hardware;
- iii. Four mooring lines;
- iv. One boat hook;
- v. One pike pole;
- vi. One hoisting sling for the vessel itself, complete with all attachments and hardware;
- vii. Two spare propellers;
- viii. One Type A, first aid kit;
- ix. Four adult-sized, life jackets;
- x. One lifebuoy and buoyant heaving line;
- xi. Two marine-certified, fire extinguishers (i.e., Type 2A:10B:C and Type 10B:C);
- xii. One metal fire bucket with line;
- xiii. One fire axe;
- xiv. Two heavy-duty, flashlights;
- xv. Twelve pyrotechnic distress signals; and
- xvi. One emergency position indicating radio beacon.

b) Transport Canada compliant trailer, complete with:

- i. One full-size spare tire on rim;
- ii. Ratchet tie down straps for each cargo anchoring point;
- iii. One turnbuckle; and
- iv. One lug wrench, one spare winch strap, and one spare wheel hub.

c) Ship cradle, complete with ratchet tie down straps for each cargo anchoring point.

4 REQUIREMENTS

4.1. PHYSICAL CHARACTERISTICS

4.1.1. VESSEL PARTICULARS

- 4.1.1.1. The overall length (LOA) of the SPAS must be between 9.0 metres (m) and 10.7 m.
- 4.1.1.2. The overall beam (BOA) of the SPAS must be between 2.6 m and 3.05 m.
- 4.1.1.3. The overall draft of the SPAS must be no greater than 1.7 m in a normal load (skimming) condition, with the outboard engines and oil recovery subsystem lowered.
- 4.1.1.4. The height of the SPAS must be no greater than 4.15 m when placed on its trailer, and after all hinged or collapsible items are lowered.
- 4.1.1.5. The gross tonnage of the SPAS must not exceed the assigned formal tonnage (AFT) defined in TP 13430, Standard for the Tonnage Measurement of Vessels (10/2012) for the corresponding LOA. All tonnage measurements must be performed by a Transport Canada appointed Tonnage Measurer.

4.2. OPERATIONAL REQUIREMENTS

4.2.1. ENVIRONMENTAL CONDITIONS

- 4.2.1.1. The SPAS must be suitable for service in the following environmental conditions:
 - a) Ambient air temperatures ranging from -10 degrees to +35 degrees Celsius (°C);
 - b) Water temperatures ranging from -2°C to +30°C;
 - c) Exposure to direct sunlight, rain, hail, sleet, snow, freezing spray, wind, fog, and any combination thereof;
 - d) Deployment in both fresh and salt waters, either of which may contain slush ice (although the SPAS is not required to serve in any ice breaking capacity); and
 - e) Deployment in debris laden waters (e.g., contaminated organic debris and flotsam).
- 4.2.1.2. The SPAS must withstand ambient air temperatures ranging from -40°C to +60°C during storage without incurring any damage.

4.2.2. CREW COMPLEMENT

- 4.2.2.1. The SPAS must be able to be safely operated and navigated by a crew of two persons. The SPAS must accommodate an additional complement of up to two persons during transit.

4.2.3. SPEED

- 4.2.3.1. The SPAS must recover oil between 0 knots to 2 knots in the normal load (skimming) condition; i.e., both stationary and while making way.

- 4.2.3.2. The maximum speed of the SPAS must be at least 15 knots in the normal load (transit) condition.

4.2.4. SEAKEEPING AND MANOEUVRABILITY

- 4.2.4.1. The SPAS must be fully operational in Type II–Protected Waters (i.e., wave heights ≤ 1 m) as per ASTM F625/F625M-94 (2017), Standard Practice for Classifying Water Bodies for Spill Control Systems.
- 4.2.4.2. The SPAS must be able to transit safely in Design Category C conditions as per ISO 12217-1:2015, Small Craft – Stability and Buoyancy Assessment and Categorization, Part 1: Non Sailing Boats of Hull Length Greater Than or Equal to 6 m.

4.2.5. VESSEL DESIGN

- 4.2.5.1. The SPAS must be developed from a Parent Skimmer design that is currently road transportable in Canada (without escort vehicle accompaniment) and in satisfactory operation, with a minimum of 1,000 cumulative operating hours. The Parent Skimmer design must comprise a hull that is built around (or constitutes) the oil recovery, storage, and offloading systems to serve the identified mission profile. After modification, the inherent volume and deck area, stability characteristics, lightship and deadweight distribution, and reserve buoyancy of the Parent Skimmer design must satisfy the requirements specified herein.
- 4.2.5.2. The SPAS must incorporate design features that facilitate its decontamination after use. The Contractor should eliminate surface configurations and crevices that can trap or retain recovered oil. The Contractor must provide access to those areas susceptible to contamination or where contamination cannot be prevented.
- 4.2.5.3. The hull form must efficiently direct water flow to and from the oil recovery system while minimizing entrainment failure.
- 4.2.5.4. The hull form must be optimized for low speed operation in shallow and narrow waterways.

4.2.6. OIL RECOVERY

- 4.2.6.1. The fitted oil recovery system must be a commercially proven design, with a minimum of 1,000 cumulative operating hours in real-world, oil spill recovery events.
- 4.2.6.2. The nameplate recovery rate of the fitted oil recovery system must be at least 1 m³ per hour for each of the following oil types:
- a) Light oils, such as diesel or jet fuel; and
 - b) Medium oils, such as lube or fresh crude oil.
- 4.2.6.3. All oil recovery performance data must be collected as per the general procedure defined in ASTM F631, Standard Guide for Collecting Skimmer Performance Data in Controlled Environments.

4.2.7. OIL TRANSFER PUMP

- 4.2.7.1. The pumping capacity of the fitted oil transfer pump must be at least 20 m³ per hour.
- 4.2.7.2. The total discharge head of the oil transfer pump must be at least 10 m.

4.2.8. WASHDOWN PUMP

- 4.2.8.1. The pumping capacity of the fitted washdown pump must be at least 4 m³ per hour.
- 4.2.8.2. The suction lift of the fitted washdown pump must be at least 3 m.

4.2.9. MISSION DURATION

- 4.2.9.1. The endurance of the SPAS must be at least 8 hours without requiring replenishment of fuel(s). A typical mission profile would consist of 2 hours making way in the normal load (transit) condition, and 6 hours of recovery and offloading operations in the normal load (skimming) condition.

4.2.10. NOISE

- 4.2.10.1. The Contractor must keep airborne noise levels on the forward deck and in the wheelhouse as low as possible. Sound pressure levels must be measured in accordance with 30-000-000-EG-TE-001, Noise Measurement and Acceptance Criteria for Canadian Coast Guard Vessels, as far as applicable.
- 4.2.10.2. Acoustic insulation must be installed on the machinery space deckhead to help abate airborne noise levels.
- 4.2.10.3. The Contractor must post a warning sign near all sources of sound that exceed 85 decibels A-weighted (dB_A). Each posted sign must contain the sound hazard information prescribed in SOR/2010-120, Maritime Occupational Health and Safety Regulations.

4.2.11. EMISSIONS

- 4.2.11.1. The gasoline outboard engines must satisfy the applicable emission standards referenced in SOR/2011-10, Marine Spark Ignition Engine, Vessel, and Off Road Recreational Vehicle Emission Regulations.
- 4.2.11.2. The diesel engine in the hydraulic power unit (HPU) must satisfy the applicable Tier 4 emission standards referenced in SOR/2005-32, Off Road Compression Ignition Engine Emission Regulations.

4.2.12. LAUNCHING, RECOVERY, AND TRANSPORTATION

- 4.2.12.1. The SPAS must be readily road transportable on the trailer specified herein, using a tow vehicle with a minimum gross vehicle weight rating (GVWR) of 3,850 kg.
- 4.2.12.2. The SPAS must be launchable and recoverable using the trailer and tow vehicle specified herein.

4.2.12.3. The SPAS must be transportable on the deck of a ship using the cradle specified herein.

4.2.12.4. The SPAS must be easily launched and recovered using an overhead crane.

4.2.13. MAINTAINABILITY

4.2.13.1. The Contractor must standardize the selection of equipment, fasteners, hardware, attachments, fittings, and fabrication methods used in the SPAS to minimize the number of unique spares.

4.2.13.2. All disconnects, mounting, and wiring provisions must be designed and labelled to prevent erroneous connections.

4.2.13.3. The use of specialized tools and equipment must be restricted to infrequent and complex service work, such as engine overhauls and rebuilds.

4.3. DESIGN AND CONSTRUCTION

4.3.1. REGULATIONS AND STANDARDS

4.3.1.1. The Contractor must ensure that each SPAS complies with all applicable construction requirements defined in the following documents:

- a) TP 1332, Construction Standards for Small Vessels (04/2010), and all ABYC Standards referenced therein;
- b) CSA C22.2 No.183.2-M1983 (R2013), Direct Current (DC) Electrical Installations on Boats, and all ABYC 'E' Electrical Standards referenced therein;
- c) 70-000-000-EU-JA-001 (formerly DGTE69), CCG Specification for the Installation of Shipboard Electronic Equipment, August 2004; and
- d) 30-000-000-ES-TE-001, CCG Colour Coding Standard for Piping Systems, July 2010.

4.3.2. STABILITY

4.3.2.1. The Contractor must conduct a stability examination in accordance with ISO 12217-1:2015, Small Craft – Stability and Buoyancy Assessment and Categorization, Part 1: Non-Sailing Boats of Hull Length Greater Than or Equal to 6 metres.

4.3.2.2. The Contractor must provide Canada with an Inclining Experiment Report and Stability Booklet for the first of class SPAS.

4.3.3. WELDING

4.3.3.1. All aluminum welding must be performed in accordance with the Standards of the Canadian Standards Association (CSA) and the Canadian Welding Bureau (CWB). The Contractor must demonstrate that the firm, their facilities, processes, and welders are certified to CSA W47.2-11 (R2015), Certification of Companies for Fusion Welding of Aluminum, Division 1 or 2; welding workmanship must satisfy CSA W59.2-18, Welded Aluminum Construction.

- 4.3.3.2. In lieu of the Canadian Standards specified in 4.3.3.1, certification to the same elements in ISO 3834-2:2005, Quality Requirements for Fusion Welding of Metallic Materials will be considered equivalent if performed by an International Institute of Welding Authorized National Body for Company Certification (IIW-ANBCC).
- 4.3.3.3. The Contractor must demonstrate access to a welding engineer.
- 4.3.3.4. All testing and inspection of welds must comply with the requirements defined in APPENDIX A.

4.3.4. ERGONOMIC DESIGN

- 4.3.4.1. The SPAS must be designed and outfitted in accordance with those practices defined in ASTM F1166-07 (2013), Standard Practice for Human Engineering Design for Marine Systems, Equipment, and Facilities.

4.3.5. VIBRATION

- 4.3.5.1. The Contractor must fit all rotating machinery with suitable, resilient mounts to minimize vibratory effects. Flexible connections must be interposed on all piping to resiliently mounted equipment.

4.3.6. EQUIPMENT CARE AND PROTECTION

- 4.3.6.1. All parts and equipment must be kept clean and protected against dust, moisture, rapid temperature changes, extreme temperatures, and foreign matter during manufacture, storage, pre-installation staging, assembly or installation, and post-installation.
- 4.3.6.2. All pieces of equipment subject to freezing temperatures must be kept drained, except during testing and trials.

4.3.7. WORKMANSHIP

- 4.3.7.1. Each SPAS must be constructed and finished with a high degree of workmanship. At a minimum, the Contractor must ensure:
 - a) Surfaces are free from blemishes, burrs, defects, irregularities, sharp edges, and other conditions that would be deleterious to the finish component;
 - b) Component dimensions are accurate and conform to the required tolerances defined in the provided drawing(s);
 - c) Parts are properly aligned to preclude binding and deformation as a result of assembly or operation; and
 - d) All welds and coatings are uniform, complete, and free of cracks, porosity, and scratches.

4.4. CONSTRUCTION MATERIALS

4.4.1. GENERAL CONSIDERATIONS

- 4.4.1.1. All materials used in the construction and outfitting of the SPAS must be of marine-grade quality and inherently resist corrosion under the environmental conditions specified herein. The use of wood products or similar hygroscopic material is prohibited.
- 4.4.1.2. All materials used in the construction and outfitting of the SPAS must be chemically compatible with recovered oil products.
- 4.4.1.3. All materials used in the construction and outfitting of the SPAS must be resistant to ultraviolet (UV) degradation.
- 4.4.1.4. All materials used in the construction and outfitting of the SPAS must conform to the requirements defined in an internationally recognized Standard, such as, but not limited to ASTM, ISO, International Electrotechnical Commission (IEC), or SAE Standards. Canada reserves the right to request samples of any proposed material.
- 4.4.1.5. All materials used in the SPAS must not adversely affect the health of crew when used for their intended purpose. The use of materials and equipment containing functional mercury and asbestos is prohibited.

4.4.2. ALUMINUM

- 4.4.2.1. Unless otherwise specified by Canada, the Contractor must use the following marine-grade, aluminum alloys for all structural and non-structural applications:
 - a) 5083-H32 or 5086-H116 for plate thicknesses $\geq 3/16$ inch;
 - b) 5052-H32 for plate thicknesses $< 3/16$ inch; and
 - c) 6061-T6 for all extrusions, tubing, and piping, with Type 5356 filler alloy.

4.4.3. STEEL

- 4.4.3.1. Unless otherwise specified by Canada, the Contractor must use Type 316L stainless steel in all non-welded and welded applications. The Contractor may propose other stainless or high alloy steel(s) for consideration by Canada.

4.4.4. OLEOPHILIC MATERIALS

- 4.4.4.1. Unless otherwise specified by Canada, the Contractor must use polyethylene or polyurethane to serve as the oleophilic surface(s) in the oil recovery system. The Contractor may propose other synthetic materials, with an affinity for oil, for consideration by Canada.
- 4.4.4.2. Unless otherwise specified by Canada, each oil roller or scraper must be manufactured from ultra-high molecular weight (UHMW) plastic. The Contractor may propose other synthetic materials, with low adhesion properties and a high resistance to abrasion, for consideration by Canada.

4.4.5. CORROSION PROTECTION

- 4.4.5.1.** The Contractor must supply and fit sacrificial anodes to the hull, each outboard engine, and the HPU to protect against corrosion.
- 4.4.5.2.** The quantity and distribution of sacrificial anodes must be sufficient to protect the entire wetted surface area for a minimum of 24 months.

4.4.6. DISSIMILAR METALS

- 4.4.6.1.** The Contractor must avoid direct contact between dissimilar metals expected to cause galvanic corrosion. If such contact cannot be avoided, an insulating material must be installed between the dissimilar metals to minimize the corrosive effect. The Contractor may propose alternate methods to minimize galvanic corrosion for consideration by Canada.

4.5. FASTENERS AND HARDWARE

4.5.1. GENERAL CONSIDERATIONS

- 4.5.1.1.** Unless otherwise specified by Canada, all fasteners, nuts, and similar hardware used by the Contractor must be Type 316L stainless steel. The Contractor may propose other stainless or high alloy steel(s) for consideration by Canada.
- 4.5.1.2.** Fasteners must be easily removable if the adjoining component requires removal or permits access for maintenance.
- 4.5.1.3.** Unless otherwise specified by Canada, all threaded fasteners must be paired with a corresponding nylon-insert, lock nut to resist loosening due to shock and vibration loading.
- 4.5.1.4.** The Contractor must not make threaded connections by tapping aluminum structural components. Similarly, the Contractor must not make threaded connections by tapping steel structural components whose thickness is less than one bolt diameter. Where direct threading is required in these circumstances, the Contractor must use helical coil, galvanically-compatible, threaded inserts.
- 4.5.1.5.** All nuts that will become inaccessible after construction must be captured (or anchored) to prevent them from backing off if the threaded fastener is later removed.
- 4.5.1.6.** All fasteners used in a deck traffic area must be flush-mounted to eliminate tripping and snagging hazards.
- 4.5.1.7.** All threaded connections must be correctly torqued.

4.6. CHAIN AND ATTACHMENTS

4.6.1. GENERAL CONSIDERATIONS

- 4.6.1.1. Unless otherwise specified by Canada, all chain and chain attachments supplied and used by the Contractor must be a suitable carbon steel grade. Chain attachments include, but are not limited to, shackles, rings, links, and swivels.
- 4.6.1.2. All carbon steel chain and chain attachments must be hot-dip galvanized as per ASTM A153/A153M-16a, Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
- 4.6.1.3. All chain supplied by the Contractor must represent a minimum Grade 30, Proof Coil designation as per ASTM A413/A413M-07 (2012), Standard Specification for Carbon Steel Chain or NACM, Welded Steel Chain Specifications (04/2010).
- 4.6.1.4. All chain attachments supplied by the Contractor must conform to the requirements prescribed in RR-C-271F, Chains and Attachments, Carbon and Alloy Steel.

4.7. FLEXIBLE HOSES

4.7.1. FLEXIBLE HOSE CONSTRUCTION

- 4.7.1.1. All hydraulic hose assemblies must conform to the applicable requirements defined in SAE J1942, Hose and Hose Assemblies for Marine Applications.
- 4.7.1.2. All hydraulic end fittings must conform to those requirements defined in SAE J1475, Hydraulic Hose Fitting for Marine Applications.
- 4.7.1.3. All hydraulic fittings must be fabricated from stainless steel.
- 4.7.1.4. All fuel hoses must conform to the requirements defined for United States Coast Guard (USCG) Type A1 or A1-15 hose in SAE J1527, Marine Fuel Hoses.
- 4.7.1.5. All diesel fuel hose fittings must be the field attachable, flared type defined in SAE J514, Hydraulic Hose Fittings.
- 4.7.1.6. All fuel hose fittings must be fabricated from corrosion resistant, metallic material(s).

4.7.2. FLEXIBLE HOSE CONFIGURATION

- 4.7.2.1. Each flexible hose assembly must be fitted clear of obstructions.
- 4.7.2.2. The length of all fitted, flexible hose assemblies must be sized to minimize response lag and pressure losses while still allowing for hose contraction.
- 4.7.2.3. The bend radius of all fitted, flexible hose assemblies must be greater than the minimum value recommended by the original equipment manufacturer (OEM).
- 4.7.2.4. Additional mechanical protection must be provided for all fitted, flexible hose assemblies susceptible to chafing.

- 4.7.2.5. Hangers and clamps must be used to support all fitted, flexible hose assemblies and prevent excessive sag.
- 4.7.2.6. The minimum rated pressure of all fitted, flexible hose assemblies must exceed the working pressure that it may be subjected to while in service.

4.7.3. HYDRAULIC HOSE ASSEMBLIES

- 4.7.3.1. Hydraulic hose assemblies must be permanently labelled at each end with a unique identifier that corresponds to the accompanying hydraulic system drawing(s). For example, aluminum cable tags, ferrules, or shrink tubing with mechanically-applied lettering are appropriate means of labelling.
- 4.7.3.2. All hydraulic hose assemblies must be static pressure tested at 1.5 times their rated working pressure for a minimum of 2 hours to confirm no leakage.

4.7.4. DISCHARGE HOSE ASSEMBLIES

- 4.7.4.1. The Contractor must supply four discharge hose assemblies with each SPAS. The Contractor must securely stow all supplied discharge hose assemblies in brackets mounted on the guardrail(s).
- 4.7.4.2. Each discharge hose assembly must comprise the non-collapsible hose construction and couplings specified herein.
- 4.7.4.3. The total nominal length of each discharge hose assembly must be 3.0 m.
- 4.7.4.4. The nominal inner diameter of each discharge hose must be 3 inches.
- 4.7.4.5. The minimum rated working pressure of each discharge hose assembly must exceed the maximum rated output pressure of the oil transfer pump.
- 4.7.4.6. The proof pressure of each discharge hose assembly must be at least 2 times the maximum rated output pressure of the oil transfer pump.

4.7.5. DISCHARGE HOSE CONSTRUCTION

- 4.7.5.1. At a minimum, each discharge hose must employ the following construction:
 - a) A compounded elastomer inner tube;
 - b) A synthetic fibre reinforcement;
 - c) A stainless or coated copper electrostatic discharge wire; and
 - d) A compounded elastomer cover.
- 4.7.5.2. Each layer of the discharge hose construction must be bonded to its adjacent layer(s) to produce a unified hose wall. Both the compounded elastomer inner tube and cover must be of uniform thickness.
- 4.7.5.3. The compounded elastomer cover must be black in colour.

4.7.6. DISCHARGE HOSE COUPLINGS

- 4.7.6.1.** Each supplied discharge hose must terminate with the following coupling halves (whose requirements are defined in A-A-59326D, General Specification for Coupling Halves, Quick Disconnect, Cam Locking Type):
 - a) One end fitted with a Type II, Class SS, Style 1 coupling half (i.e., male, cam locking coupling half by hose shank); and
 - b) The opposing end fitted with a Type VI, Class SS, Style 1 coupling half (i.e., female, cam locking coupling half by hose shank).
- 4.7.6.2.** All male and female, cam locking coupling halves must be attached to the discharge hose using a band style, punch clamp, or a crimped sleeve.
- 4.7.6.3.** All male and female, cam-locking coupling halves must be directly connected to the electrostatic discharge wire.
- 4.7.6.4.** Each discharge hose must be supplied with the following coupling halves (whose requirements are defined in A-A-59326D, General Specification for Coupling Halves, Quick Disconnect, Cam Locking Type):
 - a) One, Type IX, Class SS, Style 1 coupling half (i.e., dust cap coupling half); and
 - b) One, Type X, Class SS, Style 1 coupling half (i.e., dust plug coupling half).
- 4.7.6.5.** All supplied cam locking coupling halves must be consistent with the hose size specified in 4.7.4.4.

4.7.7. VALVES

- 4.7.7.1.** All supplied valves must conform to the design and construction requirements defined in an internationally recognized Standard, such as, but not limited to, ASTM Standards.
- 4.7.7.2.** All valves must be suitable for the intended application and be readily accessible for inspection, operation, maintenance, and removal. Where possible, valves should be grouped in manifold form.
- 4.7.7.3.** All valves whose inadvertent operation is undesirable or could pose a risk to crew must be fitted with a locking-type handle.
- 4.7.7.4.** A quarter-turn valve must be used in all applications that require quick shutoff or isolation of the working fluid.

4.8. HULL STRUCTURE

4.8.1. GENERAL CONSIDERATIONS

- 4.8.1.1.** The hull must be an all-welded, aluminum construction, complete with a dedicated compartment below deck to house machinery and equipment as specified herein.

- 4.8.1.2. Longitudinal strength in the hull structure must be maintained by the continuity of main fore and after members. Where cuts or interruptions impair the continuity of these main structural members, effective compensation must be fitted to achieve an equivalent strength.
- 4.8.1.3. Framing welds must be continuous in all areas subject to vibration, and all bow areas subject to impact. Structural members within the hull bottom and in other areas where water and recovered oil may collect must be joined with double continuous welds.
- 4.8.1.4. All cut-outs in the hull structure must be circular or incorporate radiused corners. The Contractor must minimize the number of openings in watertight bulkheads.
- 4.8.1.5. Limber holes must be fitted throughout the hull structure to allow satisfactory bilge drainage.

4.8.2. HULL PENETRATIONS

- 4.8.2.1. All through-hull penetrations including, but not limited to, seacocks and hull drains must conform to the requirements defined in ABYC H-27 (2014), Through-Hull Fittings and Drain Plugs.
- 4.8.2.2. Each fitted seacock must attach to the hull via an integral mounting flange.
- 4.8.2.3. Each fitted seacock must be appropriately bonded to the hull.
- 4.8.2.4. A minimum of one hull drain must be fitted in each void space, recovered oil storage tank, and the machinery space. Each hull drain must be located at (or near) the lowest point of the space it penetrates to facilitate drainage.
- 4.8.2.5. Each hull drain must be mounted flush to the exterior hull surface.
- 4.8.2.6. All fitted hull drains and drain plugs must be identical.

4.9. HULL OUTFIT

4.9.1. HATCHES AND ACCESS PLATES

- 4.9.1.1. All hatches and access plates must be of flush-mount, aluminum construction. A gasket must be fitted to each hatch and access plate that matches the watertight integrity of the encompassing surface.
- 4.9.1.2. The watertight integrity of each hatch and access plate must be tested in accordance with ISO 12216:2002, Small Craft: Windows, Portlights, Hatches, Deadlights, and Doors, Strength and Watertightness Requirements.
- 4.9.1.3. All hatches and access plates must secure in both the open and closed positions.
- 4.9.1.4. All hatches and access plates must be fitted with keyless latches.

4.9.2. GUARDRAILS

- 4.9.2.1. The perimeter of the deck must be fitted with aluminum stanchions and guardrails to prevent crew from falling overboard.
- 4.9.2.2. All guardrail stanchions must be landed on and welded to structural framing members. Intermediate and top rails must be welded to the stanchions.
- 4.9.2.3. The guardrails must extend a minimum height of 36 inches above the deck.
- 4.9.2.4. Rail openings must be provided at the bow, amidships on both the port and starboard sides, and across the stern. Galvanized chain gates must be fitted at the bow and across both side rail openings; a removable, pipe railing must be fitted across the stern to grant access to the outboard motors.

4.9.3. FENDERS

- 4.9.3.1. The perimeter of the hull must be fitted with D-section, rubber fenders at the top of the bulwark.
- 4.9.3.2. All exposed ends of a fitted rubber fender must be protected from accidental tearing and removal when coming alongside.
- 4.9.3.3. All fitted rubber fenders must be galvanically isolated from the hull.
- 4.9.3.4. An external aluminum mid-guard must be installed on each hull side, between the design waterline and the top of the bulwark.

4.9.4. SECURE STORAGE AREAS

- 4.9.4.1. The Contractor must provide secure and weathertight (as appropriate) stowage for all safety and operational equipment supplied with the SPAS.
- 4.9.4.2. Stowage methods and locations must facilitate accessibility to equipment but not introduce crew hazards or interfere with SPAS operations. All proposed stowage methods and locations must be approved by Canada.

4.9.5. SWEEP WIDTH EXTENSIONS

- 4.9.5.1. The bow must be fitted with provisions that increase the effective sweep width of the SPAS.
- 4.9.5.2. The sweep width extensions must be located on opposite sides of the oil recovery system intake channel to efficiently guide oil towards the oleophilic recovery surface(s).
- 4.9.5.3. The sweep width extensions must be easily deployed into and retracted from the water at the fore deck.
- 4.9.5.4. The distance between the leading edges of the sweep width extensions must not exceed the overall beam of the SPAS.

4.9.6. CONTAINMENT BOOM ATTACHMENT POINTS

- 4.9.6.1.** The bow must be equipped to interface with the containment boom connector defined in ASTM F962-04 (2010), Standard Specification for Oil Spill Response Boom Connection: Z-Connector. The exception to this Standard is that toggle pin holes must be located 4.5 inches above and below the design waterline (DWL).
- 4.9.6.2.** The containment boom attachment points must allow the SPAS to be towed by the containment boom in a catenary configuration.

4.9.7. ACCESS PLATFORM

- 4.9.7.1.** The SPAS must allow crew to safely remove debris from the water at the intake channel of the oil recovery system.
- 4.9.7.2.** All provisions fitted to the bow or fore deck to facilitate debris removal must not interfere with the operation of the oil recovery system.

4.10. WHEELHOUSE

4.10.1. GENERAL CONSIDERATIONS

- 4.10.1.1.** The SPAS must be fitted with an all-welded, aluminum wheelhouse to provide temporary shelter to both crew members.
- 4.10.1.2.** The wheelhouse must be located on the aft deck and allow for the unrestricted movement of crew around its perimeter.
- 4.10.1.3.** A lightweight door must be fitted to the rear of the wheelhouse to provide access. The door must not obstruct movement around the wheelhouse when in its open position, nor impede the vision of the operator when in its closed position.
- 4.10.1.4.** The wheelhouse must be fitted with a waterproof leaning post with backrest.
- 4.10.1.5.** The entire floor of the wheelhouse must be fitted with oil resistant and non-slip, anti-fatigue matting.
- 4.10.1.6.** The interior of the wheelhouse must be fitted with a minimum of two provisions to hang foul weather outerwear. These provisions must be located such that they do not interfere with the operation of the SPAS.

4.10.2. WINDOWS

- 4.10.2.1.** The wheelhouse must be fitted with the following windows in the location(s) indicated:
 - a) One, horizontal, sliding window on both the port and starboard sides, with the foremost pane fixed; and
 - b) One, fixed or top hung window on the forward side of the wheelhouse.
- 4.10.2.2.** Each window construction must comprise UV-coated, tempered safety glass in an aluminum frame.

- 4.10.2.3. All wheelhouse windows must be installed at the same height, relative to the deck, to give the operator an unobstructed view.
- 4.10.2.4. The Contractor must supply and install a minimum of one, top-mounted, 12 V, pantograph-type wiper on the exterior of the forward window.
- 4.10.2.5. Each installed pantograph-type wiper must be individually controlled and allow for variable speed operation from the wheelhouse console.

4.10.3. ROOF

- 4.10.3.1. The deckhead and roof pan of the wheelhouse must be sufficiently reinforced to support the mounting and installation of up to 50 kg of equipment.
- 4.10.3.2. All pieces of equipment that exceed the overall height specified in 4.1.1.4, when mounted to the wheelhouse roof pan, must be hinged. Each hinged component must be fitted with a receiver, securing pin, and lanyard to lock it in place when lowered or erected.
- 4.10.3.3. All antennas must be installed on wheelhouse roof pan as per the OEM requirements, with the proper kick pipes and ratcheting mounts, as required.

4.11. DECK EQUIPMENT

4.11.1. ANCHOR AND RODE

- 4.11.1.1. The Contractor must equip the SPAS with the following ground tackle sized for the SPAS design:
 - a) One, fluke-style, patent anchor;
 - b) One, rope-chain anchor rode; and
 - c) All attachments needed to connect the anchor rode to the anchor.
- 4.11.1.2. All ground tackle must be sized for the vessel length and intended duty.
- 4.11.1.3. All ground tackle must be securely stowed below deck, or in a position where it does not interfere with deck operations at the bow. The ground tackle will be manually deployed into and recovered from the water, as required.
- 4.11.1.4. The twisted polymer rope used in the anchor rode must contain a spliced eye and stainless steel thimble on the end that attaches to the chain. The bitter end must be completely heat sealed to prevent exposed rope strands or fibres.
- 4.11.1.5. The nominal size of all shackles used in the ground tackle must be the same as the adjoining chain.
- 4.11.1.6. Each shackle pin used in the ground tackle must be moused with stainless steel wire to prevent loosening while under load.

4.11.2. MOORING CLEATS AND LINES

- 4.11.2.1. The Contractor must fit the SPAS with six, cast aluminum, mooring cleats.

- 4.11.2.2. The mooring cleats must be welded on the forward, middle, and aft gunwale, on both the port and starboard sides.
- 4.11.2.3. The Contractor must supply and store a minimum of four, twisted polymer, mooring lines. The mooring lines must not be used until after SPAS acceptance.
- 4.11.2.4. The minimum diameter of each mooring line must be 5/8 inches.
- 4.11.2.5. Each mooring line must be a minimum of 8 m in length.
- 4.11.2.6. Each mooring line must contain an eye splice in one end to fit over a mooring cleat. The opposing end must be completely heat sealed to prevent exposed rope strands or fibres.
- 4.11.2.7. The mooring cleats must accommodate the provided mooring lines.

4.11.3. BOAT HOOK AND PIKE POLE

- 4.11.3.1. The Contractor must supply the following tools to facilitate the in-water handling of containment boom and debris:
 - a) One, aluminum, boat hook; and
 - b) One, aluminum, pike pole.
- 4.11.3.2. The nominal reach of the boat hook must be at least 3 m.
- 4.11.3.3. The nominal reach of the pike pole must be at least 3 m.
- 4.11.3.4. The Contractor must securely stow both the boat hook and the pike pole in brackets mounted on the guardrail(s).

4.12. TOWING AND LIFTING

4.12.1. BOW EYE

- 4.12.1.1. The Contractor must incorporate one bow eye into a structural member to serve as the forward towing and trailer securement provision for the SPAS.
- 4.12.1.2. The bow eye must be fabricated from stainless steel or aluminum.
- 4.12.1.3. The bow eye must be sufficiently sized to withstand the towed resistance of the SPAS in the normal load (skimming) condition on even keel.

4.12.2. HOISTING POINTS

- 4.12.2.1. The Contractor must fit the SPAS with four, integral hoisting points to facilitate overhead lifting.
- 4.12.2.2. Each hoisting point must be incorporated into the below deck hull structure.
- 4.12.2.3. The above deck location of each hoisting point must not pose a safety hazard to the crew or interfere with oil recovery operations.

- 4.12.2.4. Each hoisting point must be fabricated from stainless steel or aluminum.
- 4.12.2.5. The minimum safety factor of all hoisting points (and the adjacent vessel structure) must be 5-to-1, based on the lightship load condition, full fuel reserves, and a 10% margin for growth. Safety factor is expressed as the ratio of the minimum breaking strength (MBS) of the affected material(s) to the resultant load at each provision. Prior to construction, the Contractor must submit hoisting design calculations to Canada for approval.

4.12.3. LIFTING SLING AND HARDWARE

- 4.12.3.1. The Contractor must supply a four-leg, bridle sling (complete with all attachments and hardware) to lift the SPAS from a single, overhead point near its longitudinal centre of gravity.
- 4.12.3.2. All supplied lifting and rigging equipment must conform to the requirements defined in the following Regulation and Standards:
 - a) SOR/2007-128, Cargo, Fumigation, and Tackle Regulations;
 - b) ASME B30.26-2015: Rigging Hardware; and
 - c) ASME B30.9-2018: Slings.
- 4.12.3.3. The four-leg, bridle sling must be permanently marked with the load rating and date of load testing. Individual legs of this bridle sling must also be clearly identified.

4.13. PROPULSION

4.13.1. GASOLINE OUTBOARD ENGINES

- 4.13.1.1. The Contractor must supply twin (2), four-stroke, gasoline, outboard engines to propel the SPAS.
- 4.13.1.2. The twin outboard engines must be a commercial make and model currently supported in Canada.
- 4.13.1.3. The twin outboard engines must be sized to meet the performance and endurance requirements specified herein.
- 4.13.1.4. The Contractor must install each outboard engine in accordance with the engine manufacturer requirements. The Contractor is responsible for the integration of all fuel, steering, trim, instrumentation, and control equipment to yield a fully operational, propulsion system.
- 4.13.1.5. All equipment and accessories paired with the outboard engines must be approved by the engine manufacturer.

4.13.2. PROPELLERS

- 4.13.2.1. The Contractor must supply four, identical, standard rotating propellers.
- 4.13.2.2. The Contractor must install a propeller on each outboard engine. The remaining two propellers will constitute spares.

- 4.13.2.3. Each propeller must be sized and pitched to satisfy the performance requirements specified herein.
- 4.13.2.4. Each propeller must use integral provisions to absorb shocks and protect the outboard engines from damage in the event of an underwater object strike. Shear pins must not be used to achieve this protective effect.
- 4.13.2.5. Each propeller must be fabricated from cast aluminum.

4.13.3. ENGINE GUARD

- 4.13.3.1. The Contractor must fit a formed or welded pipe guard to the transom to protect the twin outboard engines from minor collisions.
- 4.13.3.2. The engine guard must extend a sufficient distance beyond the transom to allow the outboard engines to be freely moved into their tilted-up position.

4.13.4. ENGINE CONTROLS

- 4.13.4.1. The Contractor must supply and install all instrumentation and controls specified in 4.25.2.

4.13.5. VERIFICATION OF INSTALLATION AND ENGINE BREAK-IN

- 4.13.5.1. The Contractor must use an authorized representative of the engine manufacturer to inspect and verify the installation of the outboard engines prior to conducting sea trial(s) and delivery.
- 4.13.5.2. The Contractor (or an authorized representative of the engine manufacturer) must perform the outboard engine break-in procedure prescribed by the engine manufacturer as part of the sea trial(s).

4.14. HYDRAULIC STEERING GEAR SYSTEM

4.14.1. GENERAL CONSIDERATIONS

- 4.14.1.1. The Contractor must supply and install a remote, manual, hydraulic steering gear system.
- 4.14.1.2. The hydraulic steering gear system must be compatible with the twin configuration and total power output of the outboard engines.
- 4.14.1.3. At a minimum, the hydraulic steering gear system must comprise the following components:
 - a) A single helm pump with an integral, self-contained hydraulic oil reservoir;
 - b) A hydraulic steering cylinder to articulate each fitted outboard engine;
 - c) Provisions to keep the fitted outboard engines parallel and equalize loading; and
 - d) All hydraulic hoses, valves, and fittings needed to form a closed circuit and protect from undue damage.

- 4.14.1.4. The hydraulic steering gear system must be independent of all other onboard hydraulic systems.
- 4.14.1.5. The hydraulic steering gear must achieve a hard-over to hard-over response between five and seven complete revolutions of the steering wheel. All seals used in the hydraulic steering cylinders must be easily serviceable and replaceable by the end user.

4.15. FUEL SYSTEMS

4.15.1. DESIGN AND INSTALLATION

- 4.15.1.1. The Contractor must supply and install a complete gasoline fuel system for the outboard engines.
- 4.15.1.2. The Contractor must supply and install a complete diesel fuel system for the HPU.
- 4.15.1.3. At a minimum, each fuel system must comprise the following components:
 - a) A single, non-integral fuel tank;
 - b) A fuel level indicator fitted to the fuel tank;
 - c) A simplex fuel filter/water separator for each engine;
 - d) A manual, fuel priming bulb for each engine; and
 - e) All valves, manifolds, fittings, and hoses needed to plumb the fill, vent, supply, and return (if applicable) fuel lines.
- 4.15.1.4. The Contractor must route all fuel lines clear of hot surfaces and electrical equipment.
- 4.15.1.5. The Contractor must verify the fuel supply and return (if applicable) arrangements with each engine manufacturer prior to construction.
- 4.15.1.6. The Contractor must clean and flush each fuel system following installation.

4.15.2. FUEL TANKS

- 4.15.2.1. The Contractor must size the volume of each fuel tank to satisfy the endurance requirements specified herein.
- 4.15.2.2. Each fuel tank must be fabricated from aluminum.
- 4.15.2.3. Each fuel tank must be installed below the level of the main working deck and extensions.
- 4.15.2.4. Each fuel tank must be fitted with a manual fuel shut-off valve.
- 4.15.2.5. The diesel fuel tank must be fitted with an inspection or clean-out plate. A drainage port must also be integrated into the lowest point of the diesel fuel tank.

4.15.3. FUEL LEVEL INDICATORS

- 4.15.3.1. Each fuel level indicator must employ a float-type sending unit paired with a remote, analog gauge.
- 4.15.3.2. The Contractor must calibrate each fuel level indicator to the volume of its associated fuel tank.
- 4.15.3.3. The Contractor must equip the diesel fuel tank with a graduated sounding rod to manually determine the fuel level, in addition to the analog gauge.

4.15.4. FUEL FILLING AND VENTING

- 4.15.4.1. The Contractor must enclose each fuel fill and vent location with a spill coaming.
- 4.15.4.2. Each coaming must be fitted with a removable drain plug.
- 4.15.4.3. The Contractor should offset each deck fuel fill plate with a standpipe to minimize the likelihood of introducing contamination into the fuel tank.
- 4.15.4.4. Each fuel cap must be permanently tethered to its standpipe or to the deck to prevent cap loss.

4.15.5. FILTRATION AND PRIMING

- 4.15.5.1. The Contractor must install a simplex fuel filter/water separator on the fuel supply line to each outboard gasoline engine, and the diesel HPU.
- 4.15.5.2. Each fuel filter must be sized to meet the requirements of the engine manufacturer.
- 4.15.5.3. Each simplex fuel filter/water separator must be fitted with a transparent bowl and integral water drain valve.
- 4.15.5.4. Each simplex fuel filter/water separator must be mounted to the vessel structure. The Contractor must incorporate a drip tray under each unit, or allow for a portable container to be easily placed under each unit to collect discharge.
- 4.15.5.5. Each simplex fuel filter/water separator must be isolated using manual valves.
- 4.15.5.6. The Contractor must install a manual, fuel priming bulb on the fuel supply line to each outboard gasoline engine, as well as the diesel HPU.

4.16. BILGE SYSTEM

4.16.1. GENERAL CONSIDERATIONS

- 4.16.1.1. The Contractor must supply and install a dedicated, submersible, electric bilge pump in each void and machinery space, complete with all float switches, piping, fittings, and valves necessary for operation.

- 4.16.1.2. All overboard bilge discharges must comprise vented loops and anti-siphon valves located above the maximum vessel heel line.
- 4.16.1.3. The Contractor must supply and install the bilge pump indicators and controls specified in 4.25.5.

4.17. HYDRAULIC POWER UNIT

4.17.1. GENERAL CONSIDERATIONS

- 4.17.1.1. The Contractor must supply a complete HPU.
- 4.17.1.2. The Contractor must size the output of the HPU to drive the following equipment at their maximum rated speed and power:
 - a) One, variable speed, oil recovery system (as specified in 4.18);
 - b) One, submersible, oil transfer system (as specified in 4.20); and
 - c) One, seawater, washdown system (as specified in 4.21).
- 4.17.1.3. At a minimum, the HPU must comprise the following components:
 - a) A diesel engine to serve as the prime mover;
 - b) A positive displacement, hydraulic pump to pair with the diesel engine;
 - c) A hydraulic oil reservoir, complete with suction and return filtration;
 - d) An integral seawater cooling system, complete with intake strainer, engine-driven circulation pump, and heat exchanger;
 - e) All flexible hoses, valves, manifolds, and fittings required to form closed circuits with the connected equipment and protect against overpressurization; and
 - f) All instrumentation and controls needed to monitor the performance of the diesel engine and hydraulic oil.
- 4.17.1.4. The Contractor must install the HPU below deck in the machinery space.
- 4.17.1.5. The Contractor must install the HPU in accordance with all OEM requirements. The Contractor is responsible for the integration of all cooling, fuel, instrumentation, and control equipment to yield a fully operational, hydraulic system.
- 4.17.1.6. The HPU must be located on or near the centreline of the SPAS for added stability.
- 4.17.1.7. The HPU must be skid mounted, with integral, load-rated lifting provisions on the skid to facilitate the safe removal of the HPU from the SPAS.
- 4.17.1.8. The HPU must be removable from the SPAS without cutting the deck.

4.17.2. DIESEL ENGINE

- 4.17.2.1. The diesel engine must be a commercial make and model currently supported in Canada.
- 4.17.2.2. The diesel engine must use a forced oil lubrication system.

- 4.17.2.3. The diesel engine must be liquid-cooled.
- 4.17.2.4. The diesel engine must be fitted with a wet exhaust system, complete with water-lift silencer and integral drain valve.
- 4.17.2.5. The diesel engine must be fitted with one or more aids to facilitate starting at low temperatures. Each cold starting aid should be automatically deactivated when the diesel engine is running.
- 4.17.2.6. All equipment and accessories paired with the diesel engine must be approved by the engine manufacturer.

4.17.3. HYDRAULIC PUMP

- 4.17.3.1. The hydraulic pump must be a fixed-displacement type. The Contractor may propose a variable displacement hydraulic pump for consideration by Canada.
- 4.17.3.2. The hydraulic pump must be a commercial make and model currently supported in Canada.
- 4.17.3.3. Each hydraulic pump must be self-lubricating, with no provision other than the circulating hydraulic oil.

4.17.4. HYDRAULIC OIL RESERVOIR

- 4.17.4.1. The Contractor must install the hydraulic oil reservoir below deck in an easily accessible location near the HPU.
- 4.17.4.2. The hydraulic oil reservoir must be non-integral to the vessel hull.
- 4.17.4.3. The hydraulic oil reservoir must be fabricated from aluminum or stainless steel.
- 4.17.4.4. The hydraulic oil reservoir must be sized to meet the rated flow demands of the hydraulic pump.
- 4.17.4.5. The hydraulic oil reservoir must be fitted with a replenishment port to facilitate filling, complete with tethered cap. The replenishment port must be accessible from the topside of the SPAS.
- 4.17.4.6. The Contractor must integrate a graduated sounding rod into the hydraulic oil reservoir to manually determine the oil level.
- 4.17.4.7. The hydraulic reservoir must be fitted with a suction strainer to remove sediment in the supply line.
- 4.17.4.8. The return line of the hydraulic reservoir must be fitted with a replaceable, in-line filter.

4.17.5. SEAWATER COOLING SYSTEM

- 4.17.5.1. The intake of the seawater cooling system must be connected to a seacock.

- 4.17.5.2. The open area of the intake strainer must be sized to satisfy the debris tolerance of the circulation pump and heat exchanger.
- 4.17.5.3. The intake strainer must be fabricated from aluminum or stainless steel.
- 4.17.5.4. The discharge of the seawater cooling system must be connected to the wet exhaust system.

4.17.6. CONTROL AND SYSTEM PROTECTION

- 4.17.6.1. The Contractor must supply and install all instrumentation and controls specified in 4.25.3.
- 4.17.6.2. All fitted pressure relief valves must discharge to the hydraulic reservoir, or to the low pressure leg of the hydraulic run.
- 4.17.6.3. All fitted pressure control valves must reseal after the excess fluid pressure is relieved.

4.18. OIL RECOVERY SYSTEM

4.18.1. GENERAL CONSIDERATIONS

- 4.18.1.1. The Contractor must supply and install a proven, variable speed, oil recovery system. The Contractor is responsible for the plumbing and integration of all equipment to yield a fully operational, oil recovery system.
- 4.18.1.2. The oil recovery system must be a commercial make and model that is currently supported in Canada, and will continue to be supported in Canada for the foreseeable future.
- 4.18.1.3. The oil recovery system must be hydraulically driven by the HPU.
- 4.18.1.4. The oil recovery system must be hydraulically lowered into and raised from the water.
- 4.18.1.5. The Contractor must supply a heavy-duty, fitted fabric cover to protect the oil recovery system during transit and storage, complete with a means for securing it in place.

4.18.2. DESIGN AND CONFIGURATION

- 4.18.2.1. The oil recovery system must comprise one or more rotating, oleophilic surfaces to interface with the water and recover oil. Oil must readily adhere to and be retained by each oleophilic surface until it can be removed.
- 4.18.2.2. The oil recovery system must be designed or readily adaptable on scene to recover the following oil types:
 - a) Very light oils and sheens;
 - b) Light oils, such as diesel or jet fuel;
 - c) Medium oils, such as lube or fresh crude oil; and
 - d) Heavy oils and emulsions.

- 4.18.2.3. The oil recovery system must incorporate mechanical provisions to achieve the following outcomes:
 - a) Reduce the effect of the bow wave on recovery performance when the SPAS is making way; and
 - b) Allow for recovery operations when the SPAS is stationary.
- 4.18.2.4. The oil recovery system must segregate and retain recovered, oiled debris without easily clogging.
- 4.18.2.5. The oil recovery system must incorporate one or more synthetic rollers or scrapers to remove recovered oil from the oleophilic surface(s).
- 4.18.2.6. The force applied by the synthetic rollers or scrapers onto the oleophilic surface(s) must be adjustable to optimize recovery operations.
- 4.18.2.7. The synthetic rollers or scrapers must be easily changeable in the field.

4.18.3. HULL INTEGRATION

- 4.18.3.1. The oil recovery system must be integrated on the centreline of the vessel.
- 4.18.3.2. The oil recovery system must be located amidships to minimize the relative motion between its leading edge and the encountered oil layer.
- 4.18.3.3. The oil recovery system must be stowed and secured parallel to the main deck for transit, so as to not obstruct forward visibility from the wheelhouse.

4.18.4. CONTROL

- 4.18.4.1. The Contractor must supply and install the controls specified in 4.25.4, both on the wheelhouse console and at a dedicated control station on the foredeck.
- 4.18.4.2. The foredeck control station must provide a clear view of the operation of the oil recovery system.
- 4.18.4.3. The foredeck control station must provide a safe position for the operator to stand.

4.19. RECOVERED OIL STORAGE SYSTEM

4.19.1. DESIGN AND CONFIGURATION

- 4.19.1.1. The Contractor must incorporate three recovered oil storage tanks below deck. Topside access must be provided for each storage tank to facilitate decontamination.
- 4.19.1.2. The recovered oil storage tanks must be integral to the hull.
- 4.19.1.3. The recovered oil storage tanks must be arranged amidships, with a centre storage tank flanked by port and starboard wing storage tanks.

- 4.19.1.4. The total combined volume of the three recovered oil storage tanks must be a minimum of 4.0 cubic metres (m³).
- 4.19.1.5. The recovered oil storage tanks must be interconnected to redistribute oil amongst the tanks and equalize loading.
- 4.19.1.6. The recovered oil storage tanks must be vented to prevent vapour lock during transfer operations. Each vent head must be fitted with a spark arrestor and backflow preventer.

4.20. OIL TRANSFER SYSTEM

4.20.1. GENERAL CONSIDERATIONS

- 4.20.1.1. The Contractor must supply a submersible, positive displacement, oil transfer pump.
- 4.20.1.2. The oil transfer pump must be a commercial make and model currently supported in Canada, and will continue to be supported in Canada for the foreseeable future.
- 4.20.1.3. The oil transfer pump must be hydraulically driven by the HPU.
- 4.20.1.4. The Contractor must install the oil transfer pump in the lowest point in the centre storage tank. The Contractor is responsible for the plumbing and integration of all equipment to yield a fully operational oil transfer system.

4.20.2. DISCHARGE PORT

- 4.20.2.1. The discharge of the oil transfer pump must be piped above deck to a 3 inch, 90 degree, elbow fitting.
- 4.20.2.2. The elbow fitting must be offset from the deck using a standpipe to facilitate the connection and disconnection of discharge hoses.
- 4.20.2.3. The discharge elbow must terminate with a 3 inch, male, cam-locking coupling half (as specified in 4.7.6.1).
- 4.20.2.4. The 3 inch, male, cam-locking coupling half must be fitted with a dust cap (as specified in 4.7.6.4), and a lanyard to prevent cap loss.

4.21. SEAWATER WASHDOWN SYSTEM

4.21.1. GENERAL CONSIDERATIONS

- 4.21.1.1. The Contractor must supply and install a seawater washdown system. The Contractor is responsible for the plumbing and integration of all equipment to yield a fully operational, seawater washdown system.

- 4.21.1.2. At a minimum, the seawater washdown system must comprise the following components:
 - a) An intake strainer;
 - b) A reversible, washdown pump; and
 - c) A non-collapsible, deck hose and nozzle.
- 4.21.1.3. The seawater washdown system must be configured to support the following operations:
 - a) Suction seawater from the intake seacock and discharge through the deck hose; and
 - b) Suction oil from the deck hose and discharge into the recovered oil storage tanks.

4.21.2. INTAKE STRAINER

- 4.21.2.1. The open area of the intake strainer must be sized to satisfy the debris tolerance of the washdown pump.
- 4.21.2.2. The intake strainer must be fabricated from aluminum or stainless steel.
- 4.21.2.3. The intake strainer must be easily removable to empty debris.

4.21.3. WASHDOWN PUMP

- 4.21.3.1. The washdown pump must be a commercial make and model currently supported in Canada.
- 4.21.3.2. The washdown pump must be hydraulically driven by the HPU.
- 4.21.3.3. The washdown pump must be fitted below deck in the machinery space.
- 4.21.3.4. The washdown pump must be self-priming.

4.21.4. DECK HOSE AND NOZZLE

- 4.21.4.1. The Contractor must size the length of the deck hose (and nozzle spray) to easily reach the entire deck area.
- 4.21.4.2. The nominal inner diameter of the deck hose must be 1.5 inches.
- 4.21.4.3. The Contractor must fit a reel to the exterior of the wheelhouse to stow the deck hose and nozzle when not in use.

4.22. ELECTRICAL SYSTEM

4.22.1. DESIGN AND LAYOUT

- 4.22.1.1. The SPAS must be fitted with a reliable and voltage-stabilized, 12 V_{DC} electrical generation and distribution system. The design of this marine electrical system must comply with the following Standards (and all subject Standards referenced therein):
 - a) CSA C22.2 No. 183.2-M1983 (R2013), DC Electrical Installations on Boats; and
 - b) TP 1332, Construction Standards for Small Vessels (04/2010).

- 4.22.1.2. The electrical system must be a two-wire, ungrounded type, with insulated feed and return paths.
- 4.22.1.3. The electrical system must be sized to satisfy all SPAS electrical load requirements.
- 4.22.1.4. The electrical system must allow for battery switching and isolation in the event of a battery or alternator failure.
- 4.22.1.5. At a minimum, the Contractor must supply Canada with the following documentation to delineate the electrical system:
 - a) Single-line drawings of the complete electrical installation, reflecting the actual loads of all equipment to be fitted;
 - b) Block diagrams, and wiring and connection diagrams for all systems or circuits requiring electrical power, including all pertinent operational and control logic;
 - c) Installation drawings for all major equipment, including main wireway routes and wireway penetration details;
 - d) Cable schedules, indicating the location, connection, size, and overall length of all required cables;
 - e) Electrical load analysis for the installed equipment, reflecting prospective loading under summer day, winter night, and emergency conditions;
 - f) A short-circuit analysis to estimate the prospective short-circuit current and main distribution points of the electrical system; and
 - g) A protective device discrimination analysis to determine the trip settings for effective load disconnection under short-circuit fault conditions.
- 4.22.1.6. The electrical system must be approved by Canada prior to installation.

4.22.2. INSTALLATION AND INTEGRATION

- 4.22.2.1. The Contractor must supply all electrical equipment, cable, hardware, fixtures, and fittings required to furnish a fully operational, electrical system.
- 4.22.2.2. The Contractor must install all electrical equipment, cable, hardware, fixtures, and fittings in accordance with OEM requirements. The Contractor is fully responsible for the integration and testing of the complete electrical system.
- 4.22.2.3. All fitted electrical equipment must be installed so that electromagnetic interference (EMI) has no consequence on the operation of the magnetic compass, navigational appliances, communications equipment, and the electrical system.
- 4.22.2.4. The Contractor must supply Canada with updated versions of all previously submitted drawings to reflect the final, “as-fitted” condition of the electrical system.

4.22.3. BATTERIES

- 4.22.3.1. The Contractor must supply and fit the SPAS with three (3), dual purpose (i.e., starting and cycling), marine batteries to start the following engines:
 - a) Port side, outboard engine;
 - b) Starboard side, outboard engine; and
 - c) HPU diesel engine.
- 4.22.3.2. Each battery must be located as close as possible to their respective engine.
- 4.22.3.3. Each battery must employ a low maintenance and heavy-duty construction.
- 4.22.3.4. The nominal discharge voltage of each battery must be 12 V_{DC}.
- 4.22.3.5. The nominal cold cranking amperage (CCA) rating of each battery must be at least 750.
- 4.22.3.6. The discharge capacity of each battery must be sized to meet the performance and endurance requirements specified herein. The results of the electrical load analysis must be used to confirm the adequacy of the selected batteries to supply the final load requirements.

4.22.4. BATTERY BOXES AND CONNECTIONS

- 4.22.4.1. The Contractor must supply and fit a dedicated battery box to house each battery.
- 4.22.4.2. Each battery box must be securely attached to the vessel structure.
- 4.22.4.3. The starting and charging cable connections to each battery terminal must be secured with self-locking hardware.

4.22.5. ALTERNATORS

- 4.22.5.1. Each engine on board the SPAS must be fitted with an alternator to recharge its respective battery.
- 4.22.5.2. The output voltage of each alternator must be consistent with the charging voltage recommended by the battery OEM.
- 4.22.5.3. The charging capacity of each alternator must be sized to meet the performance and endurance requirements specified herein. The results of the electrical load analysis must be used to confirm the adequacy of the selected alternator(s) to recharge the fitted batteries.
- 4.22.5.4. The Contractor must supply and install a means to isolate the fitted batteries from each other when they are not.

4.22.6. DISTRIBUTION PANELS

- 4.22.6.1. The Contractor must supply and install no more than three distribution panels to organize and power fitted equipment. The internal, main copper bus must be rated for the panel size.
- 4.22.6.2. Each circuit must be protected by an individual, waterproof breaker. The results of the electrical load analysis must be used to confirm the breaking capacity of each breaker.
- 4.22.6.3. All inline fuses furnished on an equipment power cable must be removed and replaced with an equivalent-sized breaker (excluding those fuses on engine wiring harnesses).
- 4.22.6.4. All breakers must be the combined power switching and circuit protection type.
- 4.22.6.5. All breakers must be fitted with guards to prevent accidental tripping or activation.
- 4.22.6.6. A circuit identification label must be fitted adjacent to each feeder circuit breaker to indicate the following information, at a minimum:
 - a) System voltage;
 - b) Circuit number;
 - c) Circuit breaker size;
 - d) Circuit function (or load information); and
 - e) OFF and ON positions.
- 4.22.6.7. Each distribution panel must accommodate a minimum of three spare breakers.

4.22.7. CABLES

- 4.22.7.1. Unless otherwise specified by Canada, the Contractor must use marine-grade, tinned boat cable in the provided electrical system.
- 4.22.7.2. All cables must be appropriately sized to satisfy voltage drop requirements, and de-rated for the ambient temperature applicable to their installed location.
- 4.22.7.3. The Contractor must use special cables, as specified by the equipment manufacturer, for all antenna leads, radio, and navigation systems. All coaxial transmission cables used in the SPAS must be Times LMR195 or equivalent (i.e., Draka or Suhner); RG58 and RG8X coaxial transmission cables are specifically prohibited.

4.22.8. CABLE INSTALLATION

- 4.22.8.1. Cables must be routed as directly as possible on fore to aft running wireways. Branch lines must be routed at right angles (i.e., port to starboard) to the main runs.
- 4.22.8.2. Cables must be installed point-to-point, without splices or joints.
- 4.22.8.3. Cables must be neatly grouped and supported by racks, trays, hangers, or clamps. All cable support systems must be attached directly to the vessel structure, and withstand the dynamic forces and vibrations of the vessel.

- 4.22.8.4. Cables must be secured with stainless steel straps at least every 0.5 m. Fire-resistant cable restraints must be used between the metal straps.
- 4.22.8.5. Stud clips must be installed for all single cables that branch off of a cable support system to a specific piece of equipment.
- 4.22.8.6. All cable penetrations of a watertight boundary, deck, bulkhead, or other exposed surface must maintain the watertight integrity of the structure. An adaptable core, waterproof cable gland must be used at such transitions.
- 4.22.8.7. Smooth collars must be used at all other cable penetrations. Additional mechanical protection must be provided for all cable runs susceptible to chafing.

4.22.9. CABLE TERMINATIONS AND IDENTIFICATION

- 4.22.9.1. Cables must be terminated inside equipment enclosures. Termination connections must provide support and strain relief for each cable.
- 4.22.9.2. Cables must be permanently labelled at each end with a unique identifier that corresponds to the accompanying wiring diagram(s). For example, aluminum cable tags, ferrules, or shrink tubing with mechanically-applied lettering are appropriate means of labelling.
- 4.22.9.3. Unless otherwise specified by Canada, cables must terminate with solderless, crimped, compression-type cable lugs. Twist-on type connectors are specifically prohibited.
- 4.22.9.4. Coaxial cables must terminate with crimp-sleeve type connectors. PL259 solder-on connectors and Shakespeare Centre Pin no-solder connectors are specifically prohibited.

4.22.10. RECEPTACLES

- 4.22.10.1. The Contractor must supply and install the following marine-grade, accessory power outlets at the following locations:
 - a) A minimum of one, 12V_{DC} power outlet on the wheelhouse console;
 - b) A minimum of two, universal serial bus (USB) power outlets on the wheelhouse console; and
 - c) A minimum of two, watertight, 12 V_{DC} power outlets on the front exterior of the wheelhouse, towards the port and starboard sides.

4.23. LIGHTING

4.23.1. INTERIOR LIGHTING

- 4.23.1.1. The wheelhouse interior must be furnished with a light emitting diode (LED) dome light for general nighttime illumination.
- 4.23.1.2. The LED dome light must be installed in the centre of the wheelhouse deckhead or inside the roof pan.
- 4.23.1.3. The LED dome light must be switchable between white and red light.

4.23.2. EXTERIOR LIGHTING

- 4.23.2.1. The Contractor must supply and install five, LED, marine-grade floodlights in the following locations:
 - a) A single, LED floodlight on each corner of the wheelhouse roof pan (four total), situated to illuminate the fore and aft deck spaces; and
 - b) One, LED floodlight at the bow of the SPAS, situated to illuminate the forward operating area of the oil recovery subsystem.
- 4.23.2.2. The forward facing, aft facing, and bow floodlights must be wired such that they can be illuminated separately (i.e., placed on dedicated circuits).
- 4.23.2.3. Switches for the deck floodlights must be installed on the wheelhouse console.

4.23.3. SEARCH LIGHTS

- 4.23.3.1. The Contractor must supply two handheld searchlights.
- 4.23.3.2. Each searchlight must use a minimum 55 W, xenon high intensity discharge (HID) lamp.
- 4.23.3.3. Each searchlight must be fitted with a minimum 3 m, coiled power cord.
- 4.23.3.4. Each searchlight power cord must terminate with a marine plug compatible with the sockets specified in 4.22.10.

4.23.4. NAVIGATIONAL LIGHTING

- 4.23.4.1. The Contractor must supply and install navigational lighting that satisfies all applicable requirements in C.R.C., c. 1416, Collision Regulations. The Contractor is responsible for testing the navigational lighting system to conform that the arcs of visibility of the installed lights satisfy regulatory requirements.
- 4.23.4.2. The navigational lights must be independent of all other circuits. Switches for the navigational lights must be installed on the wheelhouse console.
- 4.23.4.3. The navigational lights must be permanently mounted.
- 4.23.4.4. The navigational lights must be mounted so as not to interfere with the vision of the operator.

4.24. DOMESTIC SERVICES

4.24.1. WHEELHOUSE HEATING

- 4.24.1.1. The Contractor must supply and install a heater unit in the wheelhouse, complete with all piping, fittings, and wiring required for its operation.
- 4.24.1.2. The heater unit must interface with the HPU coolant loop specified in 4.17.5.

- 4.24.1.3. The heater grill face or vent(s) must be fitted on the wheelhouse console in such a manner to encourage an even distribution of heat.
- 4.24.1.4. The heater unit must be equipped with a control on the wheelhouse console that allows for variable blower speed operation

4.24.2. WHEELHOUSE VENTILATION

- 4.24.2.1. The Contractor must supply and install an electric fan in the wheelhouse.
- 4.24.2.2. The electric fan must pivot or rotate about a central point to allow the operator to alter the direction of its airflow.
- 4.24.2.3. The electric fan must be equipped with a control on either itself or the wheelhouse console that allows the operator to vary its speed.

4.24.3. HULL COMPARTMENT VENTILATION

- 4.24.3.1. The hull design must provide adequate ventilation to all hull compartments and voids.
- 4.24.3.2. Air intakes for the machinery and equipment compartment must be located to preclude down flooding. These intakes must be fitted with provisions to allow for the effective discharge of the fire suppression system.

4.24.4. SCUPPERS AND DRAINS

- 4.24.4.1. The deck must be fitted with drains that discharge freestanding water directly overboard.
- 4.24.4.2. The deck drains must be fitted with removable drain plugs (on stainless wire lanyards) to prevent water ingress.

4.25. CONTROLS AND INSTRUMENTATION

4.25.1. GENERAL CONFIGURATION

- 4.25.1.1. The Contractor must arrange and install an ergonomic console inside the wheelhouse to mount control, communication, and monitoring equipment. At a minimum, the Contractor must ensure:
 - a) Components are grouped logically and conveniently, according to function and operational priorities;
 - b) Components are easily removable for maintenance;
 - c) All fitted controls, switches, gauges, or displays are unambiguous, accessible, and easy to use from the operator position;
 - d) Controls are marked with an arrow that indicates the direction of movement that will result in an increased response;
 - e) Toggle switches are fitted with a telltale or pilot light to indicate when the switch has been activated or moved to an ON position;

- f) Gauges are marked with the normal operating range, in addition to abnormal or dangerous conditions; and
- g) Adequate cooling air is provided for all electronic equipment to ensure its proper operation.

- 4.25.1.2. The Contractor may locate panels and controls on the deckhead of the wheelhouse, provided that such items are within easy reach of the operator.
- 4.25.1.3. The Contractor must provide progressive, dimming control for all illuminated instrumentation in the wheelhouse. Such dimming control must be independent from the compass illumination.
- 4.25.1.4. The proposed arrangement of the wheelhouse console must be approved by Canada prior to installation.

4.25.2. OUTBOARD ENGINES

- 4.25.2.1. The Contractor must rigidly mount the helm pump (specified in 4.14.1) on the starboard side of the wheelhouse console to eliminate all fore, aft, and lateral movement of the steering wheel.
- 4.25.2.2. The steering wheel fitted to the helm pump must be a stainless steel, destroyer-style construction.
- 4.25.2.3. The Contractor must supply and install a dual lever, engine control head on the starboard side of the wheelhouse.
- 4.25.2.4. Each lever must provide manual control of both the throttle and shifting of one of the mounted outboard engines. Throttle and shifting connections to each outboard engine must be made via push-pull cables.
- 4.25.2.5. The engine control head must allow for the independent trim and tilt of each mounted outboard engine.
- 4.25.2.6. At a minimum, the Contractor must supply and install a standard outboard engine instrumentation package that comprises the following components:
 - a) A tachometer for each outboard;
 - b) An running hour meter for each outboard;
 - c) A voltmeter for each outboard;
 - d) An audible and visual outboard engine alarm for high coolant water temperature;
 - e) An audible and visual outboard engine alarm for low lubricating oil pressure; and
 - f) A gasoline fuel tank level indicator.
- 4.25.2.7. The Contractor must install a three position start switch to activate the outboard engines. The three position start switch should be keyless. If a keyless start switch is unavailable, the Contractor must permanently attach keys to the wheelhouse console such that they cannot be easily removed.

- 4.25.2.8.** The outboard engine controls must be fitted with a dead-man (kill) switch and lanyard for the emergency shutdown of each outboard engine. The emergency shutdown feature must be located in the immediate vicinity of the operator.

4.25.3. HYDRAULIC POWER UNIT

- 4.25.3.1.** At a minimum, the Contractor must supply and install an HPU instrument package on the wheelhouse console that comprises the following components:
- a) A tachometer;
 - b) A running hour meter;
 - c) A voltmeter;
 - d) An audible and visual diesel engine alarm for high coolant water temperature
 - e) An audible and visual diesel engine alarm for low coolant water flow;
 - f) An audible and visual diesel engine alarm for low lubricating oil pressure;
 - g) A diesel fuel tank level indicator;
 - h) An analog gauge to monitor the pressure of the HPU hydraulic oil; and
 - i) An analog gauge to monitor the temperature of the HPU hydraulic oil.
- 4.25.3.2.** The Contractor must install a keyless, three-position start switch on the wheelhouse console to activate the diesel engine.
- 4.25.3.3.** The Contractor must install a throttling valve on the wheelhouse console to control the engine speed of the HPU.

4.25.4. OIL RECOVERY SYSTEM

- 4.25.4.1.** The Contractor must install hydraulic control valves (or a control manifold) to vary the operating speed of the oil recovery system, oil transfer system, and seawater washdown system.
- 4.25.4.2.** The Contractor must install a toggle switch to raise and lower the oil recovery system.

4.25.5. BILGE PUMPS

- 4.25.5.1.** The electric bilge pumps must be equipped with controls on the wheelhouse console that allow for MOMENTARY ON-OFF-AUTOMATIC operation.
- 4.25.5.2.** The MOMENTARY ON operation of the electric bilge pumps must require direct intervention from the operator, with some provision to deactivate the bilge pumps if the operator steps away from the wheelhouse console.
- 4.25.5.3.** An indicator light must be fitted on the wheelhouse console that illuminates when any bilge pump has activated.
- 4.25.5.4.** An audible, high level bilge water alarm must be installed in the wheelhouse.

- 4.25.5.5. The audible, high level bilge water alarm should be fitted with a provision that allows it to be temporarily silenced when annunciating.

4.25.6. BATTERIES

- 4.25.6.1. The Contractor must supply and install a battery voltmeter on the wheelhouse console that can cycle between all fitted batteries.
- 4.25.6.2. The battery voltmeter must be equipped with a low voltage alarm.
- 4.25.6.3. The Contractor must supply and install a battery switch that allows the operator to connect (or disconnect) each fitted battery to (or from) the DC distribution system.
- 4.25.6.4. The Contractor must supply and install battery switches that allow for emergency battery paralleling in the event of a single dead battery.

4.26. NAVIGATIONAL APPLIANCES AND EQUIPMENT

4.26.1. GENERAL CONSIDERATIONS

- 4.26.1.1. The Contractor must supply all navigational appliances, equipment, and associated hardware prescribed by Canadian Regulations and the requirements specified herein.
- 4.26.1.2. The Contractor must install, integrate, and commission all navigational appliances, equipment, and associated hardware in accordance with the respective OEM requirements. The proposed arrangement of all electronics must be approved by Canada prior to installation.
- 4.26.1.3. The Contractor must use an authorized representative of each navigational appliance or equipment manufacturer to inspect and verify the installation prior to conducting sea trial(s) and delivery.

4.26.2. MAGNETIC COMPASS

- 4.26.2.1. The SPAS must be fitted with one, illuminated, dimmable, magnetic compass.
- 4.26.2.2. The dial size of the magnetic compass must be at least 4.5 inches.
- 4.26.2.3. The magnetic compass must be mounted near the centreline of the wheelhouse console and in easy view of the operator.
- 4.26.2.4. The magnetic compass must be swung and properly compensated by a certified compass adjuster once SPAS fabrication and fitting is complete.

4.26.3. DEPTH TRANSDUCER

- 4.26.3.1. The SPAS must be fitted with one, Airmar P319 depth transducer.
- 4.26.3.2. The Airmar P319 depth transducer must provide the keel clearance of the SPAS to the Simrad NSS9 evo3 multi-function display.

4.26.4. AUTOMATIC IDENTIFICATION SYSTEM

- 4.26.4.1. The SPAS must be fitted with one, Simrad NAIS400 Class B automatic identification system (AIS) transceiver.
- 4.26.4.2. The Simrad NAIS400 Class B AIS transceiver must be installed in a protected location within the wheelhouse console.
- 4.26.4.3. The Simrad NAIS400 Class B AIS transceiver must provide navigational information to the Simrad NSS9 evo3 multi-function display through the NMEA 2000 bus.
- 4.26.4.4. The Simrad NAIS400 Class B AIS transceiver must be connected to the following antennas mounted on the wheelhouse roof:
 - a) Simrad NAIS400 global positioning system (GPS) antenna, using the manufacturer supplied cable; and
 - b) Shakespeare 5215 very high frequency (VHF) antenna, using the coaxial cable and connectors specified in 4.22.7.

4.26.5. MULTI-FUNCTION DISPLAY

- 4.26.5.1. The SPAS must be fitted with one, Simrad NSS9 evo3 multi-function display.
- 4.26.5.2. The Simrad NSS9 evo3 multi-function display must be mounted in (or on) the console, in a location that is both convenient for the operator and does not interfere with the operation, use, or sight of other controls or indicators.
- 4.26.5.3. The Simrad NSS9 evo3 multi-function display must interface with the navigation inputs from the Airmar P319 depth transducer and Simrad NAIS400, Class B AIS transceiver.
- 4.26.5.4. The Simrad NSS9 evo3 multi-function display must provide GPS information to the Standard Horizon GX5500 VHF digital selective calling (DSC) radio through the NMEA 0183 bus.

4.26.6. HORN

- 4.26.6.1. The SPAS must be fitted with one, electric horn.
- 4.26.6.2. The electric horn must be actuated by a spring-loaded switch on the wheelhouse console.

4.26.7. RADAR REFLECTOR

- 4.26.7.1. The wheelhouse roof must be fitted with a tube-style, cage mountable radar reflector.
- 4.26.7.2. The reflective area of the radar reflector must be at least 2 square metres (m²).

4.27. COMMUNICATIONS EQUIPMENT

4.27.1. GENERAL CONSIDERATIONS

- 4.27.1.1.** The Contractor must supply all communications equipment and associated hardware prescribed by Canadian Regulations and the requirements specified herein.
- 4.27.1.2.** The Contractor must install, integrate, and commission all communications equipment and associated hardware in accordance with the respective OEM requirements. The proposed arrangement of all electronics must be approved by Canada prior to installation.
- 4.27.1.3.** The Contractor must use an authorized representative of each equipment manufacturer to inspect and verify the installation prior to conducting sea trial(s) and delivery.

4.27.2. VHF MARINE RADIO

- 4.27.2.1.** The SPAS must be fitted with one, Standard Horizon GX5500S VHF DSC radio. Canada will be responsible for the Marine Mobile Service Identity (MMSI) registration of this radio.
- 4.27.2.2.** The Standard Horizon GX5500S VHF DSC radio must be mounted into (or on) an overhead bulkhead, or on the wheelhouse console.
- 4.27.2.3.** The Standard Horizon GX5500S VHF DSC radio must be interfaced with the navigation input from the Simrad NSS9 evo3 multi-function display.
- 4.27.2.4.** The Standard Horizon GX5500S VHF DSC radio must be connected to a Comrod AV60P8 antenna using the coaxial cable and connectors specified in 4.22.7.
- 4.27.2.5.** The Comrod AV60P8 antenna must be mounted on the wheelhouse roof, using a suitable antenna mount and 12 inch antenna extension to place it above the GPS antenna(s).
- 4.27.2.6.** The Standard Horizon GX5500S VHF DSC radio must be connected to the following speakers:
 - a) One, externally-powered speaker, mounted adjacent to the radio in the wheelhouse; and
 - b) One, external, marine public announcement (PA) speaker, centred and mounted on the front edge of the wheelhouse roof.
- 4.27.2.7.** Both speakers specified in 4.27.2.6 must be placed on the same breaker as the Standard Horizon GX5500S VHF DSC radio.

4.27.3. GOVERNMENT FURNISHED EQUIPMENT

- 4.27.3.1.** The Contractor must reserve sufficient space to accommodate a Motorola APX8500 radio, complete with a 02 Control Head and Standard Horizon MLS 310B speaker. Space must be reserved in the following locations to allow Canada to install this government furnished equipment (GFE):
 - a) In the wheelhouse console to mount the transceiver;

- b) In (or on) an overhead bulkhead, or on the wheelhouse console to mount the control head and speaker;
- c) In the transit between the wheelhouse interior and the wheelhouse roof to run two coaxial feedlines;
- d) On the wheelhouse roof to mount a VHF antenna; and
- e) On the wheelhouse roof to mount an ultra-high frequency (UHF) antenna.

4.27.3.2. The Contractor must provide a spare breaker to accommodate the equipment specified in 4.27.3.1.

4.28. SAFETY EQUIPMENT

4.28.1. GENERAL CONSIDERATIONS

- 4.28.1.1.** The Contractor must supply and fit all safety equipment for a vessel of this size prescribed by The Small Vessel Regulations and the requirements specified herein.
- 4.28.1.2.** All safety equipment must be Canadian approved or meet Canadian approval requirements (e.g., Transport Canada or the United States Coast Guard).

4.28.2. FIRST AID KIT

- 4.28.2.1.** The Contractor must supply one, Type A first aid kit. The contents of a Type A first aid kits are defined in SOR/2010-120, Maritime Occupational Health and Safety Regulations.
- 4.28.2.2.** The Contractor must locate the first aid kit within the wheelhouse where it is easily accessible.
- 4.28.2.3.** The stowage location of the first aid kit must clearly identified by a conspicuous sign

4.28.3. PERSONAL LIFE SAVING APPLIANCES

- 4.28.3.1.** The Contractor must equip the SPAS with four, adult-sized lifejackets. The final mounting or stowage location(s) of the lifejackets are subject to the approval of Canada.
- 4.28.3.2.** The Contractor must supply one buoyant heaving line that is at least 15 m in length. One end of the buoyant heaving line must be fitted with a soft, buoyant mass.
- 4.28.3.3.** The Contractor must supply one lifebuoy attached to a buoyant heaving line.
- 4.28.3.4.** The lifebuoy and attached heaving line must be mounted on the outside of the wheelhouse.

4.28.4. FIRE SAFETY

- 4.28.4.1.** The Contractor must equip the SPAS with the following marine-certified, fire extinguishers:
 - a) One, Type 2A:10B:C portable fire extinguisher, that is certified for marine use, located inside the wheelhouse; and

b) One, Type 10B:C portable fire extinguisher, that is certified for marine use, located near the entrance to the below deck machinery space.

- 4.28.4.2. The Contractor must supply and install a fire suppression system for the below deck machinery space. The Contractor is responsible for the integration of all fire detection and alarming equipment to complement the fire suppression system.
- 4.28.4.3. The Contractor must fit the SPAS with all fire detection equipment and alarms, as prescribed by SOR/2010-91, Small Vessel Regulations.
- 4.28.4.4. The Contractor must equip the SPAS with one metal fire bucket, complete with a minimum of 3 m of line. The final mounting or stowage location of the fire bucket and line is subject to the approval of Canada.
- 4.28.4.5. The Contractor must equip the SPAS with one fire axe. The final mounting or stowage location of the fire axe is subject to the approval of Canada.

4.28.5. VISUAL SIGNALS

- 4.28.5.1. The Contractor must equip the SPAS with two, heavy-duty, LED flashlights.
- 4.28.5.2. Each flashlight must be watertight and designed specifically for marine use.
- 4.28.5.3. Each flashlight must be powered by alkaline batteries. The Contractor must equip each flashlight with fresh alkaline batteries before delivery to Canada.
- 4.28.5.4. The Contractor must equip the SPAS with the following minimum quantities of pyrotechnic distress signals:
 - a) Six, Type B signals (i.e., multi-star rocket); and
 - b) Six, Type C signals (i.e., hand-held).
- 4.28.5.5. Each supplied pyrotechnic distress signal must be manufactured within three months of the date of delivery of the SPAS to Canada.

4.28.6. EMERGENCY POSITION INDICATING RADIO BEACON

- 4.28.6.1. The SPAS must be equipped with a 406 megahertz (MHz) emergency position indicating radio beacon (EPIRB).
- 4.28.6.2. The EPIRB must be located inside the wheelhouse near the operator position.
- 4.28.6.3. The EPIRB must be easily released from its stowage mount.

4.29. LABEL PLATES, NAMEPLATES, AND NOTICES

4.29.1. GENERAL CONSIDERATIONS

- 4.29.1.1.** The Contractor must supply and install label plates to identify all fitted equipment, tanks, vents, fill connections, valves, hoisting points, and towing points. These label plates must indicate all safe working limits or maximum capacities, as applicable. Label plates for oil recovery, storage, and transfer equipment must delineate safety precautions, as well as the appropriate start-up, operational, and emergency procedures.
- 4.29.1.2.** Unless otherwise specified by Canada, all label plates must be fabricated from aluminum. Label plates used inside the wheelhouse, on the wheelhouse console, and inside electrical closures may be fabricated from laminated plastic.
- 4.29.1.3.** All label plates must be machine engraved with bevelled edges.
- 4.29.1.4.** All label plates must be secured with reusable fasteners.
- 4.29.1.5.** All label plates must convey the necessary information in both Canadian English and French.
- 4.29.1.6.** The fabrication, content, and arrangement of all label plates must be approved by Canada prior to installation.

4.29.2. BUILDER'S NAMEPLATE

- 4.29.2.1.** The Contractor must supply and fit a Builder's Nameplate in the wheelhouse of the SPAS, on the trailer, and on the ship cradle. The Builder's Nameplate must be fitted in a conspicuous location wherever it is installed.
- 4.29.2.2.** The Builder's Nameplate must be made of a weather resistant material that is compatible with its adjoining surface.
- 4.29.2.3.** The following information must be permanently etched into the Builder's Nameplate:
 - a) National Asset Code (to be assigned by Canada);
 - b) Naval architect or designer;
 - c) Builder;
 - d) Hull number;
 - e) Year of construction; and
 - f) Lightship displacement (in kilograms).
- 4.29.2.4.** The Builder's Nameplate must convey all required information in both Canadian English and French languages.

4.30. PAINTING AND COATINGS

4.30.1. GENERAL CONSIDERATIONS

- 4.30.1.1.** Unless otherwise specified by Canada, the hull exterior, hull interior, deck, and wheelhouse must be left unpainted.
- 4.30.1.2.** The Contractor must apply a non-skid coating or texture to all exposed deck surfaces.

4.31. TRAILER

4.31.1. GENERAL CONSIDERATIONS

- 4.31.1.1.** Unless otherwise specified by Canada, the Contractor must supply one, heavy-duty trailer to launch, recover, and transport each SPAS.
- 4.31.1.2.** The trailer must safely operate on paved, gravel, and dirt roadways under the environmental conditions specified herein. These roadways may contain severe washboard, potholes, rough terrain, or any combination thereof.
- 4.31.1.3.** The trailer must comply with all provincial and territorial requirements for an unescorted, oversize load.
- 4.31.1.4.** The GVWR of the trailer must be less than 4,500 kg. The GVWR includes the complete, outfitted trailer, laden with the SPAS in the normal load (transit) condition.

4.31.2. VEHICLE SAFETY REGULATIONS

- 4.31.2.1.** Each trailer must comply with all applicable requirements in the following Regulations:
 - a) C.R.C., c. 1038, Motor Vehicle Safety Regulations; and
 - b) TP 14117, Trailers: Federal Lighting Equipment Location Requirements (2007).
- 4.31.2.2.** Each trailer must carry the National Safety Mark (NSM).

4.31.3. FRAME AND OUTFITTING

- 4.31.3.1.** The trailer must be an all-welded, reinforced, aluminum construction.
- 4.31.3.2.** The trailer must be fitted with rollers and side guard rails that completely conform to the shape of the SPAS hull.
- 4.31.3.3.** The trailer must support the centered mass of the SPAS such that the tongue weight is between 8 to 15% of the total load.
- 4.31.3.4.** The trailer must be fitted with enclosed fenders that can support a minimum mass of 100 kg from the topside. The rear of each fender must be fitted with a mud flap to protect the SPAS from road damage.

4.31.4. SUSPENSION AND AXLES

- 4.31.4.1. The trailer must be fitted with a tandem axle configuration.
- 4.31.4.2. The trailer must be fitted with an underslung, leaf-type suspension system.
- 4.31.4.3. Both axles and the suspension system must be rated at the trailer GVWR plus 15%.
- 4.31.4.4. One axle of the trailer must be fitted with a commercial hubometer to facilitate vehicle usage tracking.
- 4.31.4.5. Each wheel bearing must be fitted with stainless steel, grease nipples.

4.31.5. BRAKE SYSTEM

- 4.31.5.1. The trailer must be fitted with an operator-controlled, electric-over-hydraulic disc brake system. The brake system must comprise stainless steel rotors, calipers, and mounting brackets, in addition to ceramic brake pads.
- 4.31.5.2. The brake system must be fitted with provisions that allow for fresh water flushing.

4.31.6. WHEEL ASSEMBLY

- 4.31.6.1. The trailer must be fitted with radial tires that are mounted on six-bolt, galvanized steel rims. The tires must be approved for trailer use, and appropriately sized for the trailer GVWR and towing speed.
- 4.31.6.2. The Contractor must supply and fit a matching, full-size, spare tire (on rim) at the front of the trailer.
- 4.31.6.3. The Contractor must supply two commercial wheel chocks to prevent accidental movement.

4.31.7. LIGHTING SYSTEM

- 4.31.7.1. The trailer must be equipped with a submersible, LED, brake and turn signal lighting system. The Contractor must recess or otherwise protect lights from damage on the trailer frame.
- 4.31.7.2. The trailer lighting system must interface with the tow vehicle electrical system using a 7-way, recreational vehicle-style, round connector.
- 4.31.7.3. The 7-way, round connector must extend a minimum of 1 m beyond the trailer tongue.

4.31.8. CARGO ANCHOR POINTS

- 4.31.8.1. The trailer must be fitted with a manual, two-speed, bow winch assembly.
- 4.31.8.2. The Contractor must supply one, heavy-duty, nylon winch strap, complete with safety hook. The nylon strap and safety hook must be rated for the intended load.

- 4.31.8.3. The trailer must be fitted with sufficient and appropriately arranged, cargo anchoring points to prevent the forward, lateral, and rearward movement of the SPAS during transport.
- 4.31.8.4. Unless otherwise specified by Canada, the Contractor must supply ratchet tie down straps, with hooks, for each cargo anchoring point. The ratchet tie down straps must be rated for the intended load.
- 4.31.8.5. The front of the trailer must be fitted with a provision to secure a turnbuckle to the bow of the SPAS. The Contractor must supply a rated, turn buckle for this purpose.

4.31.9. TOW VEHICLE ATTACHMENTS

- 4.31.9.1. The Contractor must bolt a 2-5/16 inch, Class III compliant, ball coupler to the trailer frame. The Contractor may propose an appropriate pintle hitch for consideration by Canada.
- 4.31.9.2. The trailer must be fitted with two, galvanized safety chains and shackles. The free ends of each safety chain must be fitted with a clevis hook connector, complete with integral latch.
- 4.31.9.3. All safety chains, shackles, and clevis hook connectors must be sized and rated for the anticipated trailer load.
- 4.31.9.4. The trailer must be fitted with sway control equipment that is rated for the trailer GVWR.

4.31.10. ACCESSORIES

- 4.31.10.1. The trailer must be equipped with a heavy-duty tongue jack, complete with an integral swivel wheel.
- 4.31.10.2. The lifting capacity of the tongue jack must be at least 20% of the trailer GVWR.
- 4.31.10.3. The tongue jack must pivot about its connection point to the trailer frame to allow for stowage, parallel to the trailer tongue, during transport.
- 4.31.10.4. The trailer must be fitted with an integral bunk or tool box to house the following road hazard related equipment:
 - a) A lug wrench and bottle jack;
 - b) A spare winch strap; and
 - c) A spare wheel hub, complete with bearings and grease.
- 4.31.10.5. The trailer must be fitted with a rear-mounted, license plate holder.

4.32. SHIP CRADLE

4.32.1. GENERAL CONSIDERATIONS

- 4.32.1.1. Unless otherwise specified by Canada, the Contractor must supply one, heavy-duty ship cradle for each SPAS.

- 4.32.1.2. The ship cradle must be an all-welded, reinforced, aluminum construction.
- 4.32.1.3. The ship cradle must be fitted with cargo anchoring devices that are arranged in such a manner to prevent forward, lateral, and rearward movement of the SPAS.
- 4.32.1.4. The Contractor must supply a ratchet tie down strap (with hooks) for each cargo anchoring device.
- 4.32.1.5. The ship cradle frame must be fitted with a minimum of eight, heavy-duty, load-rated eyes for mounting chain and binders.

4.33. SHIPPING AND DELIVERY

4.33.1. GENERAL CONSIDERATIONS

- 4.33.1.1. Prior to shipping, the SPAS must be secured on its respective trailer, cleaned, preserved, and covered as per the requirements defined herein.
- 4.33.1.2. All bilges must be dry, and free of oil and debris.
- 4.33.1.3. All fuel tanks must be full and treated with fuel stabilizers.
- 4.33.1.4. The outboard engines must be preserved (in accordance with manufacturer recommendations) for storage up to one year in an environment that will be subjected to temperatures below 0°C.
- 4.33.1.5. All batteries must be disconnected.
- 4.33.1.6. A warning plate must be tied to the steering wheel, indicating that the vessel has been protected for shipping and storage and must not be started until the outboard engines have been reactivated.
- 4.33.1.7. All contact points with the SPAS must be padded.
- 4.33.1.8. The SPAS must be shrink-wrapped to offer protection during shipping and storage.

APPENDIX A WELD TESTING AND INSPECTION

- A.1. All welds must be subjected to 100% visual inspection. Visual inspection must precede examinations by any other methods required herein.
- A.2. All visual inspection must be performed, and the results reported, by an individual certified by CWB to CSA W178.2-2018, Certification of Welding Inspectors, Level 2 or 3.
- A.3. The Contractor must make provisions to perform penetrant and radiographic examinations in accordance with Table 1.

Table 1: Weld inspection requirements for new construction vessels (<12 m LOA)

Method	Number of examinations required
	Aluminum vessels
Penetrant testing (PT) 1000 mm	$0.50 \times (L+B+D)$
Radiographic testing (RT) 440 mm – butts or seams 300 mm × 300 mm – intersecting butts and seams	$1.00 \times (L+B+D)$
where: L is the overall length [m]; B is the greatest moulded breadth [m] and D is the moulded depth at side, measured at L/2 [m].	

- A.4. When access does not permit the use of a 300 mm by 300 mm film size at intersecting butts and seams, a series of films must be positioned to offer examination of 150 mm of the weld in all directions.
- A.5. Penetrant and radiographic examination personnel must be certified by Natural Resources Canada (NRCan) as meeting the qualification requirements of CAN/CGSB 48.9712-2014, Non-Destructive Testing (NDT): Qualification and Certification of Personnel, Level 2 or 3. For a company located outside of Canada, certification by other national certifying bodies to equivalent national standards (in lieu of CAN/CGSB 48.9712-2014) is acceptable.
- A.6. Visual inspection procedures must generally comply with the requirements of ASME BPVC.V-2017: Non-Destructive Examination, and CSA W59.2-18, Welded Aluminum Construction.
- A.7. Penetrant and radiographic examination procedures must generally comply with the requirements of ASME BPVC.V-2017: Non-Destructive Examination, and CSA W59.2-18, Welded Aluminum Construction.
- A.8. For a company located outside of Canada, visual inspection and non-destructive examination procedures written to other equivalent national standards (in lieu of ASME BPVC.V-2017 and CSA W59.2-2018) are acceptable.
- A.9. Inspection procedures and personnel qualification certificates must be filed with Canada prior to performing inspections of any type.

- A.10. The acceptance criteria for visual inspection and penetrant and radiographic examination must be in accordance with CSA W59.2-2018, Welded Aluminum Construction, with the following exceptions:
- a. Pores open to the surface are not permitted in any weld; and
 - b. Undercut is not permitted in any weld.
- A.11. For a company located outside of Canada, weld acceptance criterion to other equivalent national standards are acceptable.
- A.12. The selection of the locations of the PT and RT inspections will be of the butts and seams of the plating of the primary ship structure being taken at the sole discretion and direction of Canada. The primary ship structure is taken as the part of the vessel hull structure which forms the primary hull girder, including structure to resist ice loadings. It consists of strength decks, platforms and shell plating and their supporting framing, tank top, vertical keel, and longitudinal and main transverse bulkheads. In addition to the primary hull girder, water-, oil-, and gas-tight bulkheads must be considered part of the primary hull structure. Radiographic inspection developed wet film and digital images must be provided to and become the property of Canada.
- A.13. For each inspection method, a copy of the current year qualification certificate of the examining individual must be attached to the initial interpretation or verification report supplied to Canada. If a new validation year is entered or if a different individual is used, new qualification certificates must be supplied, with any subsequent interpretation report being submitted.
- A.14. Inspection procedures and techniques are to be prepared by Level 3 personnel for each inspection method required herein, and submitted to Canada prior to performing any inspections of completed work.
- A.15. Procedures for radiographic inspection must follow the requirements of ASME BPVC.V-2017, Non-Destructive Examination, Article 2, or equivalent.
- A.16. Digital Image Acquisition and evaluation is the preferred technique; however:
- a. Procedures may be for the use of imaging plates (CR) or direct (DR) digital (no analog conversion).
 - b. When imaging plates or direct digital is not possible or available, film radiography must be used.
 - c. When film radiographic techniques are used, all cassettes (film holders) must be double loaded (minimum) with film of same type or class.
- A.17. For PT and RT inspections, weld profiles and contours must be sufficiently smooth to ensure that geometric conditions do not cause false indications. Transitions from weld reinforcement (root or cap) must transition smoothly into the base metal so as to not produce indications which could lead to misinterpretation of indications.
- A.18. Prior to inspection by any method, welds and adjacent areas must be cleaned so as to be free from all primer, paint, weld spatter, and other foreign matter to enable accurate interpretation of the area of interest (weld zone).
- A.19. Staging and lighting must be provided to permit safe access for inspection.

- A.20. Welds to be examined by liquid penetrant and radiographic test methods must be subjected to third party visual inspection first. A formal report must then be issued by the certified inspector.
- A.21. If the surfaces and geometric conditions of the weld to be examined by any inspection method is such that it may or would interfere with the interpretation of the area of interest (weld zone), welds must be dressed smooth or flush to the satisfaction of the NDT certified inspector and Canada prior to the weld inspections being carried out.
- A.22. All linear and volumetric indications (acceptable, unacceptable, or otherwise) must be characterized and described on the original inspection interpretation report by the certified examiner that performed the original examination.
- A.23. All indications of defects must be categorized as to type (i.e., porosity, inclusion, lack of fusion, or crack).
- A.24. All surface indications must be categorized as to type and dimensioned for size (i.e., porosity diameter, crack length). Position relative to weld centreline must be noted.
- A.25. All repairs must be documented fully indicating the dimensional size (i.e., length, depth, and width of excavation) and position using the same reference as the originally recorded position.
- A.26. All repaired areas must be re-inspected using the same inspection method as the original inspection. Where the indications were detected with surface methods (PT), the repair area must undergo additional inspection utilizing volumetric methods (RT)
- A.27. All excavations for repairs must be inspected after excavation and prior to re-welding to ensure complete removal of the indication.
- A.28. When a discontinuity extends to either or both ends of a location being inspected, additional overlapping inspection must be required. The overlapping inspection must show a portion of the original end.
- A.29. When an overlapping inspection displays unacceptable discontinuities at either or both ends, the entire weld length must be considered unacceptable unless proven otherwise by the Contractor. Under this condition, welds must be repaired to the extent required by Canada.
- A.30. All overlapping inspections must be taken prior to repair of the originally rejected location. If repair has occurred prior to overlapping inspections and the entire weld length has not been repaired, the overlapping inspections must be placed to overlap the start and finish of the repair.
- A.31. When an unacceptable discontinuity fails to extend to either or both ends of a location being inspected, additional inspection of the same length within the same weld at a position as designated by Canada must be inspected.
- A.32. When an unacceptable discontinuity is detected in the additional inspection length, the entire weld must be considered unacceptable until proven otherwise.
- A.33. The Contractor is responsible for all costs associated with performing overlapping and additional inspections, as a result of discontinuities detected in the original inspections.

- A.34. For each failed location, one new location must be examined. All new locations must be selected by Canada. Each new location must be considered in addition to the requirements herein. All costs associated with performing the additional inspections must be incurred at the expense of the Contractor.
- A.35. Unacceptable welds must be removed, and the joint re-welded and re-inspected by the same original testing method. Care must be taken to ensure that the inspection of the repaired area is accurately located, so that it measures the original location that was rejected.
- A.36. When an entire weld, base material, entire part, or entire section contains unacceptable discontinuities as specified herein, no corrective action must be taken until the repair procedure has been agreed to by Canada.
- A.37. Inspection reports must be prepared and filed by the Quality Department of the Contractor and made available to Canada. At a minimum, reports must record the date of inspection; Builder or Contractor's name; vessel type and hull number; Owner's name; name of the inspection organization; inspection procedure number; interpretation report number; item; location; all discontinuities (including single and accumulated indications); weld acceptance criteria; location of discontinuities; and the name, qualification, level, and signature of the individual(s) performing the inspection and interpretation. Inspection reports must reference material type, thickness, joint type, and geometry.
- A.38. When a portion of a weld is to be inspected by liquid penetrant or radiographic methods, the location must be subjected to visual inspection in advance of the other inspection method. Interpretation reports are required for both inspection methods.
- A.39. The Contractor must implement a system of documentation which links the initial inspection report (individual serialization) to the excavation report (individual serialization) to the re-inspection report (individual serialization):
- Original inspection: PT (Weld ID) XXX-1
- Original inspection: UT (Weld ID) XXX-1
- If repair is required:
- PT (Weld ID) XXX-G1 PT (G=Grind/Gouge): PT inspected and cleared
- RT (Weld ID) XXX-R1 RT (R= Re-inspect RT): Re-weld and re-inspect RT
- A.40. The Contractor must prepare an adequate number of non-destructive inspection arrangement drawings and sketches that accurately document the location of the inspections.
- A.41. The inspection method, weld identification number, and abbreviations for each inspection must be accurately recorded on a progressive basis. A legend detailing the identification symbols used by the Contractor must appear on each arrangement drawing.
- A.42. The Contractor must supply updated NDT arrangement drawings to Canada on a regular basis throughout the contract period. The final drawings must be supplied to Canada electronically at contract completion.

Part 3.2
Technical Bid Evaluation Plan

**Environmental Response Equipment Modernization/
Mobile Incident Command Equipment Project**

Self-Propelled Advancing Skimmer

TECHNICAL BID EVALUATION PLAN
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APPENDIX A MANDATORY CRITERIA

Item no.	Mandatory Requirement	Contract reference	Method of Compliance	Initials	Compliant (Y/N)?
M1	The overall length (LOA) of the SPAS must be between 9.0 metres (m) and 10.7 m.	TSOR 4.1.1.1.	<p>To demonstrate compliance with Mandatory requirements M1, M2, M3, M4, M5, and M6, the Bid must include the following two items:</p> <p>1) A complete set of preliminary engineering drawings for a proposed SPAS unit that demonstrate compliance with requirements M1 through M6. The provided drawing(s) must clearly convey all requisite information needed for the manufacture and assembly of a SPAS, including, at a minimum:</p> <ul style="list-style-type: none"> i. All measurements and components of the proposed SPAS including at a minimum overall length, overall beam, overall draft, trailer dimensions, and total volume of recovered oil tanks; ii. Date of issue; iii. Units of measure; iv. Drawing scale; v. Dimensioned features; vi. Assembly notes; and vii. Author of drawing. <p>2) A table indicating how the proposed SPAS trailer complies with all provincial and territorial requirements for an unescorted, oversize load.</p>		
M2	The overall beam (BOA) of the SPAS must be between 2.6 m and 3.05 m.	TSOR 4.1.1.2.			
M3	The overall draft of the SPAS must be no greater than 1.7 m in a normal load (skimming) condition, with the outboard engines and oil recovery subsystem lowered.	TSOR 4.1.1.3.			
M4	The height of the SPAS must be no greater than 4.15 m when placed on its trailer, and after all hinged or collapsible items are lowered.	TSOR 4.1.1.4.			
M5	The total combined volume of the three recovered oil storage tanks must be a minimum of 4.0 cubic metres (m ³).	TSOR 4.19.1.4.			
M6	The trailer must comply with all provincial and territorial requirements for an unescorted, oversize load.	TSOR 4.31.1.3.			

TECHNICAL BID EVALUATION PLAN
APPENDIX A

Item no.	Mandatory Requirement	Contract reference	Method of Compliance	Initials	Compliant (Y/N)?
M7	<p>The SPAS must be developed from a Parent Skimmer design that is currently road transportable in Canada (without escort vehicle accompaniment) and in satisfactory operation, with a minimum of 1,000 cumulative operating hours. The Parent Skimmer design must comprise a hull that is built around (or constitutes) the oil recovery, storage, and offloading systems to serve the identified mission profile. After modification, the inherent volume and deck area, stability characteristics, lightweight and deadweight distribution, and reserve buoyancy of the Parent Skimmer design must satisfy the requirements specified in the TSOR.</p>	<p>TSOR 4.2.5.1.</p>	<p>The Bid must include the following two items:</p> <p>1) Documentation from customers validating that their Parent Skimmer design complies with requirement M7.</p> <p>For each customer, the Bidder must provide:</p> <p>a) A quality acceptance letter* on the customer letterhead that contains, at a minimum, the following information:</p> <ol style="list-style-type: none"> i. A comment on the delivery and quality acceptance of the purchased Parent Skimmer(s); ii. A brief description of the work performed using the Parent Skimmer(s) (including cumulative operating hours), with reference to the supporting invoice(s); iii. The time (month and year) when the contract was awarded <u>AND</u> completed; iv. Contact information (name, address, phone number and email address) for the customer; and v. A signature from an authorized representative of the customer corroborating the content of the quality acceptance letter. <p>b) All supporting invoices* that clearly identify the following information:</p> <ol style="list-style-type: none"> i. Date of invoice issue; ii. Delivery date(s) of the Parent Skimmer (s) iii. Customer name; and iv. Associated quantity of Parent Skimmer(s) sold. <p>*The provided quality acceptance letter must be associated with the provided invoices. For example, if the letters are from Customer A and Customer B, the invoices provided must be from Customer A and Customer B.</p> <p><u>AND</u></p> <p>2) A table identifying how the Parent Skimmer will be modified in order to comply with each TSOR requirement. For each TSOR requirement the Bidder must either confirm that the requirement is met in their Parent Skimmer design or provide a description indicating how their Parent Skimmer design will be modified in order to meet the requirement.</p>		

TECHNICAL BID EVALUATION PLAN
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Item no.	Mandatory Requirement	Contract reference	Method of Compliance	Initials	Compliant (Y/N)?
M8	<p>The nameplate recovery rate of the fitted oil recovery system must be at least 1 m3 per hour for each of the following oil types:</p> <p>a) Light oils, such as diesel or jet fuel; and</p> <p>b) Medium oils, such as lube or fresh crude oil.</p>	TSOR 4.2.6.2.	<p>The Bid must include the following two items:</p> <p>1) A description, including the test conditions, test procedure, and test results which have been used in the past to measure the performance of the fitted oil recovery system. The test parameters must include the following at a minimum:</p> <ul style="list-style-type: none"> i. The system must be advancing at a minimum of 1 knot ii. The system must achieve a minimum 50% throughput efficiency (the percentage of oil which is collected relative to the total amount of oil encountered) iii. The test must be performed in ASTM F625 Type II – Protected Waters iv. The test must be conducted with at least one oil type ranging in viscosity from light to medium oil <p><u>AND</u></p> <p>2) Certification from an accredited registrar or accredited certification body confirming the validity of the test data provided in 1).</p>		

TECHNICAL BID EVALUATION PLAN
APPENDIX A

Item no.	Mandatory Requirement	Contract reference	Method of Compliance	Initials	Compliant (Y/N)?
M9	<p>The Quality Management System of the entity (or entities) performing the manufacture and the Quality Management System of the entity (or entities) performing the integration* of the SPAS must comply with the requirements of ISO 9001:2015, Quality Management Systems.</p> <p>* Assembly of manufactured components in order to create the complete system</p>	Quality Management	<p>The Bid must clearly identify each entity that will be performing any manufacturing and integration of the SPAS.</p> <p>For each identified entity WITH ISO 9001 certification, the Bid must include:</p> <ol style="list-style-type: none"> 1) A current and valid ISO 9001 certificate from an accredited Registrar that shows the manufacture and integration* of all SPAS components is within the entity's scope of registration <p>AND</p> <ol style="list-style-type: none"> 2) A Quality Assurance Manual that delineates the processes and procedures used by the entity to manufacture or integrate SPAS components. <p>For each identified entity WITHOUT ISO 9001 certification, the Bid must include:</p> <ol style="list-style-type: none"> 1) A Quality Assurance Manual that delineates the processes and procedures used by the entity to manufacture and integrate all SPAS components <p>AND</p> <ol style="list-style-type: none"> 2) A matrix identifying the section, and page and/or paragraph number in the entity's Quality Assurance Manual that clearly demonstrates how the processes and procedures used by the entity to manufacture and integrate all SPAS components align with the elements of the ISO 9001:2015, Quality Management Systems Standard. 		

APPENDIX B RATED CRITERIA

Item no.	Rated Criteria	Evaluation Factor/Reference	Evaluation	Evaluation Scale	Max Score
R1	<p>The nameplate recovery rate of the fitted oil recovery system must be at least 1 m³ per hour for each of the following oil types:</p> <ul style="list-style-type: none"> a) Light oils, such as diesel or jet fuel; and b) Medium oils, such as lube or fresh crude oil. <p>1 m³ per hour is the minimum mandatory requirement as per TSOR 4.2.6.2., but additional points will be given to systems that demonstrate better recovery rates.</p>	TSOR 4.2.6.2.	<p>The Bid must include the following two items:</p> <ol style="list-style-type: none"> 1) A description, including the test conditions, test procedure, and test results which have been used in the past to measure the performance of the fitted oil recovery system. The test parameters must include the following at a minimum: <ol style="list-style-type: none"> i. The system must be advancing at a minimum of 1 knot ii. The system must achieve a minimum 50% throughput efficiency (the percentage of oil which is collected relative to the total amount of oil encountered) iii. The test must be performed in ASTM F625 Type II – Protected Waters iv. The test must be conducted with at least one oil type ranging in viscosity from light to medium oil <p>AND</p> <ol style="list-style-type: none"> 2) Certification from an accredited registrar or accredited certification body confirming the validity of the test data provided in 1). 	<p>Recovery Rate = 1m³ per hour = 1 point</p> <p>1 m³ per hour < Recovery Rate ≤ 2m³ per hour = 20 points</p> <p>2 m³ per hour < Recovery Rate ≤ 3m³ per hour = 30 points</p> <p>3 m³ per hour < Recovery Rate ≤ 4m³ per hour = 40 points</p> <p>Recovery Rate > 4m³ per hour = 50 points</p>	50 points

TECHNICAL BID EVALUATION PLAN
APPENDIX B

Item no.	Rated Criteria	Evaluation Factor/ Reference	Evaluation	Evaluation Scale	Max Score
R2	<p>The entity (or entities) performing the manufacture of the Self-Propelled Advancing Skimmer and the entity (or entities) performing the integration of the Self-Propelled Advancing Skimmer must have successfully manufactured* Parent Skimmers for a minimum of two different customers, with each contract clearly satisfying the following terms:</p> <ol style="list-style-type: none"> 1) Delivery (or deliveries) constituting a minimum of two (2) Parent Skimmer within a one (1) year period and within the last ten (10) years; and 2) The customer must be from one of the following categories: <ol style="list-style-type: none"> a. Petroleum extraction, transportation, and distribution industry; b. Marine spill Response Organization; or c. Government department or agency. <p>*Met delivery and quality requirements as stipulated in the contract.</p>	Proven Experience	<p>For each completed contract, the Bid must include:</p> <ol style="list-style-type: none"> 1) A quality acceptance letter* on the customer letterhead that contains, at a minimum, the following information: <ol style="list-style-type: none"> i. A comment on the delivery and quality acceptance of the purchased Parent Skimmer(s); ii. A brief description of the work performed, with reference to the supporting invoice(s); iii. The time (month and year) when the contract was awarded AND completed; iv. Contact information (name, address, phone number and email address) for the customer; and v. A signature from an authorized representative of the customer corroborating the content of the quality acceptance letter. <p>AND</p> <ol style="list-style-type: none"> 2) All supporting invoices* that clearly identify the following information: <ol style="list-style-type: none"> i. Date of invoice issue; ii. Delivery date(s) of the Parent Skimmer (s) iii. Customer name; and iv. Associated quantity of Parent Skimmer(s) sold. <p>*The provided quality acceptance letter must be associated with the provided invoices. For example, if the letters are from Customer A and Customer B, the invoices provided to demonstrate the quantity of Parent Skimmers sold within 1 year must be from Customer A and Customer B.</p>	<p>≤ 4 Parent Skimmers = 1 point</p> <p>5 to 6 Parent Skimmers = 10 points</p> <p>7 to 8 Parent Skimmers = 20 points</p> <p>9 to 10 Parent Skimmers = 30 points</p> <p>11 to 12 Parent Skimmers = 40 points</p> <p>≥ 13 Parent Skimmers = 50 points</p>	50 points